Lizard Management Plan

Bangor Village

Hughes Developments Limited

Prepared for: Hughes Developments Limited
Project: Bangor Village
Deliverable: Lizard Management Plan

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Revision No:	Date:	Details:
0	03/07/2026	Draft for client review
1	07/07/2026	Rev1 draft for client review
2	07/07/2026	Final

This report ('report') has been prepared by Effects Management Ecology Ltd ('EME') on behalf of Hughes Developments ('the Client') for the Bangor Village subdivision (the 'Project') and in accordance with the agreed offer of service between EME and the Client, dated 19 March 2026. This report has relied upon data and information supplied by the Client and or the Project team, along with publicly accessible sources available at the time of writing. The findings within this report are accurate and though Site conditions or wildlife composition are subject to change over time, a precautionary approach and professional opinion have been used to ensure the findings are as accurate as possible. This report may be relied on by the expert panel appointed to determine the substantive application for the Project under the Fast-track Approvals Act 2024. EME does not accept any liability for any unauthorised use or reliance on information within this report.

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ABBREVIATIONS

ACO	Artificial cover object
AR-D	At Risk - Declining
CGS	Canterbury grass skink
DOC	The Department of Conservation
EME	Effects Management Ecology Ltd
GMT	G-minnow Trap
HSE	Health, Safety and Environment
LEF	Lizard exclusion fence
LMP	Lizard Management Plan
LRA	Lizard Release Area
m	metre
m^2	Square metre
MCS	McCann's skink
MSQA	Management, Surveillance, Quality and Assurance
NCO	Natural cover object
NPS-IB	National Policy Statement for Indigenous Biodiversity
NT	Not Threatened
PFT	Pitfall trap
PH	Principal Herpetologist
PM	Project Manager
PTC	Percentage trap catch
SGS	Southern grass skink
SHC	Supervised habitat clearance
SQEH	Suitably qualified and experienced herpetologist
TEcIA	Terrestrial Ecological Impact Assessment
UHC	Unsupervised habitat clearance
WAA	Wildlife Act Authority
WC	Works Contractor

GLOSSARY

Active trap range	The area around a lizard survey or salvage device, assumed to be within the range of attracting a lizard, defined as a 2.5m radius around a device based on industry standard device densities of 5m spacing.
Actual or potential habitat	Areas demarcated as confirmed or likely to support indigenous lizard species on-site.
Brumation	A state of sluggishness or inactivity in reptiles.
Buffer zone	The area around habitat that must be avoided to ensure Project-related effects to not adversely affect protected lizards.
Discrete area	A separate, distinct, or unconnected area of lizard habitat.
Disturbance	Project-related affects that may result in an adult bird vacating or abandoning an active nest.
Ectotherm	Refers to animals that rely on external environmental sources to regulate their body temperature.
Effects management hierarchy	Means an approach to managing the adverse effects of an activity on indigenous biodiversity that requires that: a) Adverse effects are avoided where practicable; then b) Where adverse effects cannot be avoided, they are minimised where practicable; then c) Where adverse effects cannot be minimised, they are remedied where practicable; then d) Where more than minor residual adverse effects cannot be avoided, minimised or remedied, biodiversity offsetting is provided where possible; then e) Where biodiversity offsetting of more than minor residual adverse effects is not possible, biodiversity compensation is provided; then f) If biodiversity compensation is not appropriate, the activity itself is avoided.
Grass skink	Any species of skink currently or previously within the *Oligosoma polychroma* complex, including synonyms and recent taxonomic updates (i.e.: *Oligosoma* aff. *polychroma* Clade 4 & *O. chionochloescens*).
Habitat suitability assessment	A high-level walkthrough assessment, performed by a suitably qualified and experienced herpetologist, to determine if habitats are suitable to support populations of indigenous lizards.
High-quality (lizard) habitat	Areas of habitat likely to support lizards at a relatively high abundance.
Incidental death	The unintentional killing of protected species (lizards) following the implementation of all reasonable measures.
Lizard habitat	Areas demarcated as either high- or low-quality habitat, confirmed, likely or possible to support populations of indigenous lizards.
Lizard management period	Period between 1 October and 31 April.
Low-quality (lizard) habitat	Areas of habitat possible to support lizards at a relatively low abundance.
Percentage trap catch	Trap catch is the percentage of lizards caught over the total number of trapping occasions.
Project Herpetologist	The named herpetologist on the Wildlife Act Authority, tasked with implementing this Lizard Management Plan.
Suitable trap day	A day where daily environmental factors are favourable for lizard activity and therefore trapping, typically defined as when daily temperatures are greater than 15°C with little or no rain within the lizard management period.
Suitably qualified and experienced herpetologist	A professional terrestrial ecologist with a background and expertise (at least 5 years) in conducting lizard salvage operations.
Suitably qualified ecologist	A qualified ecologist with suitable training to perform tasks under the supervision (direct or remote) of the Project Ecologist or Project Herpetologist.
Supervised habitat clearance	Slow methodical removal of habitat by excavator, under the direct supervision and guidance of the Project Herpetologist or a suitably qualified ecologist, to actively catch lizards that may still be present within habitat following lizard trapping.

Trap nights	A period of time from when a lizard survey or salvage device is deployed for approximately 24 hours, overnight.
Trapped area	The total area combining all active trap ranges from devices deployed.
Valid trap day	Seasonal and daily weather
Zone of Influence	The area in which Project-related effects can be expected to impact ecological features.

SUMMARY OF KEY POINTS

- This LMP must be implemented by a suitably qualified and experienced herpetologist.

- Between the granting of the authority under the Wildlife Act 1953 and the commencement of Project works, routine farming activities undertaken on-site (including grazing) should continue in duration and intensity.

- As soon as possible, but at least 10 working days prior to the commencement of the Project, a meeting (preferably on-site) should be held with the Project Manager, Works Contractor and the Project Herpetologist to discuss the Wildlife Act Authority and the implementation of this Lizard Management Plan, the overall approach to the Project (including staging).
    - At that meeting, the Project Herpetologist must provide a detailed briefing to the Works Contractor on the lizards which may be encountered on-site and the actions which must be followed in accordance with the Wildlife Act Authority, if lizards are identified, and to ensure clarity on the Lizard Management Plan implementation with regard to other Ecological and/or Environmental Management Plans (i.e.: the Bird Management Plan / the Sediment and Erosion Control Plan etc).

- The lizard release area must be established in the dryland ecosystem area in Reserve 816 and 817 during the first stage of the Project works. In addition;
    - The lizard release area must have landscape design input from the Project Herpetologist to ensure the plants, hardscape and layout achieves high-quality habitat for all indigenous lizards expected to be salvaged from the Site.
    - Once the lizard release area is established, predator control must be undertaken within the lizard release area, in accordance with this Lizard Management Plan.
    - No lizards may be relocated to the lizard release area until the Project Herpetologist has confirmed in writing to the Consent Holder that the area is suitable for receiving lizards.

- Prior to any works being undertaken within 5m of lizard habitat demarcated in this Lizard Management Plan:
    - The Project Herpetologist must undertake a habitat suitability assessment to reconfirm the presence of lizard habitat within that area.
    - Where no lizard habitat is present, the Project Herpetologist will confirm in writing to the Consent Holder where Project works may progress without lizard management.
    - Where lizard habitat is reconfirmed, lizard management in accordance with this Lizard Management Plan must be completed.
    - Following completion of lizard management, the Project Herpetologist will confirm in writing to the Consent Holder that Project works may progress in that area.
    - Lizard management must be implemented and completed during appropriate weather conditions and within the lizard management period as defined within the Lizard Management Plan.

- If lizard management is planned for commencement within October, artificial cover objects must be installed at least 8 weeks prior (i.e.: within August).

1 INTRODUCTION

1.1 PURPOSE AND SCOPE

Effects Management Ecology Ltd (EME) was engaged by Hughes Developments Limited to perform a Terrestrial Ecological Assessment (TEcIA) to support a substantive application under the Fast-track Approvals Act 2024 for the proposed Bangor Village residential development in Darfield (Effects Management Ecology Ltd, 2026) (the Project). The substantive application seeks resource consents under the Resource Management Act 1991 (RMA) and a Wildlife Act Authority under the Wildlife Act 1953 (Wildlife Act) to authorise the Project.

As outlined within TEcIA, the Project site is approximately 133ha and is located at 160 Bangor Road, Darfield (the Site).

The TEcIA confirmed the presence of Canterbury grass skink (*Oligosoma* aff. *polychroma* Clade 4) on-site and within the zone of influence (ZOI). There is a low likelihood that skink species' may be present on-site (Effects Management Ecology Ltd, 2026).

All indigenous lizards are absolutely protected under the Wildlife Act 1953 (New Zealand Government, 2025). As lizards are not highly mobile, they are at risk of being killed during impacts to their habitat. Lizard management must therefore be conducted under a Wildlife Act Authority (WAA) by a suitably qualified and experienced herpetologist (SQEH) to reduce the risk of harm to protected lizards. The WAA granted for the Project authorises the salvage and transfer of lizards from the Site in accordance with this Lizard Management Plan (LMP) and the incidental killing of lizards.

The management of effects to lizards, and lizard habitat, outlined within this LMP complies with the National Policy Statement for Indigenous Biodiversity (NPS-IB) (Ministry for the Environment, 2023). This LMP has been based on the guidelines for producing LMPs (Department of Conservation Lizard Technical Advisory Group, 2018) and the mitigation outlined in this LMP follows the Key principles for lizard salvage and transfer in New Zealand (Department of Conservation Lizard Technical Advisory Group, 2019), and considers reducing the impact of development on New Zealand lizards (Department of Conservation Lizard Technical Advisory Group, 2023), and the Guidelines for conservation-related translocations of New Zealand lizards, where appropriate (Department of Conservation Lizard Technical Advisory Group, 2018).

1.2 PROJECT AREA

The Site, defined within the associated TEcIA, will accommodate the Bangor Village Project. The Project proposes to develop a highly modified sheep and crop farm into a new residential neighbourhood, immediately west of Darfield, Canterbury (Figure 1).

Legend:

- Project boundary
- Irrigation race
  - Existing race
  - Proposed new race alignment
  - Proposed race section to be infilled
- State Highways
- NZ Topo 1-50k Property Titles
- ESRI Satellite

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0 50 100 150 200 250 m

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Figure 1: Site overview.

1.3 GOALS AND OBJECTIVES

The goals and objectives of this LMP are as follows:

- Avoid lizard habitat impacts as far as practicable on-site to achieve the Project outcomes.
- Avoid, as far as practicable, or otherwise minimise the risk of death of indigenous lizards during construction of the Project.
- Where impacts to lizard habitat cannot be avoided, minimising the impacts as far as practicable, unless those impacts are to enhance habitat or otherwise result in a positive outcome for lizards.
- Reduce impacts to native lizards and lizard habitat compared to current baseline conditions.
- Achieve a no net loss of native lizards within a short-term timescale.
- Create high-quality lizard habitat on-site, to result in a permanent increase in native lizard abundance.

1.3.1 Adherence to the Key Principles

This LMP adheres to the key principles of lizard salvage and transfer. A summary of how and where adherence has been applied is provided in Table 1.

Table 1: Key principles for lizard salvage and transfer, how they've been achieved and where.

Key Principles	Adherence actions	Location
Principle 1. Lizard species' values and site significance must be assessed at both the development and receiving sites	Lizard surveys were conducted on-site and within the two potential LRAs	TEcIA Section 5.3.1 LMP Section 1.4 & Section 2.2.1
Principle 2 Actual and potential development-related effects and their significance must be assessed	TEcIA has been completed, with actual and potential adverse effects to lizards and their habitats were assessed.	TEcIA Section 5.3.2 & Section 6.1.2
Principle 3 Alternatives to moving lizards must be considered	An on-site LRA is preferred to avoid moving lizards off-site.	LMP Section 2.2.1
Principle 4 Threatened lizard species require more careful consideration than less-threatened species	Lizard management outlined within this LMP meets previously accepted and endorsed mitigation by the Department of Conservation for the same At Risk species of lizard.	LMP Section 2.1 and Section 2.2
Principle 5 Lizard salvage, transfer and release must use the best available methodology	Lizard management outlined within this LMP utilise methodologies appropriate for the species and methodologies previously accepted and endorsed mitigation by the Department of Conservation.	LMP Section 2.2
Principle 6 Receiving sites and their carrying capacity must be suitable in the long term	LRAs have been assessed and are considered suitable to receive more than the expected lizards affected and sustain a population into the long-term.	LMP Section 2.2.1
Principle 7 Monitoring is required to evaluate the salvage operation	Post-salvage monitoring requirements are outlined within this LMP.	LMP Section 3
Principle 8	Salvage completion reporting and post-salvage monitoring reporting requirements are outlined within this LMP.	LMP Section 5

Key Principles	Adherence actions	Location
Reporting is required to communicate outcomes of salvage operations and encourage process improvements		
Principle 9 Contingency actions are required when lizard salvage and transfer activities fail	A salvage outcome assessment is outlined within this LMP	LMP Section 4

1.4 KEY SPECIES

The species included within this LMP include all indigenous lizards within the TEcIA identified as possible, likely, highly likely or confirmed to utilise habitats on-site or within the ZOI.

Based on fine level surveys conducted, habitats present and professional opinion, the 'At Risk – Declining' Canterbury grass skink (CGS) (*Oligosoma* aff. *polychroma* Clade 4) was confirmed as present, while southern grass skink (SGS) (*O. chionochloescens*), and the 'Not Threatened' McCann's skink (MCS) (*O. maccanni*) are considered possible to be present and may be affected by Project activities. Indigenous lizards included within this LMP and their National (Hitchmough, et al., 2026) & Regional (Lettink, et al., 2026) threat classifications are provided in Table 2.

Table 2: Indigenous lizards likely to utilise habitats on-site or within the ZOI.

Scientific name	Common English and/or Māori name	Threat classification
Oligosoma aff. *polychroma* Clade 4	Canterbury grass skink / mokomoko	AR-D
Oligosoma chionochloescens Syn: *O.* aff. *polychroma* Clade 5	southern grass skink / tussock skink / mokomoko	AR-D
Oligosoma maccanni	McCann's skink / mokomoko	NT

1.4.1 Lizard Habitat

Species within the grass skink complex (i.e.: CGS / SGS) occupy a wide range of habitat types from coastal to alpine zones, but prefer open areas including grassland, tussock, shrubland and modified agricultural habitats, where there is sufficient cover, but also inhabit coastal dune habitat, wetlands, rocky herbfields and stoney dry riverbed areas (New Zealand Herpetological Society, 2026 A) (New Zealand Herpetological Society, 2026 B).

The MCS typically occupies dry rocky and grassland environments from the lowlands up into subalpine regions, readily inhabiting rock tor systems, boulder fields, scree, rocky herbfield, tussock and exotic grasses (New Zealand Herpetological Society, 2026 C).

1.4.1.1 On-Site

Based on survey results, Site conditions and current baseline conditions, grassland along the 'east-west' portion of the irrigation race from the sheep yards to where the irrigation race runs south (Figure 2), provides low-quality habitat. The eastern portion of this area, south of Paddock 7 was confirmed to support indigenous lizards (Figure 41; Appendix A). Although unconfirmed and slightly disconnected, the rest of this area to and around the southern sheds near the sheep yards can be expected to support lizards also, though it is regularly sprayed with glyphosate.

Figure 2: Area of low-quality, confirmed lizard habitat, along irrigation watercourse.

Figure 3: Area of low-quality, unconfirmed lizard habitat, near the sheep yards. Note: this area was entirely killed by glyphosate by late April.

Although no lizards were trapped or evidence of lizard presence found within any other area on-site, several locations were found to have habitat that could support lizards. Site conditions and routine farm impacts such as sheep grazing and glyphosate spraying have reduced these areas to 'low-quality'. These areas include Paddock 20 (Figure 4), the Yards (Figure 5 & Figure 6), rank grass within the eucalyptus stand (Figure 7) and the irrigation between Paddocks 4 & 5 (Figure 8). For reference, Paddocks number are shown in Figure 41 (Appendix A).

Figure 4: Area of unconfirmed low-quality lizard habitat within Paddock 20.

Figure 5: Area of unconfirmed low-quality lizard habitat within the 'Yards' Paddock (14 April 2026).

Figure 6: Area of unconfirmed low-quality lizard habitat within the 'Yards' Paddock (28 April 2026). Note: moderate grazing impacts.

Figure 7: Area of unconfirmed low-quality lizard habitat within the eucalyptus stand. Note: killed by glyphosate spray.

Figure 8: Area of unconfirmed low-quality lizard habitat along the irrigation race between Paddocks 4 & 5. Note: killed by glyphosate spray.

A few areas of largely unimpacted rank grass along the driveway, east of Paddock 20 (Figure 41; Appendix A) are considered high-quality habitat, though no lizards were caught in a representative location within this area (Figure 9).

The areas on-site identified as high- or low-quality habitat are based on professional judgement and guided by the actual or potential to support populations of indigenous lizards, collectively identified as 'lizard habitat on-site'.

Figure 9: Example of unconfirmed high-quality lizard habitat between the driveway and Paddock 20.

A summary of lizard habitat on-site is provided in Table 3, and shown in Figure 10 to Figure 15.

Table 3: Actual and potential lizard habitat on-site.

Habitat type	Total (ha)
Low quality – confirmed lizard presence (adjacent to irrigation race)	0.0048
Low quality unconfirmed lizard presence – assumed present in very low abundance.	1.9844
High quality unconfirmed lizard presence – assumed present in very low abundance	0.0863
Total actual or potential lizard habitat on-site	**2.0755**

Legend:

Lizard habitat on-site

- Low-quality habitat (lizards confirmed)
- Low-quality habitat (lizards unconfirmed)
- High-quality habitat (lizards unconfirmed)
- Project boundary

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0 50 100 150 200 250 m

N

1:6,000

Figure 10: Lizard habitat on-site.

Legend:

Lizard habitat on-site

- Low-quality habitat (lizards unconfirmed)
- Project boundary

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0 10 20 30 40 50 m

1:1,500

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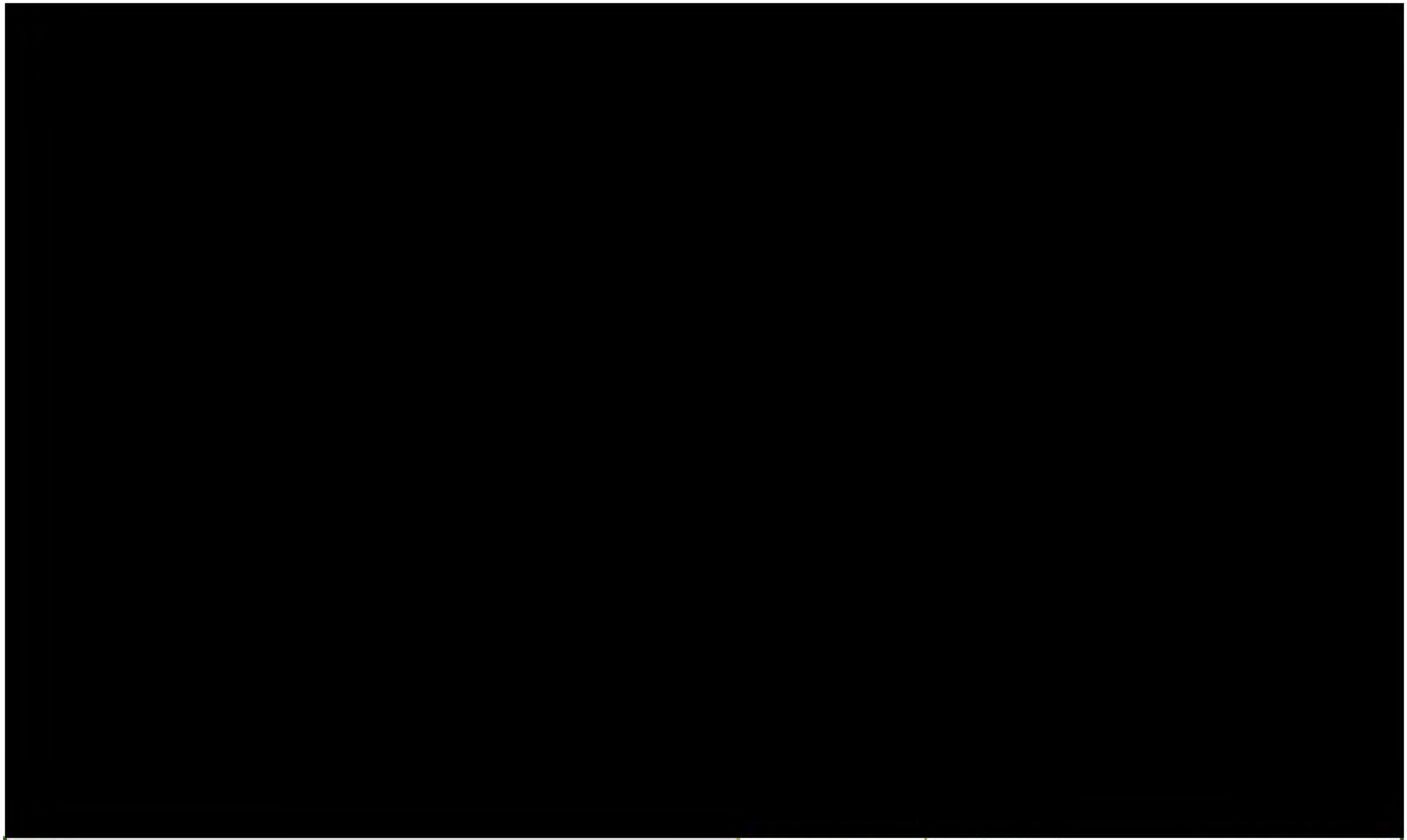
Figure 11: Lizard habitat on-site (north east corner).



Legend:

Lizard habitat on-site

- Low-quality habitat (lizards unconfirmed)
- Project boundary

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Figure 12: Lizard habitat on-site (east).

0 10 20 30 40 50 m

1:1,500

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Legend:

Lizard habitat on-site

- Low-quality habitat (lizards unconfirmed)
- High-quality habitat (lizards unconfirmed)
- Project boundary

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0 10 20 30 40 50 m

1:1,500

N

Figure 13: Lizard habitat on-site (south east corner).

Legend:

Lizard habitat on-site

- Low-quality habitat (lizards unconfirmed)
- High-quality habitat (lizards unconfirmed)
- Project boundary

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Figure 14: Lizard habitat on-site (Paddock 20).

0 10 20 30 40 50 m

1:1,500

N

Legend:

Lizard habitat on-site

- Low-quality habitat (lizards confirmed)
- Low-quality habitat (lizards unconfirmed)
- Project boundary

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0 10 20 30 40 50 m

1:1,700

N

Figure 15: Lizard habitat on-site (centre).

1.4.1.2 Off-site within ZOI

Several CGS were trapped, observed or evidence found of indigenous lizards off-site within the ZOI. Skinks were regularly caught or observed associated with a pampas bush near the western end of the Site along SH77 (Figure 16), while the hedgerows along SH77 could provide low-quality habitat for lizards to utilise (Figure 17). An ink card also confirmed skink presence at the eastern end of the Site adjacent to SH77, though traps in this area failed to catch lizards (Figure 17).

Figure 16: Confirmed lizard habitat (pampas) off-site at the end of the hedgerow adjacent to SH77.

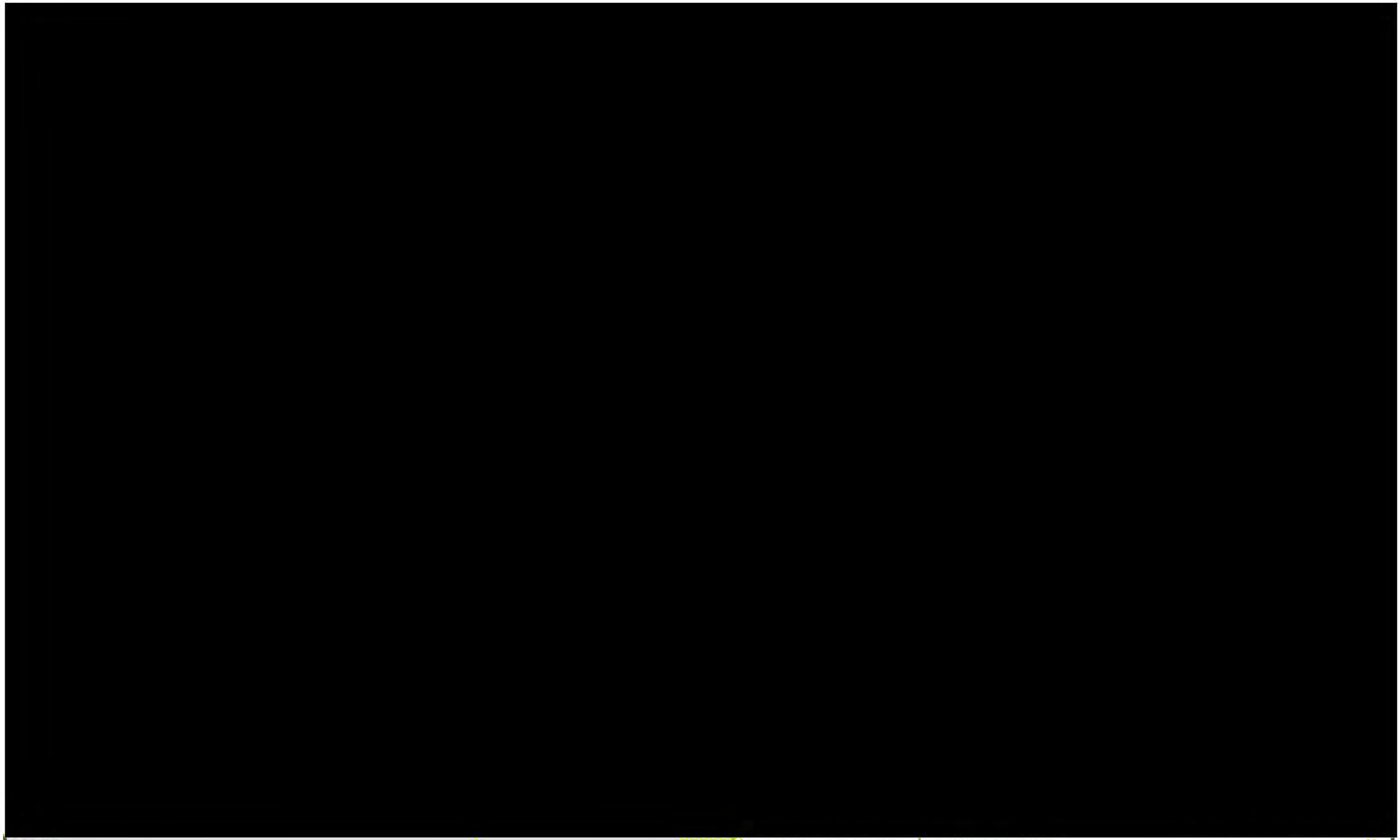
Figure 17: Example of unconfirmed low-quality lizard habitat off-site (hedge on left) and high-quality lizard (rank grass right) adjacent to SH77.

The entirety of the unmaintained road reserve adjacent to SH73 on the eastern boundary of the Site provides high-quality lizard habitat and CGS were confirmed as present (Figure 18). As this habitat is contiguous with the largely unimpacted riparian zones of the irrigation race, this area can be expected to also support indigenous skinks (Figure 19).

Figure 18: Example of confirmed high-quality lizard habitat off-site, adjacent to SH73.

Figure 19: Potential lizard habitat, along irrigation race off-site.

Off-site habitat is of little consequence other than ZOI on-site around the habitat, as the habitat itself will be avoided. Skink survey results within off-site habitats have been used as a conservative approach to inform population estimates on-site. Off-site habitats within the ZOI are shown in Figure 20.



Legend:

Lizard habitat within the ZOI

- High-quality (lizards confirmed)
- Low-quality (lizards unconfirmed)
- Project boundary

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Figure 20: Lizard habitat off-site.

0 50 100 150 200 250 m

1:6,000

N

Legend:

Lizard habitat within the ZOI

- High-quality (lizards confirmed)
- Low-quality (lizards unconfirmed)
- Project boundary

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Figure 21: Lizard habitat on-site (eastern boundary).

0 10 20 30 40 50 m

1:1,500.002244

N

Legend:

Lizard habitat within the ZOI

- High-quality (lizards confirmed)
- Low-quality (lizards unconfirmed)
- Project boundary

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Figure 22: Lizard habitat off-site (eastern race).

0 10 20 30 40 50 m

1:1,500

N

Legend:

Lizard habitat within the ZOI

- High-quality (lizards confirmed)
- Low-quality (lizards unconfirmed)
- Project boundary

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0 10 20 30 40 50 m

N

1:1,100

Figure 23: Lizard habitat off-site (southern boundary - east).

Legend:

Lizard habitat within the ZOI

- High-quality (lizards confirmed)
- Low-quality (lizards unconfirmed)
- Project boundary

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Figure 24: Lizard habitat off-site (southern boundary - west).

0 10 20 30 40 50 m

N

1:1,100

1.4.2 Population Estimate On-Site

A study from the Eglinton Valley, where extensive long term predator control operations have occurred, estimated southern grass skink densities as high as **9,200 skinks per ha** (Lettink, O'Donnell, & Hoare, Accuracy and precision of skink counts from artificial retreats, 2011). Based on the pest control efforts, this can be assumed to be at the high end of the spectrum for grass skink density and carrying capacity within a grassland habitat.

Lizard salvages act as a population census compared to surveys, which can lack accuracy on population estimates. High-quality grassland habitat in Canterbury with little (Wilmer's Basin) or no (Dunns Crossing) pest control, have been found to support grass skink densities of approximately (approx.) **1,000 per ha** (Hansen, Choromanski, & Chapman, 2020) & (Hansen, 2026). Salvage results at both, the Wilmer's Basin and Dunn's Crossing Sites revealed abundances to be representative of the baseline survey population estimates. Baseline surveys conducted at the Wilmer's Basin and Dunn's Crossing Sites were similar in method and intensity as used during the on-site baseline survey that failed to detect lizards (i.e.: funnel trap grids).

The baseline survey conducted at the Dunns Crossing Project Site, found grass skinks were **five times fewer** within areas of rank grassland with amenity planted native trees and shrubs when compared to the rank grassland within the SH1 road reserve (Hansen, 2025). Rank grassland is considered 'high-quality habitat' for grass skinks based on existing data, while areas that can support grass skinks but at far lower densities can be defined as 'low-quality habitat'. Assuming high-quality habitat without predator control typically supports grass skink densities of approx. 1,000 skinks per ha, areas of low-quality habitat can be expected to support approx. **200 skinks per ha** (five times fewer).

Table 4: Summary of previous relevant skink densities.

Skinks	Low density[1]	Moderate density[2]	High density[3]
Grass skink / McCann's skink	**200 per ha** grassland and amenity planted trees and shrubs near Rolleston.	**1,000 per ha** rank grassland within a stormwater retention basin in Christchurch, and within the Road Reserve of SH1, Rolleston	**9,200 per ha** unimpacted grassland.

Surveys on-site resulted in only two skink observations associated with artificial cover objects (ACOs) along the irrigation race, south of Paddock 7 (Figure 2). The two observations may have even been the same animal as the observations were only 5m apart and were several days apart. Whereas off-site surveys within the ZOI confirmed up to[4] six unique animals.

Industry standard methodology for surveying small terrestrial lizards and for indices of abundance, is to space lizard survey devices, such as ACOs and Gee's minnow funnel traps (GMTs) 5m apart (Lettink M. , 2012 A) (Lettink M. , 2012 B). By this spacing, survey devices have an assumed 'active trap range' of a 2.5m radius. While ACO and GMT grids were more intensely trapped with 3m spacing, in the hopes of increasing catch

[1] No predator control.
[2] No predator control (Dunns Crossing), or low-level predator control on adjacent properties (Wilmer's Basin).
[33] Extensive long-term aerial and ground-based predator control.
[4] Highly likely at least 2, if not 3 observations under ACOs and within a tracking tunnel were the same animals previously caught.

and recatch rates, by applying a 2.5m radius around all survey devices (Figure 25) a total 'trapped area' (on- and off-site) was 0.33ha

Figure 25: Example of the 'active trap range' around ACOs (black squares) and GMTs (red circles).

Population estimates can be made by applying the minimum and maximum number of animals trapped or observed during surveys. Abundance per ha can be estimated using the minimum and maximum number of skinks trapped or observed, and the 'area trapped'. These abundances can then be used to estimate the population on-site within all actual and potential habitat. This estimate would be assumed to be conservative, based on the significant lack of detections on-site and the current baseline conditions such that the habitat is of low quality and routinely impacted. A summary of the calculations and the estimated on-site skink population is provided in Table 5.

Table 5: On-site population estimates.

Number of skinks detected	Number of skinks	Skinks per ha[5]	Population on-site[6]
Minimum	5	16	**32**
Maximum	8	25	**51**

Taking a conservative precautionary approach and tripling the maximum population estimate, **a total of 90 to 150 skinks may be impacted on-site**.

1.5 KEY STAFF

1.5.1 Project Manager

The Project Manager (PM) is to be appointed by Hughes Developments when the Project moves to the Management, Surveillance, Quality and Assurance (MSQA) stage or when the Contract Administrator/Engineer to Contract is confirmed. The PM will be responsible for Project management

[5] n x (1 ÷ 0.33) – then rounded up to a whole skink.
[6] Skinks per ha x total actual and potential habitat on-site (2.0755).

matters and will be the point of contact for the Project Herpetologist and Works Contractor throughout the construction phase and implementation of this BMP.

1.5.2 Project Herpetologist

The Project Herpetologist (PH) is to be appointed by Hughes Developments and must be a suitably qualified and experienced herpetologist (SQEH). The PH is primarily responsible for implementing this LMP.

1.5.3 Works Contractor

The Contractor will be appointed by Hughes Developments for this Project and may have a Health, Safety & Environmental advisor (or equivalent) who will be responsible for developing and ensuring implementation of their Environmental Management Plans. The Health, Safety & Environmental advisor, if appointed, or Site Foreman must be made known to the PM and PH immediately upon appointment and provide their contact details.

1.6 GUIDANCE FOR CONTRACTOR

Prior to any on-site works, a pre-start meeting is held on-site with the PE, Contractor Site Foreman and any other relevant parties to ensure clarity on the LMP implementation, and other Environmental Management Plans required by the PE.

The Contractor will have some tasks to perform throughout the Construction phase regarding wildlife observations, management (temporary standdowns) and reporting, as outlined within this LMP. While it is the Contractor's responsibility, the PE must work closely with the Contractor to provide adequate guidance, and training to fulfil those roles.

2 LIZARD MANAGEMENT

The management outlined within this LMP is based on the effects management hierarchy (EMH), pursuant to the National Policy Statement for Indigenous Biodiversity (NPS-IB) (Ministry for the Environment, 2023). This LMP details the methods to avoid or otherwise minimise and remediate Project effects, and a precautionary approach where risk or uncertainty exists, pursuant to EIANZ guidelines (Roper-Lindsay, Fuller, Hoosan, Sanders, & Ussher, 2018).

2.1 AVOIDANCE

To avoid the risk of suitable lizard habitat developing across the Site, farming activities consistent with current practices must be continued prior to the commencement of Project works. Where practicable, grazing should be conducted immediately ahead of each stage of the Project to ensure paddocks are reduced to bare earth prior to bulk earthworks.

If practicable, break-feed fencing should be used by the farmer to stage paddock vegetation removal, towards adjacent lizard habitat.

2.1.1 Seasonal Timing

To reduce the risk of significant harm to lizards, lizard management and Project works within lizard habitat and the ZOI, demarcated within this LMP, must **avoid** months (Table 6) and temperatures when lizards are expected to be in brumation.

Table 6: Months when lizards are expected to be in brumation.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

Red = Months in which lizard habitat must be avoided and when lizard management cannot occur.

Project works can occur at any time of the year and on any day in the following locations:

- In areas only where the PH has confirmed that no lizard habitat exists.
- In areas where lizard habitat has been confirmed and written approval is provided to the Consent Holder by the PH that Project works can commence following completion of lizard management.

2.1.2 Timing and weather

Lizards are ectothermic and exhibit brumation, which is a state of sluggishness/inactivity during periods of cold. Lizard management must be performed during suitable seasonal and weather conditions, defined as between 1 October and 31 April and when daily temperatures meet or exceed 15 degrees Celsius (°C), preferably with little or no rain. This is to ensure lizards are sufficiently active to encounter lizard traps and to reduce the risk of harm to any residual lizards, that evaded traps, during habitat clearance.

On-site weather conditions can be different to those recorded art the nearest publicly available weather station. To ensure accurate weather conditions are obtained on-site for lizard activity, a temperature logger(s) must be maintained on-site to confirm lizard management suitability.

2.1.3 Lizard Exclusion

Lizard exclusion can be implemented in two ways, either through lizard exclusion fencing (LEF), or by maintaining a completely bare-earth area of at least 10m.

Lizard exclusion is to be used to avoid lizards recolonising the Project works footprint from adjacent lizard habitat or following salvage and transfer.

Lizard exclusion is only required should lizard management be completed during appropriate seasonal conditions, and construction may be delayed allowing grass / lizard habitat to regrow on-site. The regrowth of suitable habitat on-site could allow lizards to enter the Project works footprint, putting them at risk, or require delays and repeated lizard management during suitable seasonal conditions.

LEF can be constructed in a variety of ways but must have polythene sheeting facing the adjacent lizard habitat (Figure 26 & Figure 27). Polythene sheeting must extend up at least 400mm (Figure 28) and be buried into the ground, sufficiently deep so that lizards cannot gain access under it, or the sheeting be pulled out of the ground by strong winds (Figure 28 & Figure 29).

Figure 26: Example of a LEF using plastic trellis.

Figure 27: Example of a LEF utilising a sediment control fence (File Photo).

Figure 28: LEF extending >400mm and buried into sand facing the adjacent lizard habitat (File Photo).

Figure 29: LEF dug into the ground facing the adjacent lizard habitat.

LEF must be regularly monitored and maintained to avoid gaps or holes that lizards may be able to pass through.

Alternatively, the complete removal and ongoing maintenance of a habitat-free area, for at least 10m immediately adjacent to lizard habitat is deemed sufficient to avoid lizards from recolonising the Project works footprint (Figure 30 & Figure 31). Depending on sediment and erosion control requirements, this may be a more cost-effective method to avoid lizard recolonisation of the Project works footprint.

Figure 30: Example of lizard exclusion habitat clearance implementation (incomplete) (File Photo).

Figure 31: Example of a lizard exclusion area following implementation (complete) (File Photo).

2.2 MINIMISATION

2.2.1 Lizard Release Areas

A lizard salvage can only occur if a suitable lizard release areas (LRA) has been confirmed to receive lizards, pursuant to Principle 6 (Department of Conservation Lizard Technical Advisory Group, 2019).

LRA's must be predefined and have been assessed for suitability to receive animals, including being ecologically appropriate and have long-term security. The habitat at the LRA must be suitable to support the population of lizards expected to be salvaged prior to and during habitat clearance on-site, and their carrying capacity must be suitable in the long term and allow for a sustainable population over time (Department of Conservation Lizard Technical Advisory Group, 2019).

Two LRA options have been proposed; one on-site, and one off-site.

2.2.1.1 On-site LRA

The on-site LRA is proposed to be the dryland ecosystem area (Figure 32) to be created within the northeastern portion of the Reserve Area 816 and 817. A small area within this location was found to have high-quality habitat (Figure 33) (notwithstanding that the area was heavily sprayed with glyphosate during the TEcIA survey period (Figure 34) and no lizards were detected during the surveys in this area).

Figure 32: Concept plan for reserve area.

Figure 33: Representative area of the on-site LRA (21/03/2026).

Figure 34: Example of glyphosate spray damage during lizard surveying (16/04/2026).

This area will be enhanced to create high-quality habitat for grass skinks but will also be suitable for MCS, should any be salvaged on-site. **The core LRA will be approx. 0.7ha of high-quality habitat** and be contiguous with the riparian plantings within this immediate area and along the irrigation race to the east, comprising approx. **1ha of low-quality habitat** lizards could utilise (Figure 35). These areas would also be contiguous with other greenspace areas which could increase habitat that may support lizards. For the purposes of this LMP, those additional areas are excluded from the assessment of the LRA's suitability.

[redacted]

Legend:

- Indicative dryland ecosystem development
- Indicative riparian remediation and enhancement

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Figure 35: Lizard release area on-site.

0 10 20 30 40 50 m

1:1,300

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The dryland ecosystem has had concept design input by EME, and the LRA enhancement must be supervised by the PH. Eucalyptus, weed and existing habitat removal must be performed in a manner to avoid or reduce adverse effects to lizards, should they be present.

Strategic staged enhancement is expected to appropriately manage the risk to any lizards during enhancement works, if they are present. Potential options may include:

- Accurate demarcation of habitat that may support lizards.
- Avoiding impacts to potential lizard habitat during May to September.
- Careful tree felling and weed removal to avoid or minimise risk to potential lizard habitat (i.e.: hand felling when near or within potential lizard habitat).
- Vegetation removal protocols when removing and placing existing rank grass with native vegetation, rock piles and/or boulders.

LRA enhancement should be conducted during the first stage of the Project works to allow the enhancement plantings to establish and to create suitable habitat and ensure a suitable food resource is available to support the released skinks prior to salvage and transfer commencing.

A high-level summary of the dryland ecosystem, must include the following to achieve high-quality lizard habitat:

- Rock piles with mulch underneath to promote invertebrate food resources. Rock piles should comprise a mix of small cobbles, rail ballast size rocks (AP60 or similar), and some smaller gravels to allow skinks to utilise the rock pile, while reducing the risk of predator incursion (including mice).
    - Rock piles should be developed with input from the PH to ensure suitable size, shape, depth and locations are suitable, but should be no less than 400mm deep and at least 1m wide x 3m long placed on 150mm of mulch.
- Logs should be reused from the tree removals on-site to provide natural cover objects and promote invertebrate food resources.
- Native tussocks and grasses should be planted dense enough to provide cover from avian predators.
- Areas should be developed to promote basking opportunities while providing suitable protection or retreats from predators (i.e.: sprawling divaricating shrubs planted adjacent to rock piles and/or boulders).
- Native trees and shrubs should be planted sparsely or in clusters where shading creating by their presence does not reduce lizard habitat quality (i.e.: west or south).

The PH must determine when the LRA is suitable to receive skinks. This could be performed by comparing invertebrate diversity and abundance within the LRA with off-site habitats known to support CGS and assessing plant establishment as high-quality skink habitat.

The approx. 0.7ha of high-quality lizard habitat and approx. 1ha of low-quality lizard habitat, can be expected to support a population of lizards that would meet Key Principle 7. Population estimate calculations are provided in Table 7.

Table 7: On-site LRA carrying capacity estimates.

LRA habitat types	Area (ha)	Estimated carrying capacity	Rationale
High-quality habitat (associated with the **dryland ecosystem**).	0.7	700	Based on 1,000 per ha which has been recorded in locations of purely rank grass without predator control near Christchurch. This is considered a conservative approach, as the dryland ecosystem will be created with the primary objective of creating higher-quality habitat that just rank grass within the SH1 road reserve (Dunns Crossing)[7] or within stormwater retention basin (Wilmer's Basin)[8]
Low quality habitat (associated with the **riparian plantings** along the irrigation race).	1	200	Based on 1,000 per ha and this type of habitat supporting five times fewer skinks than rank grass within the SH1 road reserve (Dunns Crossing)[9].

Considering a conservative maximum starting population of 150 skinks, the LRA can be expected to support the released animals well into the future, achieving Key Principle 6 (Department of Conservation Lizard Technical Advisory Group, 2019). Grass skinks can produce litters of up to six, and females reach sexual maturity in around 1.5-2 years (New Zealand Herpetological Society, 2026 A). Assuming a wide range of factors listed below, the LRA could reach 1,200 skinks in 3 years, however this is extremely unlikely given the following assumptions:

- 50:50 male to female ration of the starting population; and,
- All animals being mature adults (which is often not the case); and,
- Two young are born on average to every female; and,
- All young are 50:50 male to female; and,
- Ignoring the 1.5-2-year development period for sexual maturity; and,
- No deaths, no immigration and no emigration occurs.

It can therefore be expected that the LRA will not reach carrying capacity for many years.

Department of Conservation (DOC) Technical Advisors have stated that, based on research in Central Ōtago, predator control is of little benefit for small terrestrial lizards, unless predator control is performed over an extensive area for a prolonged period (Pers. Comm. L. Adams). The Site and Project development does not lend itself to widespread landscape scale predator control, nor does the number or threat classification of affected lizards warrant it.

Individual animal welfare is important to consider however, and individual skinks may suffer a short period of stress when relocated. As such, a reduced presence of predators within the LRA throughout the salvage and transfer is recommended.

- Predator control should be implemented within the LRA to target the most likely predators of skinks on-site, including mice, rats and hedgehogs.

[7] (Hansen, 2026).
[8] (Hansen, Choromanski, & Chapman, 2020).
[9] (Hansen, 2025).

- If possible, live capture traps for feral cats should be considered, however the proximity to residential properties may mean cat control is unable to be implemented.
- Trap/bait type and device density should be appropriate to significantly reduce predator numbers within the LRA throughout the salvage and transfer period.
- Predator control within the LRA should commence at least three months prior to the commencement of lizard management, must be maintained throughout the salvage and transfer period and can cease at the start of the first October following the completion of lizard management on-site.
    - This period is considered suitable to reduce predators prior to the salvage, allowing for a soft release. Predator control throughout the salvage allows for maintained reduction in predator pressure for potentially stressed lizards following their release. Predator control throughout one winter following the completion of the salvage, allows for a continued reduction in predators within the LRA through the first brumation period. Following this time, it is expected that the lizards within the LRA will be able to sustain a viable population in the presence of the normal suite of predators, as they do so currently within the existing habitats on-site and off-site.

2.2.1.2 Alternative off-site LRA

At the time of the TEcIA survey, it was assumed that CGS or SGS would be present on-site. An alternative off-site LRA, to the on-site LRA described above, would provide an alternative location if the on-site LRA was considered inappropriate. An existing LRA, within Environment Canterbury administered land, is therefore proposed as this alternative.

This alternate LRA has been agreed to be retired from cattle grazing for the purposes of enhancement and biodiversity outcomes. EME has been allowed to use this area as a LRA for grass skinks with ongoing enhancement and predator control as required (Pers. Comm C. Brookland). This alternative LRA is dominated by high-quality rank exotic grass (Figure 36), consistent with areas previously confirmed to support grass skink population densities of approx. 1,000 per ha in the absence of predator control (Hansen, Choromanski, & Chapman, 2020), currently has very low grass skink abundance and is contiguous with a vast area of suitable habitat to allow population growth and spread.

Figure 36: Representative area of the off-site LRA.

Although adjacent to the Selwyn River, the risk of flood impacts at this alternative LRA is relatively low. The Selwyn River is dry at this location for much of the year. This alternative LRA is protected by fast growing exotic deciduous hardwoods (poplar (*Populus* sp.) and willow (*Salix* sp.)), planted along the riparian edge adjacent to the Site providing flood protection. Long-term goals for this alternative LRA site may include a stop bank development further enhancing flood protection. LRAs should provide long-term protective benefit, and so an LRA in a flood prone area should not be considered, however this alternative LRA is not considered 'flood prone'.

A baseline survey at this LRA was previously conducted in September 2025, for the Dunns Crossing Project, and was confirmed to support CGS (EcoGene, 2025). One of approx. 150 skinks released at this LRA from the Dunns Crossing Project Site, was a SGS (EcoGene, 2025). As the CGS is now known to extend to Hinds in the south (Pers. Comm. M. Tocher), and SGS is confirmed to at least Rolleston, if not the Waimakariri River in the north, this LRA and the Project Site could naturally have CGS and SGS coexisting. The confirmed presence of both CGS and SGS at this LRA and being within the known geographic range of these two sub-species from the same grass skink complex allows this LRA to suitably receive any skink salvaged from the Site.

This LRA is dominated by rank exotic grass, consistent with areas previously confirmed to support grass skink population densities of approx. 1,000 per ha (Hansen, Choromanski, & Chapman, 2020) (Hansen, 2026).

The core area of the LRA is approx. 0.5ha of high-quality habitat but is contiguous with approx. 3ha of high-quality grassland habitat and low-quality gorse/grassland habitat. The original baseline survey of this alternative LRA (for the Dunns Crossing Project), saw a single SGS caught across 300 trap nights and a trapped area of 0.1877ha. This resulted in a population density estimate of approx. 6 skinks per ha. Although unrealistically low in such high-quality habitat it proved presence, at a density which is far from lower than the expected carrying capacity. Although carrying capacity was not deemed to be a risk, gorge clearance of approx. 0.15ha was conducted to increase habitat quality and associated carrying capacity. A total of 147 skinks were salvaged and transferred from the Dunns Crossing Project into the LRA between October and December 2025.

Based on the estimated 6 skinks per ha, approx. 3 skinks can be expected within the core 0.4 ha of this alternative LRA. Those 3 along with the 147 released skinks (from the Dunns Crossing Project) results in approximately 150 skinks within the core area of this alternative LRA. Gorse removal and the contiguous habitat adjacent to the core LRA (Figure 37) allows for a much larger potential carrying capacity at this LRA. An estimated 3+ha is suitable habitat could allow for 3,000 skinks or more, therefore **this alternative LRA is not considered to have any carrying capacity constraints.**

If this LRA is used for the Bangor Village Project, it is recommended that approx. 0.1ha of gorse removal is performed to add to the increase in high-quality grassland habitat.

As outlined above in Section 2.2.1.1, a reduced presence of predators within the LRA throughout the salvage and transfer is recommended and the same methodology should be applied.

Legend:

- Indicative off-site LRA core boundary
- Indicative area of previously conducted gorse control
- Contiguous lizard habitat to off-site LRA

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Date: 07/07/2026
Reviewed by: M. Hansen
Revision: 1

Figure 37: Potential off-site lizard release area, previous gorse control and adjacent lizard habitat.

0 10 20 30 40 50 m

1:2,000

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2.2.2 Salvage Trapping

Due to the time between the TEcIA survey, the unknown commencement of lizard salvage, and highly dynamic nature of grassland habitats on-site, habitat presence and quality are subject to change. It is therefore proposed that habitat reassessment, of lizard habitat identified within this LMP, is conducted ahead of Project works which will occur within those areas to reconfirm lizard habitat suitability, and to confirm lizard management requirements.

Habitat reassessment must be conducted with appropriate lead in time ahead of the Project works commencement to ensure lizard habitat is clearly identified and demarcated and the lizard management requirements can be conveyed to the PM and Works Contractor, and to plan and implement the appropriate lizard management.

In locations where Project works will impact suitable lizard habitat, salvage trapping must occur following best practice methods, pursuant to Principle 5 (Department of Conservation Lizard Technical Advisory Group, 2019).

- Lizard management must only be conducted with an appropriate Wildlife Act Authority for the Site, by the PH or suitably qualified ecologists under the supervision of the PH.
- Lizard salvage trapping must only be conducted during appropriate seasonal and daily weather conditions.
- Lizard salvage trapping must be conducted within all areas confirmed by the PH as lizard habitat on-site.
- Lizard salvage trapping must be completed prior to Project works occurring in or affecting the confirmed lizard habitat within that area.
- Lizard salvage trapping is at the discretion of the PH and should be based on the habitat type (i.e.: within rank grass GMTs should be used, within areas of short rank grass where cover is limited, pitfall traps (PFTs) or GMTs with shade cloth (Figure 38), or ACOs can be used.
    - ACOs should be used in short rank grass areas when salvage trapping is planned for early or late in the lizard management period (i.e.: October and April).
    - GMTs and PFTs should be used throughout the peak lizard management period, or if ACOs are used, they must be checked early morning before skinks vacate hot ACOs.
    - ACOs should be double stacked, or rank grass removed to bare earth prior to ACO installation.
    - ACOs must be installed at least two months prior to October, or one month prior to any month from November to April.
        - ACOs do not require bait.
    - GMT and PFT use must follow industry best practice, be baited with canned pear or other suitable lizard bait, stuffed with appropriate material and covered to reduce the risk of heat stress and if required, a wet sponge added to the trap.
- Lizard salvage devices must be installed appropriate to the habitat type at the time of salvage.
    - To appropriately cover high-quality areas with dense rank grass, salvage trapping devices must be installed at a density of no less than an equivalent number of devices to achieve a 5m x 5m grid. Devices can be clustered around high-quality microhabitats at the discretion of the PH.

- To appropriately cover low-quality areas with short rank grass, salvage trapped devices can be installed at a density of no less than an equivalent number of devices to achieve a 20m x 20m grid.

- Valid trapping is only deemed to be during suitable weather conditions. Trapping can occur in unfavourable weather; however, this does not qualify as a suitable trap day.
- Traps must be checked at least once per day.
- During survey trapping, walkthrough surveys, manual habitat searches (MHS) and active catching of lizards under natural cover objects (NCOs) (i.e.: rocks, logs etc) and ACOs within confirmed lizard habitat (i.e.: concrete, tin, wood posts, rubbish etc) will occur to increase the chances of observing skinks within the survey area.
- Lizard trapping must be conducted for a minimum of three trap nights, during valid trap days. Although ACO surveys are often performed with delays between ACO inspections, if ACOs are used as salvage trap devices, they must also be checked daily (early morning) for three trap nights.
- Following completion of the third trap night, the percentage trap catch (PTC) within a discrete area will dictate the requirement for additional lizard salvage effort as follows:
  - 0% trap catch = no more lizard management is required.
  - 1-10% trap catch following the first three trap nights = supervised habitat clearance (SHC) must be implemented within that discrete area.
  - 11-30% trap catch following the first three trap nights = two more nights of valid trap day trapping must occur within that discrete area, followed by SHC.
  - >30% trap catch following the first three trap nights = five more nights of valid trap day trapping must occur within that discrete area, followed by SHC.

Figure 38: Shade cloth covering GMTs within short rank grass in Paddock 20.

2.2.2.1 *Percentage Trap Catch*

In areas of high lizard abundance, trapping effort is often more than three trap nights, and may continue until a regression model shows 80% of the population has been caught, or trapping ceases when two consecutive nights fail to trap a lizard (Pers. Obs.).

As the baseline survey on-site revealed a very low abundance of lizards on-site, a PTC salvage model is deemed suitable for this Site, especially when considering trapping is to occur predominantly in potential lizard habitat where lizards were not detected on-site. This will serve as a precautionary "survey" across potential habitat areas prior to habitat clearance. Furthermore, PTC has previously been approved by DOC, for these species of lizard even in areas where lizard abundance can reach 1,000 per ha (160+ (WSP), 2024).

Working PTC example 1:

Three suitable trap nights within a discrete area where 25 GMTs are installed, equals 75 trap nights.

- *If no lizards are caught after the first three trap nights, no more lizard mitigation in that area is required.*
- *If 1 to 8 (7.5) lizards are caught after the first three trap nights SHC must be implemented in that discrete area.*
- *If 9 to 23 (22.5) lizards are caught after the first three trap nights, two more trap nights (five total) and SHC is required within that discrete area.*
- *If 24 or more lizards are caught after the first three trap nights an additional five nights of trapping (eight total) and SHC must be implemented in that discrete area.*

Working PTC example 2:

Three suitable trap nights within a discrete area where 178 GMTs are installed, equals 534 trap nights.

- *If no lizards are caught after the first three trap nights, no more lizard mitigation in that discrete area is required.*
- *If 1 to 54 (53.4) lizards are caught after the first three trap nights, SHC must be implemented in that discrete area.*
- *If 55 to 161 (160.2) lizards are caught after the first three trap nights, two more trap nights (five total) and SHC is required within that discrete area.*
- *If 162 or more lizards are caught after the first three trap nights, an additional five nights of trapping (eight total) and SHC must be implemented in that discrete area.*

2.2.3 Supervised Habitat Clearance

Once lizard salvage trapping has been completed, as outlined above in Section 2.2.2, the PH must provide confirmation if and where SHC is required. SHC is an extra method of salvage following trapping, where lizards can be expected to have evaded traps. While salvage trapping is required to minimise the risk of harm during habitat clearance, SHC can be highly effective at salvaging lizards when performed by a SQEH (Pers. Obs.). In locations within confirmed lizard habitat where SHC is required, the methodology shall be as follows:

- SHC must be initiated within 48 hours of salvage trapping being completed within that discrete area, unless adverse weather conditions delay commencement.
- SHC must be conducted during suitable weather conditions.
    - If weather is not suitable, if can be expected that lizards are inactive or less likely to be active, which will also reduce their likelihood of recolonising discrete areas previously trapped.
- SHC must be conducted under the supervision of the PH or a SQEH approved by the PH.
- The excavator operator must be suitably trained for SHC by the PH or a SQEH approved by the PH, to ensure effective SHC is conducted and the working environment is safe for the ecologists.
- SHC must be conducted in a strategic and progressive manner, whereby lizard habitat is removed sequentially prior to topsoil impacts, preferably with a toothed bucket.
- If the excavator cannot commence SHC from outside lizard habitat or needs to create a lizard exclusion zone within lizard habitat, SHC must occur ahead of excavator tracking, with SHC occurring prior to habitat stockpiling adjacent to the intended track.
- The supervising SQEH must stand on the cab side of the excavator for clear visual and verbal communication

- The supervising SQEH should position themselves at the full extent of the boom/arm/bucket and guide the bucket down into the habitat to the appropriate depth to remove habitat, while allowing lizards to vacate the habitat and be caught, if present.
- As the excavator retracts the arm/bucket, the supervising SQEH walks alongside visually checking for vacating skinks.
- Bucket retraction / habitat removal should be conducted at an appropriate speed to maximise skink capture and is at the discretion of the supervising SQEH.
- If a skink is observed, the supervising SQEH must indicate to the excavator operator to cease arm/bucket movement immediately, and the SQEH must attempt to actively catch the skink when it is safe to do so.
- Progressive racking of grass and scraping to bare earth must occur to allow the excavator to reposition into the cleared area to then commence SVC in the next area.
- The toothed bucket may be required to be replaced with a normal bucket to allow effective removal of vegetation to ground level, depending on Site conditions (i.e.: vegetation/soil type).
- SHC must be conducted in a way to isolate the lizard habitat as first priority, if required.
- SHC must target the best quality habitat first, as indicated by trapping results.
- SHC must continue until the area is cleared or until the PH is satisfied the risk to lizards is sufficiently reduced (i.e.: the best quality habitat areas failed to reveal skinks or no skinks are observed for half a day of SHC within representative habitat within the discrete area), at which time the PH must notify the Works Contractor and PM that unsupervised habitat clearance (UHC) can commence.
- If during UHC skinks are observed UHC must cease, the PH must be contacted and SHC must be implemented at that area or until the PH is satisfied the risk to lizards is sufficiently reduced again.

2.2.4 Lizard handling and processing

Methods for the capture, temporary holding, and release of lizards following salvage must follow best practice, pursuant to Principle 5 (Department of Conservation Lizard Technical Advisory Group, 2019) and be based on Section 8 of the Guidelines for conservation-related translocations of New Zealand lizards (Department of Conservation Lizard Technical Advisory Group, 2018).

The procedure for handling, and transferring lizards is as follows:

- To ensure careful and appropriate care is given, all assisting staff should be provided with appropriate lizard handling training by the PH as soon as possible.
    - Help with lizard capture may occur by untrained staff (i.e.: Works contractors) but only for the capture of lizards at immediate risk of death from works during SHC activities (i.e. the excavator operator) and only if approved by the PH.
    - The PH must leave appropriate temporary holding equipment on-site when the PH or SQEE is not on-site and there is a risk of the Works Contractor encountering a lizard.
- The PH or SQEE approved by the PE, must perform all handling required for lizard identification, photographing, measuring, and release.
- Lizard handling must be kept to a minimum to reduce any potential stress to the animals.
- Any lizards captured will then be moved to a temporary storage container until release.
- The temporary holding of lizards will occur with lizards individually bagged in small cloth bags, unless they are a known gregarious species, and bagged lizards must be placed within large plastic container with appropriate ventilation, cover (grass), and damp clothes or chiller pads and the container must be kept in the shade until release to avoid heat stress.

- Lizards must be released on the same day, within appropriate time frames to avoid stress. Time frames of temporary holding will depend on daily temperature and the number of lizards captured.
- Where practicable, each lizard must be identified to species level based on morphological information.
- Locations for each salvaged lizard must be GPS recorded.
- Each lizard must have their snout to vent length (SVL) measured along with age class and if possible, sex. If possible, additional measurements may be taken, such as total length, tail regeneration length, and weight, though these are not essential if large numbers of animals are caught.
- Where abnormal morphological features are observed, confirmation of species through genetics ('tail tipping') may occur if the PH has appropriate accreditation for reptile genetic sampling.
    - Tail tipping must only be performed by a suitably qualified person with Competency Level 2 or 3 for reptile tissue sampling.
    - Tissue sampling must follow the Tissue sampling for Reptiles Standard Operating Procedure. All lizards tail tipped should have the following information obtained:
        - Sample ID
        - Location of capture including microhabitat type
        - Estimated age class
        - Total length (TL)
        - Snout to vent length (SVL)
        - Weight
        - Photos of head, body and tail including dorsal, lateral, and ventral
        - Sex (if possible)
        - Exact location of release (GPS)
- Lizards must be transferred and released within the LRA in a manner to maximise population viability, while reducing intra or interspecific competition (i.e.: if only a small number of lizards are salvaged, they should be released in a central cluster, whereas if a large number of lizards are salvaged, they should be distributed throughout the LRA).

2.3 REMEDIATION / ENHANCEMENT AND HABITAT CREATION

Existing actual or potential lizard habitat on-site will experience either 'complete and permanent' loss due to the Project. New lizard habitat area will be created in Reserve 816 & 817 and along the irrigation race (Reserve 810) and across the noise bund adjacent to SH73. As discussed below, subject to being established in accordance with this LMP, those areas will generate a net gain outcome to lizard habitat compared to existing conditions on the Site.

2.3.1 Irrigation Race

Riparian enhancement planting is proposed in the area adjoining the irrigation race within Reserve 801 and can be expected to result in low-quality habitat for lizards, however when considering the current baseline conditions this habitat is currently exposed to (i.e.: periodic sheep grazing and glyphosate spraying) the long-term outcome will result in significantly reduced impacts to lizards, through reduced impacts.

If interplanting occurs for riparian development (in other words, rank grass is retained as much as possible within the riparian planting), lizard salvage and transfer may not be required. This enhancement planting

methodology could avoid the risk of killing lizards by avoiding the need for habitat clearance and allow for the retention of a baseline lizard population in this location, **which is highly recommended, if practicable**.

2.3.2 Reserve

The reserve area is proposed for enhancement through weed and tree removal. Eucalyptus are recommended for removal within 10m of the irrigation race to improve water quality (Aquatic Ecology Ltd, 2026), and within 20m of residential properties to reduce shade and property damage from wind impacts (Kamo Marsh, 2026), while selective eucalyptus removal is recommended to enhance the approx. 0.7ha dryland ecosystem area into high-quality lizard habitat by reducing shading.

Enhancement of this area into a dryland ecosystem suitable to be used as the LRA, as outlined in Section 2.2.1.1 will require removal of trees, shrubs, ivy (*Hedera* sp.) groundcover, and rank grass. Areas of rank grass may support populations of lizards at low abundance that were not detected during the baseline survey. As such, strategic enhancement is required to avoid or minimise adverse effects to lizards that may be present. By staging enhancement plantings and habitat development then implementing strategic vegetation removal protocols, it may be possible to encourage any lizards within suitable lizard habitat to move into the enhancement area. Alternatively, a suitable area of the core LRA must be completed, and fit to receive lizards, prior to lizard salvage trapping occurring within areas of potential lizard habitat, as outlined in Section 2.2.

If any areas of possible lizard habitat (i.e.: rank grass) can be avoided or strategically enhanced, it could expedite the process for the core LRA to receive salvaged lizards by providing existing habitat and invertebrate food resources immediately.

2.3.3 Noise Bund and Project boundaries

The creation of a noise bund immediately adjacent to the SH73 road reserve is expected to be 3m high and will require vegetation to stabilise it and mitigate sediment and erosion risk. An estimated 5m cross sectional base (required to ensure a stable 3m bund) would result in approx. 7.82m surface area assuming the bund would replicate an isosceles triangle with the highest point centrally located. As this noise bund extends approx. 780m, this would result in a surface area of approx. 0.61ha (Figure 39). This noise bund will be required to be vegetated to avoid sediment and erosion (Figure 40). Hydroseeding the majority of this noise bund with a native low-grow seed mix including (*Poa imbecilla*) will require low maintenance and create high-quality grassland habitat. Small clusters of amenity native plantings may be incorporated into this noise bund (Figure 40). With PH input these areas could be expected to support approx. 680 grass skinks at a typical 1,000 per ha.

As this noise bund will be created immediately adjacent to the high-quality lizard habitat within the SH73 road reserve, it can be expected to be readily colonised within the short-term. Grass skinks have been shown to colonise hydroseeded areas within the SH1 road shoulder within only a matter of months (Hansen, 2026).

Legend:

- Indicative SH73 noise bund
- Project boundary

ESRI Satellite

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Project: 20260008 Bangor Village
Deliverable: Lizard Management Plan
Drawn by: M. Hansen
Date: 07/07/2026
Reviewed by: M. Hansen
Revision: 1

0 10 20 30 40 50 m

1:1,500.002244

N

Figure 39: Indicative noise bund adjacent to SH73.

Figure 40: Example of a similar noise bund near the Site.

Boundary fencing is proposed to be setback from the existing hedgerows adjacent to SH77. As soon as practicable following the construction of the fence, hydroseeding should occur to remediation construction impacts and to increase habitat on the north side of the existing hedgerows. As lizards were confirmed along SH77, this is expected to create additional lizard habitat.

2.3.4 Summary of Remediation and Enhancement Outcomes

within summary the Project is expected to cause an loss of approx. 0.99ha of low-quality existing lizard habitat, but an increase of approx. 1.29ha of high-quality habitat will be achieved. Furthermore, following Project completion lizard habitat on-site will be free of routine grazing and glyphosate use, significantly and permanently improving conditions for indigenous lizards. Based on population estimates outlined above, the long-term outcome associated with the Bangor Village Project could result in an increase of grass skink population by 30 times.

Lizard habitat type	Area currently on-site (ha)	Estimated lizard population	Area expected following Project completion (ha)	Estimated lizard population potential
Low-quality (actual and potential habitat)	1.9892[10]	32-51[11]	1[12]	1,580[13]
High-quality (potential habitat)	0.0863[10]		1.38[14]	

[10] Table 3.
[11] Table 5
[12] Riparian planting of approx. 1ha.
[13] Total estimate from the LRA (700), irrigation race riparian plantings (200) and the noise bund (680).
[14] 0.7ha LRA and 0.68ha noise bund.

3 POST-SALVAGE MONITORING

Pursuant to Principle 7, monitoring is required following completion of a lizard salvage and transfer (Department of Conservation Lizard Technical Advisory Group, 2019). Post-salvage monitoring is essential to determine the success or failure, inform future salvage and transfer operations and to continually update New Zealand-specific data on methods through learnings.

The level of post-salvage monitoring requirements is scaled and depends on the number of lizards salvaged. If very few lizards are salvaged and transfer, post-salvage monitoring may not-be warranted if the monitoring is unlikely to provide any viable data.

- If fewer than 50 lizards are salvaged, no monitoring is deemed necessary within the LRA, instead monitoring should focus on colonisation rates of hydroseeding the noise bund only.
- If more than 50 lizards are salvaged, post-salvage monitoring within the LRA should occur for at least five years, commencing 1 year following the completion of the release at the LRA.

3.1 NOISE BUND COLONISATION MONITORING

Noise bund monitoring can be efficiently achieved though the long-term deployment of ACOs or PFTs across the bund in several areas to determine skink colonisation from the adjacent lizard habitat within the SH73 road reserve.

- Survey devices must be deployed at the type of hydroseeding.
- Survey devices should be deployed in transects from the base of the bund, up and over to the far side to monitor skink rate of spread from the SH73 road reserve.
- PFTs are preferred due to the potential risk to motorists on SH73, however if ACOs are used, they must be double stacked and heavily weighed, or pinned, down to avoid the risk of wind impacts and risk to traffic on SH73
- Survey devices should be deployed 1m apart and several transects used for appropriate bund coverage but be no less than 20 transects.
- Survey devices must be checked at least once monthly throughout the first lizard monitoring period (October to April), equating to 6 inspections. PFTs shall be opened and baited bit a single night survey and then reclosed following inspection.

3.2 LRA MONITORING

Lizard population establishment, growth or decline can be achieved through the long-term deployment of PFTs or annual use of ACOs or GMTs within the core LRA area.

- Annual capture-mark-recapture (CMR) monitoring must be completed during optimal seasonal and weather conditions on-site.
- At least two, if not more grids of survey devices within the core LRA area must be established and repeated annually.
- CMR monitoring must be conducted following best practice methods.
- CMR must be conducted for a minimum of five years or until a population trend can be determined, whichever occurs first.

Predator monitoring must be conducted within the LRA to determine if predators may have an effect on the population of lizards within the LRA.

- Commencing at the time of predator control (three months prior to lizard management), baseline predator abundance must be determined through best practice methods (i.e.: tracking tunnels and baited ink cards and/or wax chew blocks etc).
- Every 3 months predator monitoring should be repeated to determine if predator abundance fluctuates through the seasons and to guide predator control throughout the salvage and transfer until the first October following salvage and transfer completion.
- Concurrently during the CMR survey, predator monitoring should be repeated to determine predator abundances following predator control cessation and to determine in predators could be impacting the lizard population.

4 SALVAGE OUTCOME ASSESSMENT

Pursuant to Key principle 9 (Department of Conservation Lizard Technical Advisory Group, 2019), if the salvage and transfer fails to create a viable population within the LRA the reason for the failure should be attempted to be determined (i.e.: was the habitat not suitable to support a sustainable invertebrate food resource or were predator impacts too high). Failure determination must be outlined within the Salvage Completion Report.

If a failure is determined no offsetting is required due to the expected small scale of this lizard salvage, and the expected lizard population increase allowed by the habitat remediation, enhancement and creation.

5 REPORTING

Reporting is Key Principle 8 of lizard salvage and transfers and is required to communicate outcomes of salvage operations and to encourage improvements in their methodology (Department of Conservation Lizard Technical Advisory Group, 2019). There are several aspects to this Project that require reporting.

Reporting must occur when required throughout the Project and may be in the form of emailed communications, short or full reports depending on the requirement.

5.1 PRIOR TO AND DURING WORKS

Prior to and throughout the Construction Phase the PH will be required to communicate with the PM and Works Contractor including but not necessarily limited to confirming areas of lizard habitat requiring management, when SHC can occur and when the LRA is suitable to receive lizards to allow the salvage and transfer to commence.

The format for these communications is at the discretion of the PH; however key instruction must be written and the date recorded to inform the completion report and to minimise the risk of miss communication through verbal instructions.

5.2 ANNUAL WILDLIFE ACT AUTHORITY REPORTING

Conditions within WAAs often include annual reporting requirements, irrespective of the completion of the salvage and transfer. It can be expected that a summary report is required to be provided to the DOC Permissions team annual by 30 June for the duration of the WAA.

Amphibian and Reptile Distribution Scheme (ARDS) cards with the details of all lizards observed or salvaged must be completed and sent to herpetofauna@doc.govt.nz.

5.3 SALVAGE COMPLETION

Upon the completion of the Project, a summary report detailing the outcome of lizard management must be provided to the client. This summary report must include a description and timeline of all lizard management measures that were implemented and must outline monitoring and maintenance requirements and outline the requirements of post-salvage monitoring and reporting requirements. The salvage completion report shall be completed within six months of the salvage completion.

5.4 POST-SALVAGE MONITORING

Brief annual post-salvage monitoring reports are required. Post-salvage monitoring reports must include, as a minimum the dates of the survey, the weather conditions on-site, who conducted the survey, the methodology implemented, the results of the survey, any difficulties encountered and learnings or improvements required for future surveys. Post-monitoring reports shall be completed within six months of the annual survey completion.

ARDS cards with the details of all lizards observed must be completed and sent to herpetofauna@doc.govt.nz.

5.5 FINAL SALVAGE COMPLETION

A final Lizard Management Completion Report shall be provided to the client, DOC, iwi, and any other relevant stakeholders within **six months** of post-salvage monitoring completion. The final report must outline all lizard mitigation implemented, habitat enhancement or creation completion, post-salvage monitoring, the salvage outcome and the reason for failure if a failure occurs. The report must include learnings or recommendations for future salvage improvements.

6 CONCLUSION

This LMP has been developed to avoid, minimise, and where possible remedy impacts to indigenous lizards and their habitat associated with the proposed Bangor Village development. Areas on-site have been demarcated to identify locations where lizard management is required as at the time of this LMP's development. This LMP utilises best practice techniques for the management of lizards and outlines methodologies for mitigating actual and or potential impacts to lizards and their habitats. When this LMP is implemented in full, the Project is expected to result in a long term to permanent net gain residual effect outcome for indigenous lizards while complying with the Wildlife Act 1953.

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APPENDIX A

FARM MAP

Staging to be completed in any order and combination

VERSIONS		
NUMBER	DATE	DESCRIPTION
R5	08.04.26	LAYOUT UPDATED
R6	17.04.26	LAYOUT UPDATED
R7	12.05.26	LAYOUT UPDATED
R8	14.05.26	LAYOUT UPDATED TO SUBDIVISION
R9	29.05.26	LAYOUT UPDATED

Lot 2 DP 4512

Lot 9 DP 307576

Lot 10 DP 307576

Lot 7 DP 307576

Lot 4 DP 307576

Lot 3 DP 307576

Lot 1 DP 307576

Section 1 SO 438579

Lot 1 DP 358412

Lot 2 DP 358412

Lot 1 DP 55963

Lot 1 DP 81020

Future Bridges Road

Bangor Road

Pair RES 1330

McHugh Crescent

West Coast Road - SH73

Midland line Railway

Stage 1 Stage 2 Stage 3 Stage 4 Stage 5 Stage 6 Stage 7 Stage 8 Stage 9 Stage 10 Stage 11 Stage 12 Stage 13 Stage 14 Stage 15 Stage 16 Stage 17 Stage 18 Stage 19 Stage 20 Stage 21 Stage 22 Stage 23

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 Yards

NOTES:

1) Areas and dimensions are approximate & subject to final survey and deposit of plans.

2) Service easements to be created as required.

3) This plan has been prepared for subdivision consent purposes only. No liability is accepted if the plan is used for any other purpose.

4) Any measurements taken from information which is not dimensioned on the electronic copy are at the risk of the recipient.

5) This plan is subject to the granting of subdivision and/or resource consents and should be treated as a proposal until such time as the necessary consents have been granted by the relevant authorities.

6) This plan has been prepared for the use of Hughes Developments Limited only and no liability is accepted in relation to any other parties.

7) Orion kiosk lots have not been shown and are to be created as required following a detail electrical

Proposed Memorandum of Easements

Total Area : 130.3900ha

Comprised in RTs CB47A/153 & 548760

DAVIE LOVELL-SMITH

PLANNING SURVEYING ENGINEERING

JOB TITLE:

Hughes Developments Limited
Bangor Road, Darfield

SHEET TITLE:

Proposed Subdivision of Section 2 SO 438579 & Lot 2 DP 81020

DRAWING STATUS:

For Subdivision Consent

SCALE: 1:2500@A1 1:5000@A3 DATE: June 2026

CAD FILE: H21112-Subdivision-V9.dwg VERSION: R9

DRAWING No: H 21112 SHEET No: 1 OF 1

Legend:

Farm blocks

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 Yards

ESRI Satellite

Disclaimer: This drawing has been developed based on information provided by the client, obtained by Effects Management Ecology Ltd, approved subcontractor(s) or another Third Parties for the purposes of providing contracted ecological services. The information shown is assumed to be true and accurate within reasonable accuracies for the size, scale and equipment used to capture data in the field, or produce this drawing. Information shown is subject to change over time. Effects Management Ecology Ltd holds no responsibility for any liability or action caused by any reliance on this drawing, should there be any inaccuracies or it be incompleted. This drawing has been developed for the client for the purpose in which is is intende. ©Effects Mgmt Ecology Ltd

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Project: 20260008 Bangor Village
Deliverable: Lizard Management Plan
Drawn by: M. Hansen
Date: 07/07/2026
Reviewed by: M. Hansen
Revision: 1

0 50 100 150 200 250 m

1:6,000

N

Figure 41: Farm map (with Project plan overlay).

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