

**BEFORE THE COMMISSIONERS APPOINTED BY THE CENTRAL OTAGO
DISTRICT COUNCIL**

UNDER the Resource Management Act 1991

IN THE MATTER of RC230179 an application for a 30-lot
subdivision at Rocky Point on Tarras-
Cromwell Road (SH8)

BY **TKO PROPERTIES LIMITED**

Applicant

STATEMENT OF EVIDENCE OF SIMON BEALE

Dated: 4 November 2024

Statement of evidence of Simon Beale

Introduction

- [1] My name is Simon Herbert Beale.
- [2] I am a Director of Beale Consultants Limited, an independent ecology and planning consultancy. I hold a Bachelor of Science in Zoology from the University of Otago and a Bachelor of Forestry Science from the University of Canterbury. I am a Member of the New Zealand Ecological Society the Environment Institute of Australia and New Zealand and the New Zealand Planning Institute. I am a Certified Environmental Practitioner. I was previously employed by MWH New Zealand Limited for 22 years and more recently with WSP Opus as a terrestrial ecologist and environmental planner. Much of my recent experience has been dedicated to undertaking ecological assessments for infrastructure projects and tourism related developments.
- [3] I have been instructed by TKO Properties Limited to give expert ecological evidence in respect of RC230179, an application for the revised 30-lot subdivision located at Rocky Point on the Tarras-Cromwell Road (SH8).

Code of Conduct for Expert Witnesses

- [4] While this is not an Environment Court hearing I have read and agree to comply with the Code of Conduct for Expert Witnesses in the Environment Court Practice Note 2023. This evidence is within my area of expertise, except where I state that I am relying on material produced by another person. I have not omitted to consider material facts known to me that might alter or detract from the opinions that I express.

Scope of evidence

- [5] My evidence includes:
- (a) background information including responses to the ecological matters raised in submissions and an initial peer review commissioned by Council (prepared by Mr Mike Harding dated 25 March 2024);

- (b) an outline of the ecological impact assessment (EclA) revised in response to the submissions and a peer review;
- (c) an outline of the ecological and vegetation management plan;
- (d) my response to the ecological matters raised in the Central Otago District Council planner's section 42A report addendum.
- (e) my response to the matters raised by ecologist Mr Mike Harding on behalf of Council in relation to the revised EclA (dated September 2024).
- (f) commentaries on the alignment of the proposed biodiversity offsets as described in the evidence of Mr Andrew Wells with the offsetting principles are set out in Appendix 3 of the NPS-IB.
- (g) in preparing the EclA I reviewed the following documents:

Atkinson, I.A.E. 1962: Semi quantitative measurements of canopy composition as a basis for mapping vegetation. Proceedings of the New Zealand Ecological Society 9: 1–8.

de Lange, P.J., Gosden, J., Barkla, J.W., Courtney, S.P., Fergus, A.J., Champion, P.D., Beadel, S.M., Champion, P.D., Hindmarsh-Walls, Makan, T., Pascale, M. 2023. Conservation status of New Zealand indigenous vascular plants. New Zealand Threat Classification Series 43. Department of Conservation, Wellington.

Gibson, R. 2021. Bendigo Hills Estate Subdivision. Ecological Assessment. Roger Gibson Land and Sea Services.

Hurst, J.M.; Allen, R.B. 2007. The RECCE method for describing New Zealand Vegetation – Expanded Manual, Version 4. Landcare Research Contract Report (LC0708/029), Manaaki Whenua – Landcare Research, Lincoln.

Leathwick, J.R. 2001. New Zealand's potential forest pattern as predicted from current species-environment relationships. New Zealand Journal of Botany, 2001, Vol. 39: 447-464.

Leathwick, J.R., Morgan, F., Wilson, G., Rutledge, D., Johnston, K., McLeod, M. 2002. Land Environments of New Zealand. A Technical Guide. Ministry for the Environment, Wellington.

McEwen, W. M., (editor) 1987. Ecological Regions and Districts of New Zealand. NZ Topographic Map (1:500,000). Third Revised Edition - Sheet 4. Department of Conservation, Wellington, New Zealand.

McGlone MS 2001. The origin of the indigenous grasslands of southeastern South island in relation to pre-human woody ecosystems. *New Zealand Journal of ecology* 25: 1–15.

Robertson, C.J.R; Hyvonen, P; Fraser, M.J; Pickard, C.R. 2007. Atlas of Bird Distribution in New Zealand. 1999-2004. The Ornithological Society of New Zealand, Inc., Wellington.

Robertson, H.A.; Baird, K., Dowding, J., Elliot, G., Hitchmough, R., Miskelly, C.M., McArthur, N., O'Donnell, C.F.J., Sagar, P., Scofield, P., and Taylor, 2016. Conservation status of New Zealand birds, 2016. *New Zealand Threat Classification Series* 19. Department of Conservation, Wellington.

Rogers G.M., Walker S., Lee W.G. 2005. The role of disturbance in dryland New Zealand: past and present. Department of Conservation, Wellington. *Science for Conservation* 258

Singers, N.J.D.; Rogers, G.M. 2014. A classification of New Zealand's terrestrial ecosystems. Department of Conservation, Wellington. *Science for Conservation* 325.

Walker, S., King, N., Williams, S., Burrows, L., Cieraad, E., Meurk, C., McCoverton., Price, R., Smale, M. 2009. Secondary woody vegetation patterns in New Zealand's South Island dryland zone. *New Zealand Journal of Botany*, 2009, Vol. 47: 367-393.

Walker, S., Cieraad, E., Barringer, J. 2015. The Threatened Environment Classification for New Zealand 2012: a guide for users. Landcare Research Contract Report 2184.

(h) in preparing my evidence I additionally reviewed and rely on the following documents:

Wildlands contract reports:

- Vegetation succession and climax communities at Rocky Point;
- Memorandum on lizard management;
- Terrestrial invertebrate desktop assessment;
- Draft lizard management plan.

Saline/Sodic Soils Identification and Location prepared by Roger Gibson Land and Sea Services.

Statement of evidence of Dr Wells;

Statement of evidence of Ms Samantha King.

Executive summary

[6] TKO Properties Limited (TKO) is proposing to develop a 30 lot subdivision at Rocky Point. Building platforms and curtilage areas will be created in 22 of the lots which will be served by underground services, driveways and an access road. The development will affect an area of 8.27 ha which represents approximately 13% of the property land area (64.3 ha). The development area encompasses land disturbed during construction/establishment of the building platforms, curtilage areas, driveways, access roads, underground services (generally within the driveways and roads), septic tanks (within the curtilage areas), temporary laydown/storage areas, sewage disposal areas and irrigation infrastructure.

[7] TKO propose to formally protect the balance of the property (87%) as a Landscape and Vegetation Protection Area (LVP). The LVP will be the subject of a condition prohibiting vegetation clearance and imposing an obligation on owners to undertake pest control. The LVP will be managed by an owner representative group, as required by conditions of consent. Refer proposed condition 11 provided in Mr Brown's evidence.

- [8] The development will result in the permanent clearance of early successional plant communities, being approximately 1.74 ha. of kānuka shrubland - scrub and 3.95 ha. of cushionfield. These areas represent, in percentage terms, 5.1% and 28.3% respectively of the land area these plant communities occupy at Rocky Point.
- [9] The ecological value of the affected indigenous plant communities and habitats is scored as very high using the Environment Institute of Australia and New Zealand (EIANZ) Ecological Impact Assessment guidelines. This score reflects the presence of nationally threatened and at risk flora and fauna associated with the affected cushionfields and kānuka shrubland-scrub communities.
- [10] The affected indigenous plant communities and habitats are assessed as ecologically significant in terms of the National Policy Statement for Indigenous Biodiversity (NPS-IB). These areas are not included in the SNA schedule in the Central Otago District Plan.
- [11] The magnitude and level of ecological effect of the development, is scored as high to very high in accordance with the EIANZ guidelines. This score reflects the extent of loss of cushionfield communities in particular and effects of fragmentation of the development on the cushionfield-kānuka shrubland-scrub mosaic.
- [12] A range of avoidance, remediation and mitigation measures are proposed by TKO in accordance with the NPS-IB effects management hierarchy to reduce the magnitude and level of ecological effect. These are avoidance of saline/sodic ecosystems, avoidance of habitats of Nationally Threatened and At Risk spring annuals, avoidance of mature specimens of At Risk plant species, avoidance of high quality lizard habitats, creation of lizard habitat (rock stacks), salvage of lizards, controlling undertaking rabbits, goats, ferrets and hedgehogs and controlling invasive weeds.
- [13] TKO propose to address residual adverse effects of the development through a biodiversity offset. This will involve plantings of species representing climax or pre-settlement plant communities local to the Dunstan Ecological District as informed from surveys of nearby

benchmark or relic plant communities, from potential ecosystem mapping undertaken by the ORC and from a study of successional processes occurring at Rocky Point. The offset plantings will collectively encompass an area of approximately 6.4 ha, including sites in the adjacent Bendigo Hills Estate as shown on Appendix 1 of Dr Well's evidence. The offset planting sites are additional to the LVP.

- [14] The offset plantings will be subject to performance metrics (plant growth and survival rates) as informed by programmed monitoring and reporting to ensure healthy self-sustaining plant communities established at the offset sites. This will require offset actions such as provision of quality eco-sourced plant stock, plant replacement stock, browse protectors, rabbit and goat control, invasive weed control and initially irrigation.
- [15] The offset actions including the plantings are formalised through an Ecological Monitoring and Management Plan. This includes annual reporting to Council on the monitoring results informing degree of alignment to the performance metrics and any remedial measures required.

Background

- [16] I prepared an Ecological Impact Assessment (EclA) for the proposed Bendigo Hills Estate and Rocky Point subdivisions dated June 2023 as part of the resource consent application lodged with Council in August 2023.
- [17] Submissions were received from submitters, Ms Kate Wardle, the Department of Conservation and Forest and Bird in response to public notification of the application. The submissions identified shortcoming in the ecological impact assessment as follows:
 - a) the surveys that informed the EclA did not detect nationally threatened spring annuals as these were conducted outside of the spring/early summer period;
 - b) the ecological values that have been assigned in the EclA do not account for the presence of nationally threatened spring annuals and

three other threatened and at risk species that likely inhabit the cushionfields and kānuka shrubland -scrub;

- c) the likely presence of saline ecosystems;
- d) the inappropriateness of the compensation measure proposed in the EclA especially in addressing the loss of cushionfields; and
- e) the lack of an Ecological Enhancement and Monitoring Plan.

[18] Since receipt of submissions and a peer review report commissioned by the Council (prepared by Mr Harding), I have undertaken the following investigations to address submitter and Council peer reviewer concerns, including survey work with other ecologists, collectively totalling 140 person hours.

- a) Conducted surveys in the company of botanist Neill Simpson to record the location of nationally threatened spring annuals and other Threatened and At Risk flora that were not recorded in the original EclA. These surveys recorded populations of New Zealand mousetail (*Myosorus minimis* subsp. *novae-zelandiae*), *Myosotis brevis* and *Colobanthus brevisepalus*.
- b) Conducted a drive over survey to determine the location and extent of cushionfields that exist between Northburn Station and Cluden Stream.
- c) Participated in a three hour fly over of the Dunstan Ecological District and adjacent Lindis, Maniototo, Old Man and Pisa Ecological Districts recording the location and extent of cushionfields.
- d) Undertook ground truthing of potential offset and compensation sites focussing on the cushionfields covering low hill country in the vicinity of the Bendigo Loop Road.
- e) Engaged Mr Roger Gibson a soil scientist to conduct site investigations to identify areas of saline-sodic soils on Rocky Point.
- f) Conducted property wide walk over surveys and RECCE plot surveys in the company of Andrew Wells from Wildlands. The RECCE plot

surveys covered areas of cushionfield and kānuka shrubland - scrub within and outside of the Rocky Point development area, potential offset sites in Rocky Point and the adjacent Bendigo Hills Estate and offset benchmark sites at Devils Creek and Firewood Creek near Cromwell.

- g) Collected samples of *Raoulia australis* cushion plants during the RECCE plot surveys and conveyed to Springburn Nursery for transplanting trials.
- h) Assisted Dr Wells in formulating biodiversity offsets and identifying suitable offset sites in the Bendigo Hills Estate as well as formulating biodiversity offset actions and identifying offset planting sites in Rocky Point. Details of the proposed biodiversity offsetting are provided in the evidence of Dr Wells and summarised at paragraphs 43 and 44 of my evidence.
- i) Preparation of an ecological enhancement and monitoring plan (EEMP) for the offset sites. The Plan details the offset plantings in terms of species composition, plant grade, plant spacings, plant replacement, pest and weed control, irrigation, aftercare management, monitoring and reporting.

[19] Separate investigations relating to lizards and invertebrates were undertaken by Wildlands.

[20] These investigations lead to TKO Properties altering the subdivision layout for Rocky Point and culminated in the preparation of a comprehensive EclA specific to Rocky Point, as well as revised conditions of consent.

[21] My conclusion, based upon the above further work and revised proposal coupled with the EEMP, is that the effects of the revised subdivision on terrestrial ecology values are of a lesser magnitude than the original proposal. This reflects the more comprehensive avoidance, minimisation, remediation and offset measures being proposed by TKO. The residual ecological effects after remediation measures have been implemented will reduce over time (30 years) as the offset

plantings mature and become self-sustaining and provide a seed source for natural regeneration of climax species to occur. This will achieve a no net loss outcome in biodiversity.

Introduction

[22] Overview of Subdivision Development

- (a) TKO Properties Limited is proposing to establish 30 lots within the Rocky Point property. 22 lots will contain a designated building platform including a dwelling and supplementary buildings and hard stand areas and a curtilage area to enable suitable living space around each building platform. Conditions will be established enabling limited modification of the curtilage areas (refer proposed condition 11 provided in Mr Brown's evidence). Septic systems will be sited in the curtilage areas. The remaining eight lots are smaller in size and allocated to chalet style housing without curtilage areas.
- (b) Within Rocky Point there is a Landscape and Vegetation Protection Area (LVP). While privately owned, this balance area will be subject to covenants prohibiting vegetation clearance and imposing an obligation on owners to undertake pest (rabbit and goat) and weed control. The LVP will be managed by an owner representative group. Additionally, Rocky Point includes a Scheduled Special Zone that anticipates a smaller lot size, with the balance area surrounding each lot being held in common and being protected in the same manner as the LVP areas described above.

[23] Scope of the Ecological Impact Assessment (EclA)

- (a) The revised ecological assessment prepared by Beale Consultants dated July 2024 describes the ecological setting of the property; the affected vegetation communities, habitats and indigenous fauna, their ecological value and ecological significance, provides an assessment of the magnitude and level of ecological effects arising from the development; sets out the

effects management hierarchy, and describes the biodiversity offsets proposed to address residual adverse effects.

- (b) This assessment of the ecological values and magnitude and level of ecological effects follows the criteria set out in the Environment Institute of Australia and NZ (EIANZ) Guidelines for Ecological Impact Assessment (2018). Ecological significance was determined in accordance with the criteria set out in Appendix 1 of the NPS-IB.
- (c) The proposed biodiversity offsets have been formulated in accordance with the principles set out in Appendix 3 of the NPS-IB.
- (d) The assessment takes a conservative approach and is based on the assumption that the indigenous vegetation cover within the building platforms and curtilage areas will be cleared.

[24] **Vegetation Clearance**

- (a) The works comprising building platforms and curtilage areas, driveways, ROW's and access road upgrades will result in the permanent clearance of approximately 17,370 m² of kānuka shrubland - scrub and 39,480 m² of cushionfield. These areas represent in percentage terms approximately 5.1% and 28.3% respectively of the land area these plant communities occupy at Rocky Point, both inside and outside of the development area.

Ecological Context

[25] The property is located in the Dunstan Ecological District and within the montane bio-climatic zone, ranging in altitude from c. 200 to c. 450 m a.s.l.

[26] The vegetation at Rocky Point and across surrounding hill country is classified by Singers and Rogers (2014) as VS2: Kānuka scrub/forest occurring in semi-arid dryland zone where rainfall is <650 mm per annum. GrowOtago online maps indicate a median rainfall in the Bendigo area of between 400 – 500 mm per annum.

- [27] The Threatened Environments Classification¹ indicates that the indigenous vegetation cover remaining in the Level IV land environments covering the property, N4.1e is 23.7% and N8.1b is 5.2%. These low percentages are attributed to development of the land for pastoralism since European settlement. Much of the area proposed for subdivision development is in Land Environment N4.1e.
- [28] Indigenous vegetation cover in these land environments is expected to increase over time in the absence of fire, as kānuka cover increases across the low hill country in the Bendigo area.
- [29] The historic vegetation cover determined from recent mapping of potential natural ecosystems of Central Otago would have comprised Kānuka, *Olearia* scrub/treeland². The naturally more drought prone areas would likely have supported cushionfield plant communities.
- [30] Since European settlement, cushionfield plant communities increased in area across land that became degraded through overgrazing and rabbit infestations. However, in more recent times cushionfields has been reducing in area through land use changes and land intensification in Central Otago. This is reflected in the threat ranking of the two main cushion species, *Raoulia australis* and *Raoulia beauverdii* of At Risk-Declining. This status remains unchanged in the latest update to the conservation status of vascular plants in Aotearoa New Zealand, 2023.
- [31] Despite the recent losses, extensive areas of cushionfield remain across the low elevations with west to north facing aspects between Northburn Station in the south to The Point Station in the north as was observed during a helicopter fly over.

Summary of Vegetation Communities and Habitats of Indigenous Fauna

- [32] The vegetation communities and habitats that occur at Rocky Point are:

¹ The TEC combines data from three national databases; LENZ, the Land Cover Database (LCDBv4.0, based on 2012 satellite imagery), and a 2012 update of the national protected areas network.

² <https://maps.orc.govt.nz/OtagoViewer232/?map=7d0ef0d7ba724378a0ba22ecd88f3180>.

- Kānuka shrubland - scrub;
- Cushionfield;
- Grey shrubland;
- Sweet briar shrubland;
- Silver tussock grassland;
- Exotic herbfield;
- Exotic grassland; and
- Rocky substrates.

[33] A large part of the property, especially the rocky and steeper terrain is covered in kānuka (*Kunzea serotina*) shrubland - scrub while open areas within and bordering the kānuka features cushionfields dominated by golden scabweed (*Raoulia australis*) and exotic herbfield dominated by scarlet pimpernel (*Anagallis arevensis*), stonecrop (*Sedum acre*) and hemlock (*Conium maculatum*). Patches of grey shrubland occur within gullies in association with kānuka scrub.

[34] Indigenous plant communities prevail at Rocky Point.

[35] Thirteen Threatened and At Risk plant species have been recorded at Rocky Point, many occurring in association with the cushionfields. It is noted that the conservation status of kānuka and matagouri has recently been downgraded from At Risk-Declining to Not Threatened.

[36] In her submission, Ms Wardle noted a number of Threatened and At Risk plants that have been previously overlooked in the original ecological impact assessment that are likely to occur at Rocky Point. These are the spring annuals; the New Zealand mousetail (*Myosurus minimus* subsp. *novae zelandiae*) ranked Nationally Vulnerable and the forget-me-not (*Myosotis brevis*) ranked Nationally Vulnerable, the fan mat daisy (*Raoulia monroi*) ranked Nationally vulnerable, the desert pin cushionfield (*Colobanthus brevisepalus*) ranked At Risk-Declining and the vagrant lichen (*Xanthoparmelia semiviridis*) ranked At Risk-Declining. Walk over surveys conducted in spring of 2023 at Rocky Point and at Bendigo Hills Estate recorded populations of New Zealand mousetail, *Myosotis brevis* and *Colobanthus brevisepalus*.

[37] A survey of Rocky Point and the adjoining Bendigo Hills Estate by Dr Tocher of LizardExpertNZ and subsequently by Ms Samantha King recorded two lizard species, McCann's skink (*Oligosoma maccanni*) and Kowhai gecko (*Woodworthia* "Cromwell"). These species were commonly observed in the various habitat types occurring on the properties such as rocky habitats, open areas and shrublands. Dr Tocher attributes this wide distribution to the variety of rock habitat in the form of loose rock slabs and outcroppings encountered. Additionally, both species were observed making full use of the cushionfields for cover. Details on the avoidance, remediation and mitigation measures proposed in response to effects of the development on these lizard species is set out in the Lizard Management Plan prepared by Ms King.

Assessment of Ecological Values

[38] In the EclA I scored the ecological value of the indigenous vegetation and habitats of indigenous fauna affected by the subdivision as high in accordance with the criteria set in the EIANZ Guidelines (Attachment 1). The high score is attributed to:

- Extensive areas of dryland kānuka shrubland-scrub associated with rocky terrain, bluffs and gullies;
- Sensitive dryland cushionfields dominated by golden scabweed which has a threat classification of At Risk-Declining;
- Presence of the At Risk-Declining pygmy mistletoe (*Korthalsella salicornioides*) on kānuka trees;
- Relic specimens of the At Risk-Declining *Olearia lineata*, and regionally uncommon kowhai (*Sophora microphylla*);
- Presence of populations of the At Risk-Declining Kowhai gecko;
- Presence of suitable habitat for the nationally vulnerable Eastern falcon.

[39] When taking account of the presence of the nationally threatened spring annuals and saline ecosystems at Rocky Point I have elevated the ecological value of the vegetation and habitats within the development area from high to very high.

Ecological Significance of Affected Areas

[40] I have undertaken a further assessment of the affected indigenous vegetation and habitats of indigenous fauna against the criteria set out in Appendix 1 of the NPS-IB. This assessment re-affirms the ecological significance of the affected indigenous vegetation and habitats of indigenous fauna at Rocky Point.

Assessment of Ecological Effects

[41] I assessed the magnitude of ecological effect and level of ecological effect of the development using the EIANZ criteria set out in Attachment 2.

[42] The magnitude of effect is correlated to the extent of clearance or modification of the cushionfields, kānuka shrubland - scrub and rocky terrain and the numerous habitats for indigenous flora and fauna, with many ranked as Threatened and At Risk species.

[43] In scoring the magnitude of ecological effects I adopted a conservative approach and assumed that all the kānuka shrubland - scrub and cushionfield and associated habitats that are situated within or affected by the building platforms and curtilage areas and for driveways, ROW's and access road upgrades will be permanently removed.

[44] The magnitude of ecological effect of the development on the cushionfields is scored as very high reflecting the proportion of cushionfields that would be permanently removed from the property (26%) representing a major alteration to a key element of the existing baseline conditions leading to a post-development character being fundamentally changed at a local level due to fragmentation of this plant community. The level of ecological effect is also very high.

[45] The magnitude of ecological effect of the development on the kānuka shrubland - scrub which I originally scored as low I now score as high reflecting the fact that affected kānuka trees host the At Risk-Declining pygmy mistletoe and provide overhead cover for the spring annuals.

- [46] While not assessed using the EIANZ criteria there are fragmentation effects of the development on the kānuka shrubland-scrub and cushionfield mosaic.
- [47] The walk over surveys and locations of the nationally threatened spring annuals as recorded would indicate there will be a low effect of the development on the local populations as many of the plants recorded are located outside of the development area in the LVP where there is more favourable habitat. The location of the recorded plants is shown on Attachment 3.
- [48] The ecological effects of the development on lizards and recommended avoidance and mitigation measures that will be formalised in a Lizard Management Plan are set out in Ms King's evidence.

Effects Management Hierarchy

- [49] The effects management hierarchy as set out in the NPS-IB addresses the management responses to the ecological effects of the development sequentially in accordance with the Interpretation and Clause 3.16(1) of the NPS-IB, as follows.
- [50] Avoidance Measures where practicable
- (a) Avoiding disturbance to areas of saline-sodic soils and associated cushionfields encompassing an area of 1.07 ha. as identified by Mr Gibson.
 - (b) Avoiding kānuka trees that host the At Risk - Declining pygmy mistletoe, where practicable.
 - (c) Avoiding areas of mature kānuka shrubland-scrub and associated vegetation communities that are in a more advanced stage of natural succession and generally have higher ecological values.
 - (d) Avoiding habitat that supports populations of the nationally threatened spring annuals, *Myosurus minimus* subsp. *novae-zelandiae* and *Myosotis brevis* (spring annual species). Habitats favoured by these plants generally exist around the margins of

kānuka shrubland - scrub with southerly aspects where there is minimal cover of exotic grasses and forbs.

- (e) Avoiding mature specimens of At Risk-Declining *Olearia lineata*, matagouri, kowhai, mingimingi and korokia owing to their scarcity at a local level, their habitat value for indigenous lizards and invertebrate fauna and their distinctiveness.
- (f) Avoiding rock habitat that supports lizards and implementing setbacks or no disturbance zones around rock outcrops.
- (g) Avoiding on-site quarrying of rock for road metal.

[51] Minimisation Measures (where adverse effects cannot be avoided)

- (a) Minimising the footprints for building platforms, curtilages, roads, water tanks, laydown areas, car parks and wastewater disposal fields. These design constraints are to be actively managed through consent notice conditions, and serve to minimise adverse effects on biodiversity values.
- (b) Implementing site controls that require all works associated with construction of dwellings and supporting infrastructure including machinery movements and storage, laydown and parking areas to take place within clearly defined construction zones.
- (c) Avoiding introduction of weeds from rocks by importing rock from a weed free source.
- (d) Clearly defining accessways for construction machinery and vehicles.
- (e) Installing underground services within road footprints.
- (f) Trimming of indigenous woody vegetation where possible during construction works as opposed to complete removal of trees and shrubs.
- (g) Retention (as far as practicable) of root beds of felled trees and shrubs to minimise off-site effects caused by erosion.

[52] Remediation Measures (where adverse effects cannot be minimised)

- (a) Creating schist rock habitats, under the supervision of a herpetologist, ahead of the development works through retrieving and hand placing of slab rocks across areas naturally impoverished of rock, on open and sunny sites, outside of high foot traffic areas and outside of building platforms and curtilage areas as well as across uphill and downhill road batters. The rocks should be stacked so that a variety of lizard cervices and basking platforms are created and protected from wet weather.
- (b) Plantings of indigenous shrubs are proposed around the perimeter of the building platforms within the curtilage areas.
- (c) Ongoing weed and pest control by an owner representative group.

[53] Biodiversity offsetting is proposed to address more than minor residual adverse effects that cannot be avoided, minimised, or remedied.

- (a) TKO is proposing to undertake offset plantings at four sites in Rocky Point beyond the development area and at three sites in the adjacent Bendigo Hills Estate. At Rocky Point three sites are located in a prominent kānuka covered gully and the fourth site on a terrace above SH8. At Bendigo Hills Estate offset plantings are proposed at three sites, named as Hemlock Gully, Panaroma Rise and Pylon Flat. The offset sites collectively cover 6.4 ha, comprised of 0.58 ha at Rocky Point and 5.7 ha at Bendigo Hills Estate. The offset sites at Bendigo Hills Estate are similar in terms of location and extents to what was proposed in the original EclA, dated September 2023.
- (b) The offset actions will entail planting of forest and shrub species that includes high value (threatened and at risk) plant species representing the pre-settlement climax communities at Rocky Point as identified by Wildlands.
- (c) The offset plantings will assist in reducing fragmentation effects and improve connectivity within Rocky Point outside of the

development area and between Bendigo Hills Estate and the Bendigo Scenic Reserve.

- (d) In the EclA I incorrectly referred to the plantings at Rocky Point as being biodiversity compensation when in fact they are plantings of high value plant species consistent with the offset plantings at Bendigo Hills Estate.
- (e) An offset accounting model has been used to assess the biodiversity outcomes achieved through the proposed plantings and plant management post planting.
- (f) Two slightly different offset plantings have been developed and modelled; one to offset the loss of kānuka shrubland (shrubland offset) and one to offset the loss of cushionfield (cushionfield offset).
- (g) A description of the model and outputs is provided in Dr Well's evidence.
- (h) The offset actions will be supported by pest and weed control, provision of irrigation, monitoring and reporting on plant health and performance.
- (i) Dr Wells describes in his evidence the likely components of the pre-settlement vegetation types that occurred within the gullies and basins in Rocky Point that have informed species selection at the offset sites.

[54] Positive Effects

The development will yield significant positive ecological effects. These are:

- Formal protection of the land outside of the development area representing approximately 87% of Rocky Point;
- Representation of likely pre-settlement climax woody vegetation communities in the offset plantings that are the most under-

represented vegetation types in the Dunstan ED and Central Otago ER;

- Improved connectivity and buffering functions for the Bendigo Scenic Reserve through the offset plantings;
- Improved habitat quality for indigenous lizards, avifauna and invertebrates;
- Enhancement of an ephemeral seepage wetland;
- Property wide weed control including across areas of cushionfield on saline-soic soils;
- Ongoing rabbit and goat control;
- Stock exclusion;
- Maintenance and enhancement in perpetuity of the natural character of approximately 87% of the Rocky Point land area.

Conclusions

[55] The effects management hierarchy measures including the proposed offset, combined with the additional positive ecological effects outlined above, will achieve a net gain in indigenous biodiversity over a 30 year timeframe consistent with Principle 3 set out in Appendix 3, NPS-IB. Importantly the proposed offset and additional positive effects will lead to significantly greater gains in biodiversity values than can be obtained solely from the proposed minimisation and remediation measures.

[56] I further note that the net gains in biodiversity resulting from the actions proposed through the effects management hierarchy and additional positive effects will result in significantly greater long-term benefits for the ecology of the project area compared to a situation where Rocky Point remained under a farming regime.

Responses to the s42A Report

[57] I have set out my responses to the issues raised by Adam Vincent in the following table.

Issue Raised	Response
Need for expansion of the plant species list in each lot.	The list as proposed by Mr Baxter was compiled in conjunction with myself. The species are considered appropriate for exposed sites that would be unsuitable for a number of species proposed at the offset sites, especially in the more sheltered western gully at Rocky Point.
Controlling of the effects of high vibration activities on invertebrates around timing of such works.	These activities can be programmed to certain times of the day to reduce adverse effects on invertebrates. This will be documented in the construction management plan.
Some habitat restoration along with transplanting of cushion plants in the saline areas will only go some way towards reducing development effects.	The habitat restoration in the form of offset plantings cover an area of approximately 6.4 ha. This area in my opinion is of a suitable scale in offsetting the residual adverse effects of the development and thus achieving a net gain in biodiversity in accordance with the NPS-IB. Dr Wells provides more evidence on this matter in respect of the offset accounting model results.

The approximate area of 168 ha of cushionfield in the vicinity of the site does not mean that the ecosystem is not vulnerable or difficult to replace.

At Section 11.8, EclA I state that the cushionfields are not vulnerable as they represent an early successional plant community that colonises degraded land. Local farmers characterise it as a band aid that covers the land until other forms of vegetation are able to re-establish. The populations of cushion plants on these farming properties increased during the 20th century as a result of browse pressure from stock grazing and rabbits. Areas where rabbits are now being controlled and grazing is directed towards more productive areas clearly show that other vegetation (both native and exotic) are returning to compete with the cushionfield. In this sense, preservation of the current extent of cushionfield would necessitate maintaining the current dryland farming practice of (merino) grazing and rabbit populations but also actively controlling weed infestations.

I note that TKO is proposing to control invasive exotic weeds across areas of cushionfield that occur on the saline/sodic soils in recognition of their persistence in the longer term as opposed to other areas of cushionfield where kānuka and exotic weed encroachment is clearly evident.

In the case of irreplaceability, a helicopter fly-over and ground surveys have identified that cushionfields are widespread over low altitude hill country between Northburn Station near Cromwell and The Point Station near Tarras. The loss of

	<p>cushionfield at Rocky Point will not lead to a significant reduction in percentage terms in the extent of cushionfield communities that occur in the Dunstan Ecological District.</p>
<p>Certainty is sought that the proposed offsets will address the loss of cushionfield habitats and that a net biodiversity gain can be reliably achieved within reasonable timeframes.</p>	<p>I consider that the proposed offset provides a good level of confidence in its outcome and will satisfy the long term net biodiversity gain outcomes.</p> <p>The monitoring and annual reporting requirements as specified in the EEMP will be subject to consent conditions to ensure that the planting, weed control and aftercare management measures achieve the performance metrics set out in the EEMP. Achieving these metrics will ensure the offset plantings will become self-sustaining within a 15 year timeframe.</p> <p>Further, the quantitative offset model developed by Wildlands and described in Dr Wells' evidence indicates that a net biodiversity gain can be achieved in 30 years for cushionfield and shrubland offsets. This timeframe is considered consistent with Principle 8 at Appendix 3, NPS-IB, i.e. being achieved within a resource consent timeframe.</p>
<p>Harming existing indigenous biodiversity at the offset sites.</p>	<p>We have heeded the concern expressed by Mr Harding and re-configured the Pylon Flat offset site to avoid areas of cushionfield. To address this reduction in the offset site area, further land has been added to the Panaroma Rise offset site.</p>

	<p>The Hemlock Gully site is an ephemeral wetland (seepage) but it is covered predominantly in hemlock based on RECEE plot data. In all the sampled lots the cover of hemlock and other exotic forbs varies from 55 to 95%. Bare ground varied from 10 to 45%. Indigenous vegetation presence is negligible.</p>
<p>The amended application still fails to avoid significant loss of ecosystem representation and extent or reduction in ecosystem function, particularly for cushionfield ecosystems.</p>	<p>This is symptomatic of the adverse residual effects of the development as determined from the effects management hierarchy. The effects management hierarchy requires these effects to be offset to address the loss of cushionfields and kānuka shrubland-scrub communities from within the development area. The proposed offset addresses the loss of ecosystem representation, extent and function.</p>
<p>The application does not appropriately apply the effects management framework in the NPS-IB.</p>	<p>It is my contention that the effects management hierarchy has been correctly applied. The EclA clearly sets out the avoidance, remediation and mitigation measures proposed by TKO, and consequently the biodiversity offsetting measures required to address residual adverse effects of the development as determined from the effects management hierarchy. My evidence above demonstrates how the principles for biodiversity offsetting are applied.</p>

Responses to the peer review of Mr Harding

[58] I have set out my responses to the issues raised by Mike Harding below using his report heading and sub-headings for ease of reference.

Issue Raised	Response
4.1 Plant Species Data	
<p>The EIA states that a summary of the RECCE plot data is presented in Appendix 2. Appendix 2 does not list the species recorded – nor their percentage cover – in the RECCE plots, as required by the RECCE plot method.</p> <p>The RECCE plot survey data are likely limited by the small plot size (4 m²) in cushionfield communities. RECEE plots in non woody plant communities are typically 10 m² or a variable</p>	<p>Each RECCE plot sheet includes a list of recorded species and percentage cover. These will be provided to Mr Harding in advance of the hearing.</p> <p>I disagree that the size of the plot (4 m²) limits the recording of all flora within the affected cushionfield communities. These communities are of a similar stature to turf communities and are generally homogenous in terms of species composition. Hurst and Allen (2007) specify plots sizes of 2 m² for turf communities. The plot size is appropriate for cushionfields. The surveys of spring annuals was very thorough across the development area and the balance of the property. It was clear from the walk over surveys and the RECCE plot surveys that the affected areas of cushionfield do not support spring annuals. The surveys showed the preferred habitat for spring annuals generally occur</p>

<p>area that is large enough to contain most of the species that occur in the plant community.</p> <p>It is unclear whether all plant species were recorded in the RECEE plot surveys, whether the cushionfield plot size was sufficient to adequately describe that vegetation type and whether the surveys can reliably confirm the absence of threatened spring annual species. Ideally all parts of the project area directly affected by the proposed development should be thoroughly surveyed, not just sampled over more than one spring-summer season.</p>	<p>beneath the canopy of kānuka shrubland where soil moisture conditions are more favourable and where there is lack of competition from exotic forbs and grasses.</p> <p>The RECCE plots surveys have been sufficiently comprehensive in coverage and in providing an accurate record of species composition and percentage cover. I do not consider a further spring-summer season of sampling is warranted.</p>
<p>4.2 Invertebrate Species Data</p>	
<p>A desktop survey is insufficient for assessment of the effects of an activity at a location where vulnerable ('at risk') invertebrate species have a</p>	<p>The desktop assessment conducted by Wildlands serves to reinforce the high score assigned to the magnitude of effects of the development on invertebrate</p>

<p>high “likelihood of being on-site” and where the potential effects of the activity may be permanent (i.e., “for at least 35 years”).</p>	<p>fauna. The assessment confirms the importance of cushionfield plant communities as habitat for invertebrate taxa.</p> <p>I concede that a field survey should have been undertaken to validate the desktop assessment findings.</p> <p>I note that the proposed avoidance, minimisation, remediation and offset measures will assist in improving habitat quality for invertebrate taxa.</p>
<p>4.3 Land Environments Data</p>	
<p>There has been considerable loss of indigenous vegetation within those land environments in Central Otago since 2012, notably through land-use change to high-producing grassland (pasture) and built-up area (settlement). Indigenous vegetation is now likely to be depleted to less than 20% of its former extent in the N4.1e Land</p>	<p>It is clearly apparent from historic aerial imagery that the extent of indigenous cover in the form of kānuka shrubland-scrub is increasing in extent in the Bendigo area, including within Land Environment N4.1e. I would expect there the percentage of indigenous vegetation cover in this land environment will increase over time due to successional processes favouring kānuka shrubland-scrub growth.</p>

<p>Environment (i.e., 'chronically threatened') and be further reduced in the N8.1b Land Environment (i.e., still 'acutely threatened').</p>	<p>Application of the effects management hierarchy including offsetting will ensure that the proposed Rocky Point development will not result in further loss of indigenous cover within these land environments.</p>
<p>4.3 Vegetation Classification</p>	
<p>The RMA does not necessarily place significance on 'original' or 'potential' vegetation. Instead, it requires protection of existing ecologically significant indigenous vegetation/habitat (s.6(c)) and the maintenance of existing indigenous biodiversity (s.31b). Any uncertainty about those requirements has been clarified by the NPS-IB which defines 'indigenous biodiversity' as "living organisms that occur naturally in New Zealand" and requires assessment of the significance of indigenous vegetation typical of that in the present-day environment.</p>	<p>Section 6(c) and s31.b RMA while requiring the protection of and maintenance of indigenous biodiversity does not include any qualification concerning existing indigenous biodiversity.</p> <p>I agree that this qualification is provided in the NPS-IB and is consistent with the significance assessment I provide at Section 8 of the EclA. This states that the indigenous biodiversity at Rocky Point is significant using the assessment criteria set out in Appendix 1 of the NPS-IB and applies to the present point in time at Rocky Point.</p>

<p>Descriptions of the vegetation that would have occurred or is expected to occur (climax communities) at the project area are of limited relevance for assessment of the effects of the activity or for the design of a biodiversity offset (or compensation) proposal. These analyses should also recognise the contribution the project area makes to maintenance of present-day indigenous biodiversity, the vulnerability of that biodiversity, and the need to protect and maintain existing indigenous biodiversity.</p>	<p>I would contend that the analysis of the pre-settlement climax communities is definitely of relevance. The analysis as provided by Dr Wells in his evidence is in my opinion fundamental to the design of the biodiversity offsets as proposed.</p> <p>The EclA clearly sets out the contribution the project area makes to the maintenance of the present day indigenous biodiversity at Section 8.</p> <p>While the development will result in the loss of cushionfield and kānuka shrubland – scrub communities, the development also involves the formal protection of the balance of the property that would not otherwise occur under a status quo scenario. It is likely based on a number of field observations that ecological values at Rocky Point will decline over time due to pest and exotic weed infestations in the absence of management interventions such as if Rocky Point were to remain as farmland.</p>
<p>The project area is within a part of New Zealand that is predicted to experience a greater frequency and severity of wildfire events. The likely vegetation pattern over time is gradual succession</p>	<p>The reference to a rapid change in the climate and consequent resulting extreme wildlife fire events is a matter of concern to all landowners in Central Otago.</p>

<p>to drought-tolerant woody vegetation (such as kānuka), followed by removal of that woody vegetation by wildfire. The length of each vegetation succession-wildfire period will likely be determined by climate – which is predicted to change rapidly – and the consequent extreme wildfire events, the frequency of which is expected to increase.</p>	<p>TKO Properties has been working closely with FENZ and has prepared a fire management plan in response to the fire risk presented by the prevailing woody (kānuka) vegetation. Fire suppression measures are addressed in the evidence of Mr Jamie Cowan.</p>
<p>5.0 Assessment of Effects</p>	
<p>The biodiversity offset proposal outlined in the EIA uses the EIANZ Guidelines method to assess ecological value and magnitude of effects. These guidelines are non-statutory and are not recommended or endorsed by the Ministry for the Environment, Department of Conservation, nor Ecological Society of New Zealand. Recent hearing decisions have expressed concern that</p>	<p>The EIANZ Guidelines are used widely by ecologists and recognised as a legitimate tool by many local authorities and ecology peer reviewers commissioned by Councils.</p> <p>The use of the Guidelines to assess ecological values and ecological effects in regard to this application have been thorough and in my opinion accurately reflect</p>

<p>use of the EIANZ Guidelines can result in wide differences in assessed ecological value and magnitude of effect and noted that use of the guidelines is problematic.</p>	<p>the ecology of the development area and its ecological context at a local and ecological district level.</p>
<p>The EIA assesses the overall ecological value of the project area as “very high” (p24) and confirms that it is ecologically significant. The EIA then proceeds to assess selected components of the location separately, using the EIANZ Guidelines method. This method gives insufficient regard to the importance of ecological processes (ecological integrity) at the project area and the contribution the area makes to the surrounding environment (ecological context).</p>	<p>The ecological value and ecological significance of the project area has been assessed in Section 8, EclA against the criteria set out in the EIANZ Guidelines and in Appendix 1, NPS-IB. This includes ecological context which is one of the assessment criteria which covers ecological integrity. This criterion is scored as high. I agree that the ecological processes are an important part of the assessment and should have been conveyed more clearly and thus reinforce the high score assigned to the ecological context criterion for the kānuka shrubland-scrub and cushionfield communities.</p>
<p>The EIA then applies the NPS-IB effects management hierarchy to outline how the proposed activity will avoid, minimize or remediate</p>	<p>I consider that my effects assessment is consistent with the requirements of the EIANZ Guidelines in addressing the ecological features of the project area in turn.</p>

<p>adverse effects (p28-30). However, it applies this assessment to individual components of the project area, regardless of its assessment of the whole project area as ecologically significant and having 'very high' ecological value.</p> <p>The risk of the EIANZ method is that ecological attributes, such as diversity and pattern, and important adverse effects of the activity, notably fragmentation of the project area (not just each vegetation type), may not be adequately assessed. The project area is ecologically significant as an area (SNA), not just ecologically significant for its separate components.</p>	<p>These being the cushionfield communities, kānuka shrubland - scrub, avifauna, lizards and invertebrates.</p> <p>I concede that an overall statement of the effects of the development on the indigenous biodiversity covering all indigenous vegetation communities and habitat should have been included in the EclA, particularly the effects of fragmentation on cushionfield communities.</p> <p>These effects reinforce the high to very high scores that have already been assigned to the magnitude of ecological effect in the EclA and thus underscore the requirement for biodiversity offsetting as per the effects management hierarchy.</p> <p>The EclA states the development area as a whole is ecologically significant.</p>
<p>There remains uncertainty about the potential effects of the proposed development (roads, houses, gardens, lawns) on remaining indigenous biodiversity at the project area, notably the health</p>	<p>The proposal will impose restrictions through legal instruments that will limit the development of curtilage areas and roading including driveways. Details on the</p>

<p>and survival of ‘at risk’ or ‘threatened’ species, especially species that may be present at saline habitats. The ‘edge’ or ‘off site’ effects on saline and cushionfield habitats appear to be strongly correlated with an intensification of land-use in the surrounding area. Similarly, increased nutrients, water and weeds from intensified land use have been shown to facilitate plant invasions into dryland shrubland.</p>	<p>restrictions that will be imposed on lot owners is covered in the evidence of Mr Brown.</p> <p>Rocky Point is significantly affected by rabbits and exotic plant infestations. The control of rabbits and other browsers and invasive plants will form part of the management regime of a corporate body or similar tasked with the management of the land within and surrounding the project area.</p> <p>In the absence of this management regime the ecological values of Rocky Point will degrade.</p>
<p>6.0 Review of the Proposed Biodiversity Offset</p>	
<p>6.1 No Net Loss & 6.2 Equivalence Principles</p>	
<p>The proposed biodiversity offset – if successful – will be woody vegetation that is more diverse than the kānuka shrubland/scrub that will be lost or adversely affected at the project area. The proposed offset will not replicate the cushionfield community and fauna habitat; nor will it replicate</p>	<p>The EciA is abundantly clear that the loss of cushionfield plant communities is a high residual adverse effect that requires the effect of loss of this plant community including effects of fragmentation to be offset.</p> <p>The cushionfields represent an early succession plant community that is being succeeded by kānuka. Replicating the cushionfields at offset sites is not in my</p>

<p>the condition (structure and quality) of indigenous biodiversity values at the project area.</p> <p>The proposal offsets the loss of woody plant species in the project area. It does not adequately offset the loss of other plant communities or the effects on other ecological values, such as fragmentation of a naturally functioning and ecologically significant site (ecological integrity).</p> <p>The proposed offset does not provide a like-for-like gain in the condition (structure and quality) of the indigenous biodiversity present at the project area. The proposed activity will remove vegetation/habitat at parts of the project area and will fragment the remaining vegetation/habitat with roads and residential sections.</p>	<p>opinion sound ecological practice as the replicated cushionfields would themselves be succeeded within a relatively short period of time.</p> <p>The biodiversity accounting model outputs show that the offset plantings will offset the loss of cushionfield with positive NPBV outcomes for indigenous cover, indigenous species richness and basal area.</p>
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6.3 Net Gain Principle	
<p>The proposed biodiversity offset is inconsistent with the Net Gain Principle (Principle 3(c)) of the NPS-IB (Appendix 3), which requires that the condition (structure and quality) of the indigenous biodiversity values at the offset site “are equivalent to or exceed those being lost at the impact site”.</p>	<p>The offset plantings of high value climax species will improve the condition of the biodiversity at the offset sites by increasing species diversity and over time the structure of the woody plant communities and habitat quality at the offset sites.</p> <p>The biodiversity accounting model outputs show that the offset actions will result in positive basal area and species diversity outcomes. Basal area is the most indicative measure of the progressive development of forest/shrubland ecosystems.</p> <p>The condition of the cushionfield plant communities will be improved through control of invasive weeds such as hemlock and stonecrop.</p>
6.3 Leakage	
<p>The proposed biodiversity offset planting will likely result in clearance of indigenous vegetation (loss of indigenous biodiversity) at the Panorama Rise and Pylon Flat offset sites. These effects do not</p>	<p>I accept that the offset plantings will affect some cushionfield communities at the Pylon Flat offset site. This site has accordingly been reduced in size to avoid the cushionfields.</p>

<p>appear to have been assessed in the application or considered in the biodiversity offset modelling. The offset plantings will – in effect – displace existing vegetation and replace it with small patches of indigenous vegetation that is not typical or characteristic of the present day indigenous biodiversity at these locations.</p> <p>The proposed biodiversity offset is inconsistent with the Leakage Principle (Principle 5) of the NPS-IB (Appendix 3), which requires that the offset “avoids displacing harm to other indigenous biodiversity”.</p>	<p>Additional land has been added to the Panaroma Rise offset site to ensure the overall area of the offset sites remains the same.</p>
<p>6.4 Long-term Outcomes</p>	
<p>The EIA and EEMP do not explain how the biodiversity offsets will be sustained in the long-term. Compliance with resource consent conditions in New Zealand is poor, especially where actions and outcomes are poorly defined.</p>	<p>The proposed offset will certainly satisfy the long term outcomes of this principle.</p> <p>The monitoring and annual reporting requirements as specified out in the EEMP will be subject to consent conditions to ensure that the plants are eco-sourced, are of a suitable grade and that weed control and aftercare management</p>

<p>The EIA contains insufficient information to provide confidence that the outcomes of the proposed biodiversity offset will be achieved and maintained in the long term.</p> <p>The proposed biodiversity offset is unlikely to satisfy the Long-term Outcomes Principle (Principle 6) of the NPS-IB (Appendix 3), which states that “a biodiversity offset is managed to secure outcomes of the activity that will last at least as long as the impacts, and preferably in perpetuity”.</p>	<p>measures achieve the performance metrics set out in the EEMP. Achieving these metrics will ensure the offset plantings will become self-sustaining.</p>
<p>6.5 Appropriateness</p>	
<p>The proposed activity will have adverse effects on vulnerable indigenous biodiversity. The proposed biodiversity offset is inconsistent with Principle 2(a) of the NPS-IB (Appendix 3), which states that</p>	<p>At Section 11.8, EclA I state that the cushionfields are not vulnerable as they represent an early successional plant community that colonises degraded land. Local farmers characterise it as a band aid that covers the land until other forms of vegetation are able to re-establish. The populations of cushion plants on</p>

the offsetting is not appropriate where the “residual effects cannot be addressed because of the irreplaceability or vulnerability of the indigenous biodiversity affected”.

these farming properties increased during the 20th century as a result of browse pressure from stock grazing and rabbits. Areas where rabbits are now being controlled and grazing is directed towards more productive areas clearly show that other vegetation (both native and exotic) are returning to compete with the cushionfield. In this sense, preservation of the current extent of cushionfield across this area, assuming their retention, would necessitate maintaining the current dryland farming practice of (merino) grazing and rabbit populations and undertaking active control of weed infestations.

I note that TKO is proposing to control invasive exotic weeds across areas of cushionfield that occur on the saline/sodic soils. This will ensure the cushionfields and consistent species such as *Raoulia australis* will persist for a long period of time at these locations.

The cushionfields at Rocky Point are also not vulnerable or irreplaceable as they represent a very small proportion of the cushionfields that currently exist in the Dunstan ED.

Conclusions

- [59] The proposed subdivision development will result in the permanent removal of areas of kānuka shrubland scrub and cushionfield that provide habitat for Threatened and At Risk flora and fauna.
- [60] The ecological value of the affected indigenous vegetation and habitats of indigenous fauna is scored as very high in accordance with the assessment matters set out in the EIANZ Guidelines. This is due to the presence of Threatened (Nationally Vulnerable) spring annuals and other plants ranked as At Risk - Declining that are associated with the cushionfields and kānuka shrubland-scrub, the presence of the At Risk - Declining Kawarau gecko, the possible presence of the Threatened kārearea (Eastern falcon) and existence of originally rare saline ecosystems.
- [61] The affected indigenous vegetation and habitats of indigenous fauna are ecologically significant in accordance with the NPS-IB.
- [62] The magnitude and level of ecological effect of the subdivision development on the cushionfields is assessed as very high in accordance with the EIANZ Guidelines on the basis of the percentage cover of cushionfields that would be cleared within the Rocky Point property.
- [63] The application of the EIANZ Guidelines represents best practice. The Guideline assessment criteria provides a robust framework for scoring ecological values at Rocky Point and for scoring the magnitude of ecological effects of the development.
- [64] Application of the effects management hierarchy shows that the loss of cushionfields and kānuka shrubland - scrub represent residual adverse effects that cannot otherwise be avoided, remediated or mitigated.
- [65] A biodiversity offset is proposed to address the residual adverse effects. The offset will involve plantings of species including those that represent pre-settlement climax communities.

- [66] The development will yield overall net positive ecological outcomes that are additional to the proposed biodiversity offsets.
- [67] The proposed biodiversity offsets meet the principles set out in the NPS-IB. These measures will ensure there is a net gain in biodiversity values at Rocky Point and at Bendigo Hills Estate over a 30 year timeframe.
- [68] Biodiversity values at Rocky Point in the absence of active management interventions such as pest and weed control will continue to decline.

ATTACHMENT 1 – Criteria for assigning Ecological Values (EIANZ, 2018)

Criteria to be considered when assigning ecological value and determining ecological significance of a vegetation community and habitat.

Assessment Matters	Criteria
Representativeness	<p>Criteria for representative vegetation and aquatic habitats:</p> <ul style="list-style-type: none"> • Typical structure and composition • Indigenous species dominate • Expected species and tiers are present • Thresholds may need to be lowered where all examples of a type are strongly modified <p>Criteria for representative species and species assemblages:</p> <ul style="list-style-type: none"> • Species assemblages that are typical of the habitat • Indigenous species that occur in most of the guilds expected for the habitat type.
Rarity/ distinctiveness	<p>Criteria for rare/distinctive vegetation and habitats:</p> <ul style="list-style-type: none"> • Naturally uncommon, or induced scarcity • Amount of habitat or vegetation remaining • Distinctive ecological features • National priority for protection <p>Criteria for rare/distinctive species or species assemblages:</p> <ul style="list-style-type: none"> • Habitat supporting Nationally Threatened or At Risk species, or locally uncommon species • Regional or national distribution limits of species or communities • Unusual species or assemblages • Endemism
Diversity and Pattern	<ul style="list-style-type: none"> • Level of natural diversity, abundance and distribution • Biodiversity reflecting underlying diversity • Biogeographical considerations – pattern, complexity

	<ul style="list-style-type: none"> • Temporal considerations, considerations of lifecycles, daily or seasonal cycles of habitat availability and utilisation
Ecological Context	<ul style="list-style-type: none"> • Site history, and local environmental conditions which have influenced the development of habitats and communities • The essential characteristics that determine an ecosystem's integrity, form, functioning, and resilience (from "intrinsic value" as defined in RMA) • Size, shape • Buffering function • Condition and sensitivity to change • Contribution of the site to ecological networks, linkages, pathways and the protection and exchange of genetic material • Species role in ecosystem functioning – high level, key species identification, habitat as proxy • Is important for indigenous fauna during some part of their life cycle.

Criteria used in assigning ecological value to terrestrial plant and animal species under the rarity/distinctiveness assessment matter.

Ecological Criteria	Value
Nationally Threatened species. Found in the site either permanently or seasonally	Very high
Species listed as At Risk-Declining found in the site either permanently or seasonally	High
Species listed as any other category of At Risk found in the site, either permanently or seasonally	Moderate
Locally (ED) uncommon or distinctive species	Moderate
Nationally and locally common indigenous species	Low
Exotic species including pests and species having recreational value	Negligible

Criteria for assigning ecological value to vegetation communities and habitats.

Value	Description
Very high	Area rates High for 3 or all the four assessment matters. Likely to be nationally important and recognised as such
High	Area rates High for 2 of the assessment matters. Moderate and Low for the remainder, or Area rates High for 1 of the assessment matters. Moderate for the remainder. Likely to be regionally important and recognised as such.
Moderate	Area rates High for one assessment matter. Moderate and Low for the remainder, or Area rates Moderate for 2 or more assessment matters. Low to Very Low for the remainder. Likely to be important at the level of the Ecological District.
Low	Area rates Low or Very Low for majority of assessment matters and Moderate for one. Limited ecological value other than as local habitat for tolerant native species.
Negligible	Area rates Very Low for 3 matters and Moderate. Low or Very Low for remainder.

ATTACHMENT 2 – Scoring Ecological Effect (EIANZ, 2018)

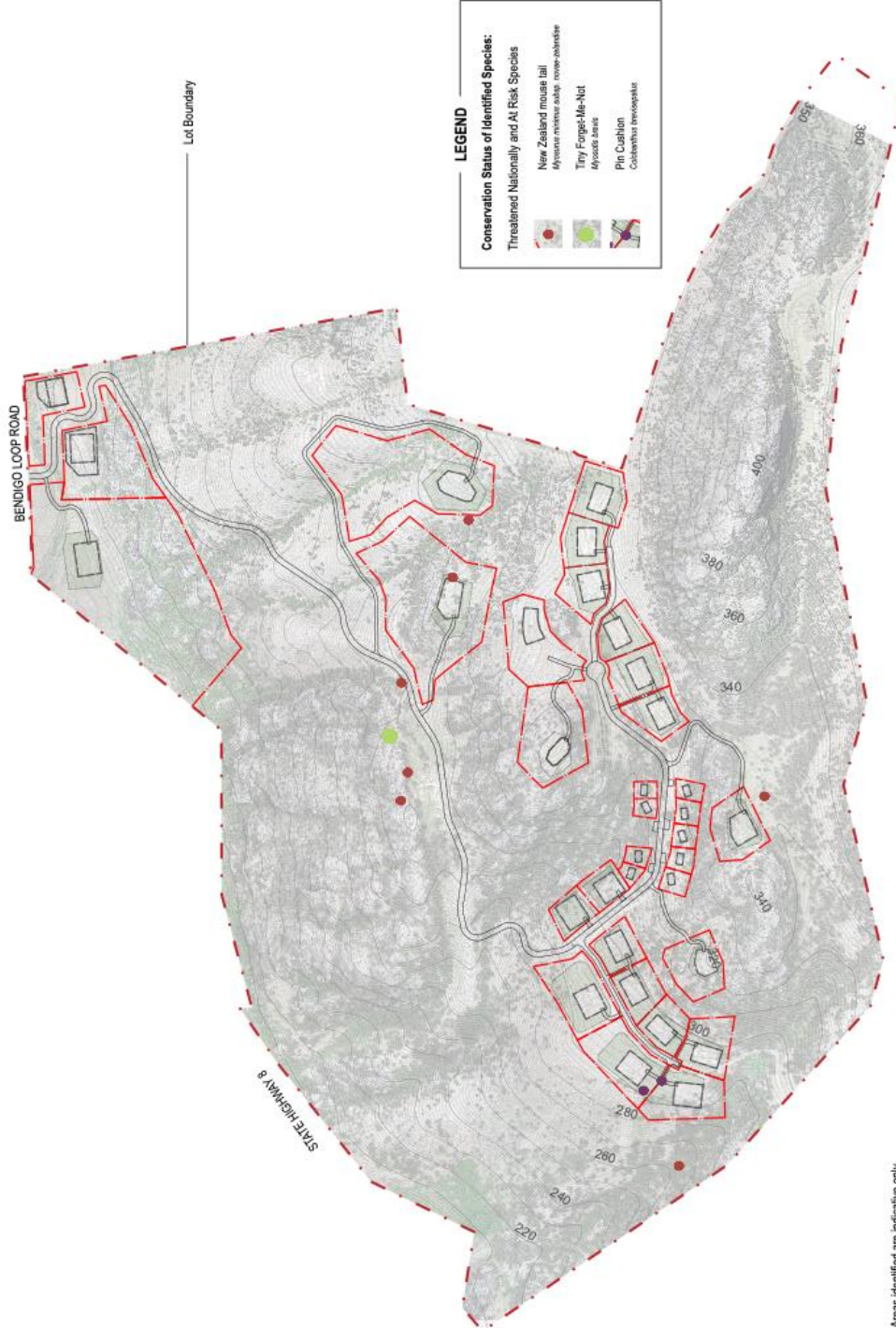
Criteria for scoring magnitude of effect

Magnitude	Description
Very High	Total loss of, or very major alteration to, key elements/features/ of the existing baseline conditions, such that the post-development character, composition and/or attributes will be fundamentally changed and may be lost from the site altogether; AND/OR Loss of a very high proportion of the known population or range of the element/feature
High	Major loss or major alteration to key elements/features of the existing baseline conditions such that the post-development character, composition and/or attributes will be fundamentally changed; AND/OR Loss of a high proportion of the known population or range of the element/feature
Moderate	Loss or alteration to one or more key elements/features of the existing baseline conditions, such that the post-development character, composition and/or attributes will be partially changed; AND/OR Loss of a moderate proportion of the known population or range of the element/feature
Low	Minor shift away from existing baseline conditions. Change arising from the loss/alteration will be discernible, but underlying character, composition and/or attributes of the existing baseline condition will be similar to pre-development circumstances or patterns; AND/OR Having a minor effect on the known population or range of the element/feature
Negligible	Very slight change from the existing baseline condition. Change barely distinguishable, approximating to the 'no change' situation; AND/OR Having negligible effect on the known population or range of the element/feature

Criteria for scoring level of effect

Ecological value → Magnitude ↓	Very high	High	Moderate	Low	Negligible
Very High	Very high	Very high	High	Moderate	Low
High	Very high	Very high	Moderate	Low	Very low
Moderate	High	High	Moderate	Low	Very low
Low	Moderate	Low	Low	Very low	Very low
Negligible	Low	Very low	Very low	Very low	Very low
Positive	Net gain	Net gain	Net gain	Net gain	Net gain

ATTACHMENT 3 – Location Plan: Threatened Spring Annuals and At Risk – Declining Pin Cushion



NOTE: Areas identified are indicative only



REFERENCE: 4271-16121 - SCALE: 1:4000 @ A3 - 21 MAR 2024
 DRAFT - NOT A WORKING DRAWING - NOT FOR CONSTRUCTION

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ECOLOGICAL ITEMS LOCATION
 INFRACON - BENDIGO