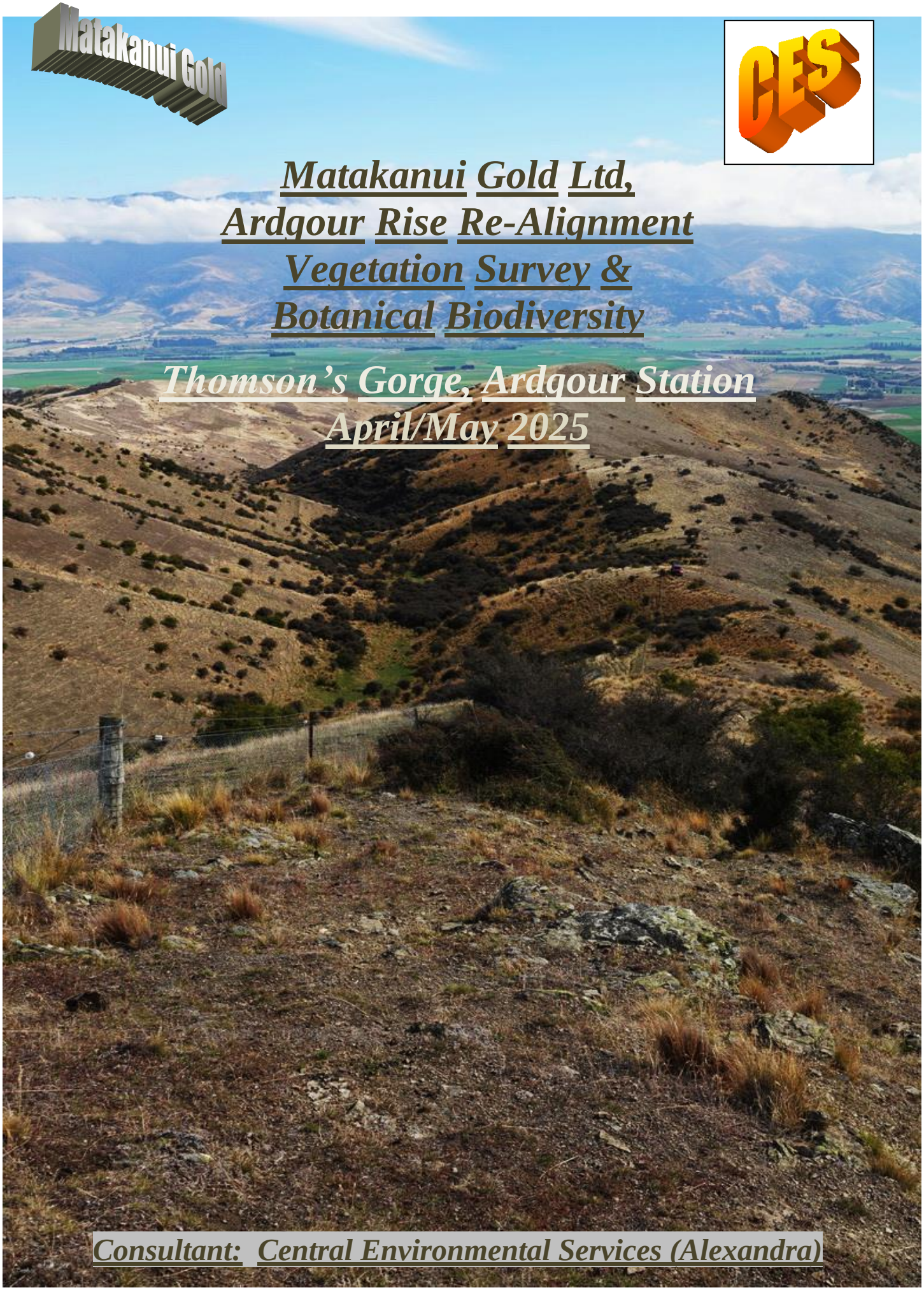
Matakanui Gold Ltd,
Ardgour Rise Re-Alignment
Vegetation Survey &
Botanical Biodiversity

Thomson's Gorge, Ardgour Station
April/May 2025



Consultant: Central Environmental Services (Alexandra)

Photo: *Ardgour Rise Road Alignment Overview – view towards RC210308 Drill Extension Site*

ARDGOUR RISE RE_ALIGNMENT VEGETATION SURVEY & BOTANICAL BIODIVERSITY, THOMSON'S GORGE, ARDGOUR STATION.

Report Compiled by: Dr Barrie Wills, Central Environmental Services, Alexandra
Assessment Date: March/April, 2025. Report May 5th, 2025.

Executive Summary

- *Matakanui Gold Ltd / Santana Minerals Ltd will need to close the existing Thomsons Gorge Road once the Bendigo Ophir Gold Project (BOGP) is consented in order to accommodate the new mine footprint, equipment access and haul roads. Re-alignment of the road is proposed along a ridgeline immediately to the north of Shepherds Ck, currently (mostly) traversed by an existing 4WD track on Ardgour Station, within Thomson's Gorge and more specifically north of Shepherds Creek.*

- *This independent report was requested by Matakanui Gold Ltd to survey and report on the vegetative ecology and botanical biodiversity status of the Ardgour Rise re-alignment site prior to undertaking consenting and construction of the new road.*

- *The site consists of part of the ridgeline immediately north of Shepherds Ck, along which the Thomsons Gorge Road diversion will be reconstructed. The Ardgour Rise re-alignment initially follows a dry, un-named creek bed south-east from the cherry orchard access road before gradually rising onto a sunny face, traversing that below an existing farm 4WD track and intersecting with the previously reported RC210308 drilling extension, then crossing a tributary to avoid the airstrip environs, re-joining the 4WD track and following that until it reaches the boundary with SN33 (Significant Natural Area 33, 350 ha, Ardgour Station). It then descends through SN33 to meet with another 4WD track running south-west to Thomsons Saddle and the existing Thomsons Gorge road.*

- *The altitude ranges from approximately 300m asl in the lower creek to ±1050m asl along adjacent ridgelines before it re-joins the existing road at Thomsons Saddle (±900m asl).*

- *An area including occasional porcupine shrub (Melicytis alpinus - Regionally Not Threatened), desert pimelia (Pimelia aridula - Threatened-Regionally Vulnerable) and desert broom (Carmichaelia petriei - At Risk-Regionally Declining) was identified near the top of an old track leading up from the western gully. It is recommended that this area be avoided if possible, or suitable mitigation options be instigated. Several mitigation options and rehabilitation methods are discussed.*

- *The sunny aspect vegetation above the creek was largely comprised of mixed, depleted grassland and herbfield with some small patches of scrub. Two mature kowhai (Sophora microphylla - Regionally Not Threatened) trees present near the eastern end of the extension appear to have been avoided during road planning as recommended.*

- *The proposed road crosses a tributary then rises to about 900m asl, bypassing the airstrip and re-joining the existing 4WD track at the top. The vegetation across this sector comprised a mixture of open tussock grassland (mainly fescue tussock, merging into silver tussock higher up) with a considerable sward of underlying exotic grasses and hawkweed. Patches of scrub (mainly matagouri, porcupine shrub, brier rose and mingimingi etc) were scattered across the ridgeline, more-so on the sunny aspects. Taramea (Aciphylla aurea - Regionally Not Threatened) was also present and became more prolific higher up the ridge.*

- *The final ±1.5km of the Ardgour Rise route descends from ±1000m asl to an altitude of ±960m asl through SN33 at which point it intersects the east/west 4WD track running down to the existing Thomsons Gorge Saddle road. It is notable that, since removal of stock under DOC jurisdiction, the shaded aspects of this reserve area have become heavily infested with tussock hawkweed (Hieracium lepidulum) to the exclusion of most pastoral species.*

- *Land within Ardgour Station does retain some fescue tussock, other exotic grasses, taramea and shrubs including occasional porcupine shrub (Melicytis alpinus) and desert broom (Carmichaelia petriei - At Risk-Regionally Declining). Minor communities of the following sub-alpine plants were noted trackside in SN33 on some rocky outcrops: Celmisia viscosa, C. gracilenta, Brachyglottis haastii, Styphelia nesophila (syn Cyathodes fraseri) and Scleranthus uniflora, none of which are threatened. Also noted trackside were small colonies of Stackhousia minima - At Risk-Regionally Naturally Uncommon) and Colobanthus strictus - At Risk-Regionally Declining. Avoid if possible.*

- *The track down to the saddle through SN33 passes through similar tussock/mouse-eared hawkweed infested land with sporadic taramea until some rocky outcrops become evident, around which a number of indigenous shrub species were growing. These included the usual matagouri, several mingmingi species (Regionally Not Threatened), porcupine shrub and desert broom (heavily browsed!). A few narrow-leaved snow tussocks (Chionochloa rigida) were present, again not threatened.*

- *In terms of the NES for Freshwater regulations, areas surveyed were dominantly exotic and estimated to have less than 20% native species ground cover present. All but the easterly DOC section within SN33 was within paddocks of exotic pasture used for grazing, had vegetation cover comprising more than 50% exotic pasture species and few or no threatened species were intercepted within them.*

- *In terms of the operative CODC District E-Plan (2025) and the significance of inherent ecological values for these sites:* ***Rarity:*** *The Ardgour Rise proposed route mainly consists of exotic pastoral species historically oversown and top-dressed (OSTD), and spread via stock, across the local landscape. Few of the identified indigenous grasses, herbs and shrubs that comprised much of the vegetation within the Ardgour Rise route are known to be rare or under any significant threat locally, regionally or nationally.*

- ***Representativeness:*** *As noted the grazed vegetation consists mainly of exotic pastoral species like browntop, sweet vernal and cocksfoot that dominate the plant community. The most prolific native plants noted were matagouri (Discaria toumatou), mingimingi (Coprosma spp) and taramea (Aciphylla aurea) plus fescue tussock and silver tussock, none of which are threatened. While there is a varied degree of co-dominance by indigenous grass and herb species on this site, those same plant species are well represented at other sites within Central Otago.*

- ***Diversity and Pattern:*** *In terms of regional biodiversity, the vegetation across the proposed road alignment is typical of many other mid-altitude catchments throughout Central Otago (and wider Otago) where historical OSTD has occurred. Exotic pastoral grasses now dominate all environments along the ridgelines and sunny aspects. The concentration of taramea on the higher southerly aspect slopes is somewhat unique to the immediate location but again is ecologically quite typical of similar hill terrain that has historically been burned throughout Central Otago.*

- ***Location and Connectivity:*** *The location of the Ardgour Rise route as surveyed was considered typical of moderate-low fertility/productivity pastoral and sub-alpine scrubby landscapes around Central Otago. With careful construction and using standard rehabilitation techniques it is considered that the overall consequence of work within this sector of the BOGP should only give effect to minor ecological and environmental impact on the vegetation types and habitats as outlined above.*

- *I therefore consider that the requirements of the NPS – Indigenous Biodiversity; the RMA National Environmental Standards for Freshwater (amended Jan 2025) for mineral extraction (Part 3 - 45D); and related Local Body plans and policies will have been substantially met in regard to the Thomsons Gorge road relocation proposal providing appropriate mitigation/rehabiltation recommendations are adhered to.*

Introduction & Disclaimer :

Matakanui Gold Ltd / Santana Minerals Ltd will need to close the existing Thomsons Gorge Road once the Bendigo Ophir Gold Project (BOGP) is consented in order to accommodate the new mine footprint, equipment access and haul roads. Re-alignment of the road is proposed along a ridgeline immediately to the north of Shepherds Ck, currently (mostly) traversed by a 4WD track. The altitude ranges from approximately 300m asl in the lower creek to ±1050m asl along adjacent ridgelines before it re-joins the existing road at Thomsons Saddle (±900m asl).

Detailed local environmental survey consent data for Central Otago has been reported in Wills (2005; 2014; 2017; 2018a,b,c; 2021; 2022a,b; 2023a-d; 2024, 2025a,b) in association with exploration permit 60311, extension RC210308 and other regional consents. Related environmental information specific to the wider Otago region was reported in LINZ, 2004; Prospect Solutions, 2021; Wildlands, 2020; WSP NZ Ltd, 2021 and Jarvie et. al. 2024.

This report was prepared to assist with botanical ecology and biodiversity consent/compliance in relation to the recently gazetted National Policy Statement – Indigenous Biodiversity; the RMA National Environmental Standards (NES) for Freshwater for mineral extraction (Part 3 - 45D); and related Local Body plans and policies. Information is provided to assist with determination, location and evaluation of the botanical biodiversity and general ecological status of the vegetation cover in order that conditions within existing and any new resource consents are complied with and that environmental standards are maintained.

This report, and the data contained in it, was prepared using the best available information and interpreted with all reasonable skill and care, however CES cannot accept any liability, whether direct, indirect or consequential, arising from the provision of information in this report.

Site Description & Historical Conservation Background:

The proposed Ardgour Rise road re-alignment is outlined in **Figure 1** (below).

The Ardgour Rise re-alignment follows a dry, un-named creek bed south-east from the cherry orchard access road before gradually rising onto a sunny face, traversing that below an existing farm 4WD track and intersecting with the previously reported RC210308 drilling extension (Wills, 2022b; 2025b), then crossing a tributary to avoid the airstrip environs, re-joining the 4WD track and following that until it reaches the boundary with SN33 (Significant Natural Area 33, 350 ha, Pt Run 238 K, Ardgour Station). It then descends through SN33 to meet with another 4WD track running south-west to Thomsons Saddle and the existing Thomsons Gorge road.

Materials and Methods

A standard visual vegetation survey combined with photography of the environment was carried out across the Ardgour Rise re-alignment corridor. The vegetative ground cover and botanical biodiversity was visually assessed and plant species that have any level of national threat status were noted, as was the general ecological and environmental status.

Plant "Risk" or "Threat" status was determined by reference to the Central Otago District Council, District Plan Rules (4.7xx), and Schedules 19.6B (Threatened Plants within CO District) and 19.6.1 (Areas of Significant Vegetation) for local species that might be identified during the survey. The CODC DP has recently (Jan 2025) been published online as an "E-Plan" but in effect it remains largely as per the 2008 Operational DP other than reference to recent Plan Changes and other minor updates. The DP review that was due in 2019 has not yet been completed. The proposed MGL mine site sits within an ONL (Outstanding Natural Landscape) designation that encompasses most of the Dunstan Mountain Range.

Plant identification and conservation status was also checked and updated via the NZ Plant Conservation Network (NZPCN) website, the CODC District Plan Schedule 19.6B **(refer Appendix 1 & 2)** and the Landcare Research 'Flora of NZ' website, along with the use of other personal library documents (de Lange *et al*. 2010, 2012, 2018, 2024; Howell & Sawyer, 2006; Mark, 2012, etc).

Ardgour Rise Road Re-Alignment – General Ecological Description:

At the north-west end the new road alignment will head upstream along an un-named dry creek from the existing cherry orchard access road. Much of the first 2 km of stream bed adjacent to the existing 4WD track has been developed with oats drilled lower down and lucerne further up the creek. Terrace slopes adjacent to the creek were undeveloped and vegetation largely consisted of exotic weedy grasses and herbs (brome spp, barley grass, sweet vernal, Kentucky bluegrass, horehound, vipers bugloss, thistles, bidibids, mignonette, brier rose etc)

Over the next ±2.8 km, the proposed road rises ±280m (to about 700m asl) across an exposed sunny face then crosses the true right creek tributary onto the ridge immediately north of the airstrip. A detailed analysis of the vegetation on that sunny aspect was provided in Wills 2025b. An area including occasional porcupine shrub (*Melicytis alpinus* – Otago: 2024 | Regionally Not Threatened), **desert pimelia (*Pimelia aridula* – Otago Regional Conservation Status = Otago: 2024 | Threatened – Regionally Vulnerable) and desert broom (*Carmichaelia petriei* - Otago Regional Conservation Status = Otago: 2024 | At Risk – Regionally Declining)** was identified near the top of an old track leading up from the gully. It is recommended that this area be avoided if possible, or suitable mitigation options as discussed below be instigated.

The remainder of the sunny aspect above the creek was largely comprised of mixed, depleted grassland and herbfield with some small patches of scrub. Two mature kowhai (*Sophora microphylla* – Otago: 2024 | Regionally Not Threatened) trees present near the eastern end of the extension appear to have been avoided during road planning as recommended.

On those sunny aspects, groundcover was dominated by litter, bare ground and rock (47% of top hits, 61% of understory hits) as outlined in the Drilling Extension report's transect data. The vegetation consisted of patches of sweet vernal (*Anthoxanthum odoratum*) and annual bromes (*Bromus hordaceous, B. diandrus* and *B. tectorum*), along with various herbs including scabweeds **(*Raoulia australis* – National Conservation Status 2023 | At Risk – Declining, *R. beauverdii* - Otago Regional Conservation Status = Otago: 2024 | Threatened – Regionally Vulnerable),** sorrel (*Rumex acetosella*), haresfoot trefoil (*Trifolium arvense*), vipers bugloss (*Echium vulgare*) and striated clover (*T. striatum*), a spring annual species that had died back. Occasional silver tussocks (*Poa cita*) were also encountered.

Within the riparian zone of the tributary creek, shaded aspects to the south and north across the creek comprised a combination of fairly dense scrub (mainly matagouri – *Discaria toumatou* - Otago: 2024 | Regionally Not Threatened) encroaching into the (dry) creek bed, then phasing into grassland dominated by exotic grasses with some tussocks, up towards the ridgeline.

Herbaceous vegetation within the shaded aspects and riparian zone consisted mainly of dense exotic tall oat grass (*Arrhenatherum elatius*) and cocksfoot (*Dactylis glomerata*), with a scattering of indigenous fescue tussocks (*Festuca novae-zelandiae*) and an understory of white clover (*Trifolium repens*). Shrub species present were dominantly matagouri (*Discaria toumatou*) and brier rose (*Rosa rubignosa*), with occasional porcupine shrub (*Melicytis alpinus*), scented tree daisy (*Olearia odorata* - Otago: 2024 | Regionally Not Threatened), mingimingi (*Coprosma propinqua* - Otago: 2024 | Regionally Not Threatened) **and scattered desert broom (*Carmichaelia petriei* - Otago Regional Conservation Status = Otago: 2024 | At Risk – Regionally Declining**).

As mentioned in Wills 2025b, the status of indigenous spring annual herbs across those sunny aspects is unknown at this stage as the main Alliance/RMA ecology report is yet to be delivered and at this time of year (autumn) the plants were not present. Working with a survey team last year we did find some *Myosotis brevis* on sunny aspects further north, but not *Ceratocephala pungens* nor *Myosurus minimus*. I can only speculate that the habitat on some of those sunny aspects might be suitable for *M. brevis* at least, however the dense covering of spring annual striated clover obviously present at the same time would provide significant competition for it.

Z

Recent grazing was noted with cocksfoot being well browsed. Farm stock grazing in the area included angus cattle and merino sheep, assisted by moderate feral rabbit numbers and some deer.

Over the next ±1.8km the proposed road rises another ±200m (to about 900m asl), bypassing the airstrip and re-joining the existing 4WD track at the top. The vegetation across this sector comprised a mixture of open tussock grassland (mainly fescue tussock, merging into silver tussock higher up) with a considerable sward of underlying exotic grasses and hawkweed.

Patches of scrub (mainly matagouri, porcupine shrub, brier rose and mingimingi etc) were scattered across the ridgeline, more-so on the sunny aspects. Taramea (*Aciphylla aurea* - Otago: 2024 | Regionally Not Threatened) was also present and became more prolific higher up the ridge.

Over the next ±2.5km the altitude of the proposed road changed as it descended along the ridgeline to ±900m asl then climbed again to its highest point at ±1050m asl. Aspect was more noticeable across this sector in determining vegetation cover. On the northerly (sunny) aspects the vegetation cover was largely comprised of mixed, depleted grassland and herbfield with some small patches of scrub around rocky outcrops.

Conversely on the southerly shaded aspects the vegetation cover was a combination of scattered scrub and taramea herbfield, with exotic grassland among silver and fescue tussocks growing up towards the ridgeline. The proposed road alignment across this sector is mainly confined to the ridgeline and these shaded slopes. The vegetation on the shaded aspects consisted mainly of exotic grasses like browntop (*Agrostis capillaris*), sweet vernal (*Anthoxathum odoratum*) and cocksfoot (*Dactylis glomerata*), with a scattering of indigenous silver and fescue tussocks (*Poa cita*; *Festuca novae-zelandiae*) and an understory of hawkweeds (*Hieracium pilosella* and *H. lepidulum*). Shrub species present were dominantly matagouri (*Discaria toumatou*) with occasional porcupine shrub (*Melicytis alpinus*) and mingimingi (*Coprosma propinqua*).

The final ±1.5km of the Ardgour Rise route descends to an altitude of ±960m asl through SN33 at which point it intersects the east/west 4WD track running down to the existing Thomsons Gorge Saddle road. It is notable that, since removal of stock under DOC jurisdiction, the shaded aspects of this reserve area have become heavily infested with tussock hawkweed (*H. lepidulum*) to the exclusion of most pastoral species. Land still within Ardgour Station does retain some fescue tussock, other exotic grasses, taramea and shrubs including occasional porcupine shrub (*Melicytis alpinus*) and desert broom (*Carmichaelia petriei* - Otago Regional Conservation Status = Otago: 2024 | At Risk – Regionally Declining). Minor communities of the following sub-alpine plants were noted trackside on some rocky outcrops: *Celmisia viscosa, C. gracilenta, Brachyglottis haastii, Styphelia nesophila* (syn *Cyathodes fraseri*) and *Scleranthus uniflora*, none of which are threatened. **Also noted trackside were several small colonies of *Stackhousia minima* - Otago Regional Conservation Status = Otago: 2024 | At Risk – Regionally Naturally Uncommon) and *Colobanthus strictus* - Otago Regional Conservation Status = Otago: 2024 | At Risk – Regionally Declining). Avoid these if possible.**

The track down to the saddle through SN33 passes through similar tussock/mouse-eared hawkweed infested land with sporadic taramea until some rocky outcrops become evident near RMA Ecology marker SP2, around which a number of indigenous shrub species were growing. These included the usual matagouri, common mingmingi, porcupine shrub and desert broom (heavily browsed!) in addition to Colensoi's mingimingi (*Acrothamnus colensoi* - Otago: 2024 | Regionally Not Threatened), Cheeseman's mingmingi (*Coprosma cheesemanii* - Otago: 2024 | Regionally Not Threatened) and Foweraker's mingimingi (*C. fowerakeri* - Otago: 2024 | Regionally Not Threatened). A few narrow-leaved snow tussocks (*Chionochloa rigida*) were present, again not threatened.

Proposed Ardgour Rise Road Images, West to East:

A: Cherry Orchard Road Gully.




Clockwise from Top Left:

1.. Looking down gully with drilled oats (dark green) and lucerne. Some matagouri scrub in dry creek (parts have been sprayed).

2.. View upstream in lucerne paddock, matagouri scrub in dry creek on right.

3.. View upstream into lower dry creek gully

4.. Old track leading up hillside approximately follows proposed road alignment, drilled oats on right.

B: Lower Ardgour Rise and Drill Extension Slope Panorama's:

1.. Upper extension of old track with native desert pimelea and desert broom stands on ridge tops.

2.. View back towards old track and Cherry Orchard gully in distance at right

3.. View up towards airstrip ridge, proposed road will follow left branch of creek

4.. Native desert pimelea and desert broom alongside old track. (*Pimelia aridula* – Otago Regional Conservation Status = Otago: 2024 | **Threatened – Regionally Vulnerable**) and desert broom (*Carmichaelia petriei* - Otago Regional Conservation Status = Otago: 2024 | **At Risk – Regionally Declining**). Avoid if possible!!

5.. Mature kowhai (*Sophora microphylla*) trees on slope near upper reaches of catchment. Alignment appears to go above these trees but avoid any damage to them from road construction.

C: Airstrip Diversion up Adjacent Ridgeline.

1.. View downslope towards creek crossing and lower slopes

2.. View up ridge to where road diversion will rejoin existing 4WD track.

3.. Panorama view of diversion ridge from above airstrip

4.. Existing 4WD track into dry creek approximately where proposed road will cross

5.. View from higher up diversion ridge looking down towards creek crossing point. Large native porcupine shrub on left.

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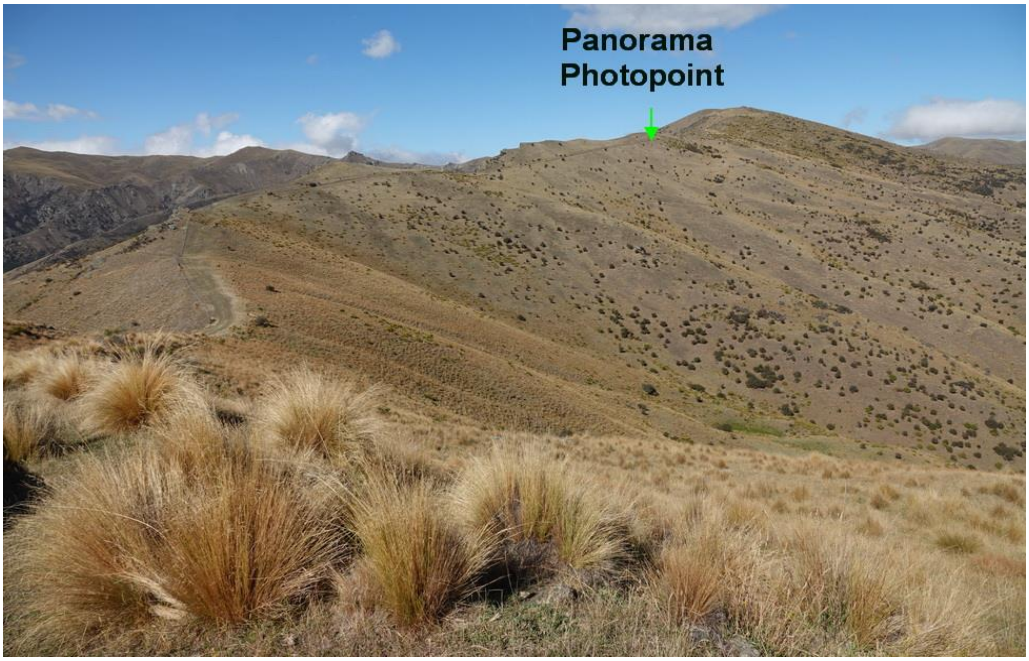
D: Top Gate via ridge to Eastern Boundary Gate.

1.. General 180° panorama from midway along ridgeline to eastern boundary gate



2.. View east along ridgeline with substantial stand of silver tussock in foreground.

3.. View west back along ridgeline track with mixed silver tussock & taramea

4.. Easterly view to highest point on road, taramea dominant vegetation with silver tussock & matagouri scrub

5.. Westerly view from Argour boundary gate, SN33 to left of fence with dense tussock hawkweed.

End of the 4WD track in Ardgour.

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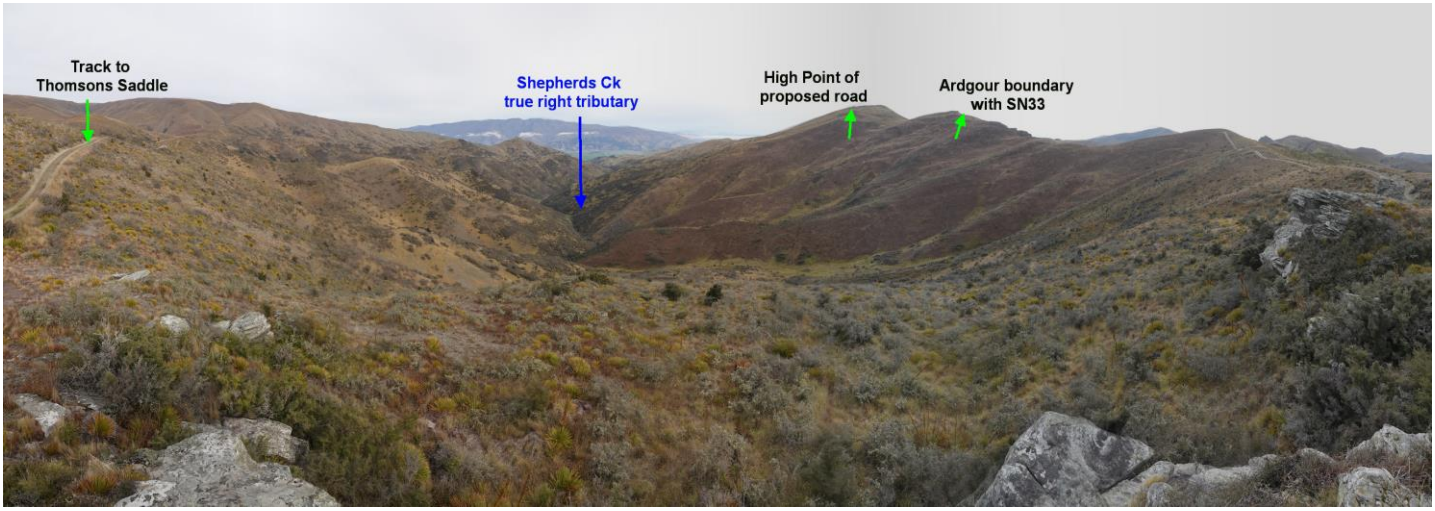
E: Eastern Boundary Gate to Thomson's Saddle via SN33.

Start of track in SN33 from the other side of boundary gate.

1.. Panorama from Ardgour boundary gate:- 4WD track at right, upper Shepherds Ck catchment within SN33 centre foreground and track to Thomsons Saddle at left.



2.. Panorama from rocky outcrop in SN33 midway down 4WD track to Thomsons Saddle, west side of ridge

3.. Panorama along 4WD track leading down to Thomsons Saddle, east side of ridge

4.. View south-east down 4WD track in SN33 from Ardgour boundary gate

5.. Rocky cutting down SN33 track from boundary gate, note dominant tussock hawkweed, outcrop also has sub-alpine herbs like *Celmisia viscosa, C. gracilenta, Brachyglottis haastii, Styphelia nesophila, Scleranthus uniflora, Stackhousia minima* ***(At Risk – Regionally Naturally Uncommon)*** *and Colobanthus strictus* ***(At Risk – Regionally Declining)***. Refer to images below.

6.. *Celmisia viscosa* *C. gracilenta* *Brachyglottis haastii,*

Styphelia nesophila,

Scleranthus uniflora

Stackhousia minima

Colobanthus strictus

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Species associated with rocky outcrop on east-west track down to Thomsons Saddle (refer Panorama 2 & 3 above)

7.. *Coprosma* spp

C. fowerakeri

C. depressa

C. cheesemanii

Acrothamnus colensoi

Melicytus alpinus

Appendix 1 presents a listing (not exhaustive) of plant species encountered on the site during this survey in late-autumn and their current **national** and **regional** threat status according to the NZ Plant Conservation Network web site and the most recent NZ Threat Classification Series 43 (de Lange *et al* 2024). **Appendix 2** outlines CODC District Plan Schedules 19.6B (Threatened Plants within CO District) and 19.6.1 (Areas of Significant Vegetation).

In terms of the NES for Freshwater regulations, areas surveyed were dominantly exotic and estimated to have less than 20% native species ground cover present. All but the easterly section within SN33 was within areas of exotic pasture used for grazing, had vegetation cover comprising more than 50% exotic pasture species and few or no threatened species were intercepted within them.

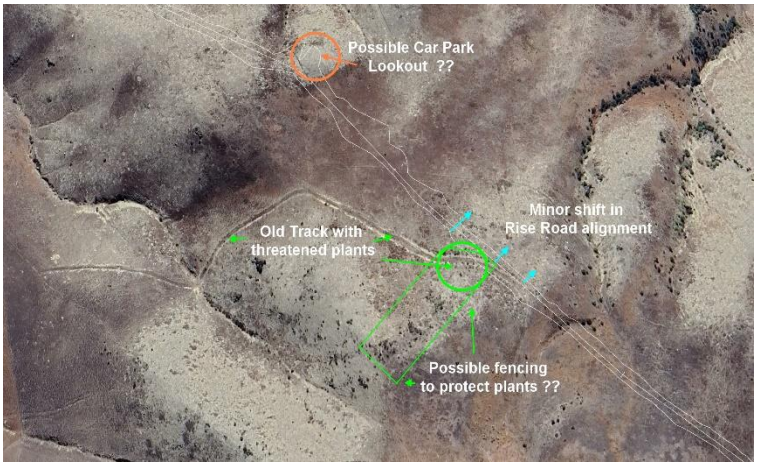
Mitigation Options for At Risk or Threatened Plants: Only the area where desert pimelia (*Pimelia aridula* – Otago Regional Conservation Status = Otago: 2024 | Threatened – Regionally Vulnerable) and desert broom (*Carmichaelia petriei* - Otago Regional Conservation Status = Otago: 2024 | At Risk – Regionally Declining) were identified near the top of an old track leading up from the western gully was any significant conservation concern noted.

Location of At Risk plants:

Options for mitigation in this area include:

A. Create a 'nursery' area at a suitable site above the old track footprint on similar ground that can be fenced to exclude stock and relocate any plants likely to be intercepted within that using a digger.

B. Where possible shift the proposed road alignment slightly north (downhill) to avoid plants that are growing along the trackside. I think the best scenario would be to place a stock/rabbit proof fence around the track & rocky outcrops where those plants are growing (covering about 1.0ha) - they will then re-seed naturally



and should establish well if browsing is restricted. This would be a good offset for biodiversity conservation in terms of the overall impact of the proposed road alignment construction disturbance, and the full project impact, plus it would be very visible from the new road. I can't think of any other sites on the old or new road where those two at risk species are so accessible. It is also an excellent lookout point across the upper Clutha valley so that is a bonus – consider forming a parking/turn around area near there!

General Rehabilitation Recommendations:

Tussocks present along the proposed road alignment (mostly fescue - *F. novae-zelandiae* and silver – *Poa cita*) could be lifted and replanted on road batters or temporarily stored in topsoil windrows for later re-planting. In the few areas where silver tussock is growing right along the 4WD trackside (therefore likely to be disturbed) it is at higher altitude and soils are moister therefore plants should transplant OK.

SN33 was originally set up as a silver tussock refuge but DOC's exclusion of stock grazing has allowed tussock hawkweed to dominate & kill most of it off so, while it is not threatened, if some of those existing silvers could be rescued and transplanted on (downhill) batters up there, that would be great. Best timing would be late winter, early spring, get them back in ground as quickly as possible as construction proceeds and toss some "bush burn" seed around at the same time.

For areas where little or no tussock replanting is feasible, oversowing with a seed mix such as Kubala Seeds "Bush Burn" mix should be used to facilitate revegetating bare soil areas.

There is a fairly dense community of grey shrub species (matagouri, tree daisy etc) that may be affected in the vicinity of the crossing point for the creek tributary. A digger may be able to relocate some of these where gaps in the scrub might occur or temporary clearance has been made. Being within the gully, soil moisture should be good if any transplants are made.

Failing that it would be best to obtain new planting stock from the likes of Springburn Nursery (nursery@springburn.nz), which specializes in propagating locally collected genetic plant material, to re-establish scrub cover.

Taramea (*Aciphylla aurea*) is a member of the carrot family (Apiaceae) thus has a substantial tap-root and will not relocate successfully. There is a substantial community of taramea across the highest southerly slopes along the proposed route which cannot be avoided. The most practical means of preventing significant damage to those is to minimise covering plants adjacent to the road with soil in side-spill earthworks, particularly downslope. Plants will eventually re-seed on site during mast years.

In conclusion:

My assessment of the current status of vegetation along the Ardgour Rise site is that it contains a mixture of (mainly) exotic and some indigenous ground cover as a result of historical pastoral development (OSTD). When considering this in terms of the operative CODC District E-Plan (2025) and the significance of inherent ecological values for these sites:

Rarity: The Ardgour Rise proposed route mainly consists of exotic pastoral species historically oversown and top-dressed (OSTD), and spread via stock, across the local landscape. Few of the identified indigenous grasses, herbs and shrubs that comprise much of the vegetation within the Ardgour Rise route are known to be rare or under any significant threat locally, regionally or nationally (refer Appendix 1). Two shrubs (desert broom and pimelea) that do have an "At Risk" or "Threatened" conservation occurrence were identified on a hill near the western end of the alignment and mitigation options are provided to ensure their conservation. A number of mingimingi (*Coprosma* spp) shrubs occur within the SN33 DOC reserve area, particularly around rocky outcrops, however none of the identified ones have a known threat status.

Representativeness: As noted the grazed vegetation in most paddocks consists mainly of exotic pastoral species like browntop, sweet vernal and cocksfoot that dominate the plant community. The most prolific native plants noted were matagouri (*Discaria toumatou*), mingimingi (*Coprosma* spp) and taramea (*Aciphylla aurea*) plus fescue tussock and silver tussock, none of which are threatened. While there is a varied degree of co-dominance by indigenous grass and herb species across this site, those same plant species are well represented at other sites within Central Otago. For example those shrubs, and fescue and silver tussocks, are found across much of the mid-altitude country from Mt Benger in the South, across the Old Man and Obelisk Ranges, the Cairnmuir, Pisa and Dunstan Mountains, and further afield.

Diversity and Pattern: In terms of regional biodiversity, the vegetation across the proposed road alignment is typical of many other mid-altitude catchments throughout Central Otago (and wider Otago) where historical OSTD has occurred. Exotic pastoral grasses now dominate all environments along the ridgelines and sunny aspects, especially where stock camps occur. The concentration of taramea on the higher southerly aspect slopes is somewhat unique to the immediate location but again is ecologically quite typical of similar hill terrain that has historically been burned throughout Central Otago. The prolific cover of tussock hawkweed (*Hieracium lepidulum*) that has developed within the SN33 Reserve is a direct result of DOC's management (or lack thereof) in deliberately removing all stock grazing, thus creating a visually striking 'Fenceline Effect'.

Size and Shape: The area is largely defined by several fenced blocks that are part of Ardgour Station, 4WD access tracks and the landscape which, in this case largely consists of steep hills with narrow ridgelines and incised streams or creeks, most of these remaining dry except when subject to substantial precipitation events.

Location and Connectivity: The location of the Ardgour Rise route as surveyed was considered typical of moderate-low fertility/productivity pastoral and sub-alpine scrubby landscapes around Central Otago. With careful construction and using standard rehabilitation techniques it is considered that the overall consequence of work within this sector of the BOGP should only give effect to minor ecological and environmental impact on the vegetation types and habitats as outlined above.

I therefore consider that the requirements of the NPS – Indigenous Biodiversity; the RMA National Environmental Standards for Freshwater (amended Jan 2025) for mineral extraction (Part 3 - 45D); and related Local Body plans and policies will have been substantially met in regard to the Thomsons Gorge road relocation proposal providing appropriate mitigation/rehabilitation recommendations are adhered to.

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Alexandra
5th May, 2025

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Appendix 1: Plant Listing – Typical Plant Species & Current Ecological Threat Status (as per NZ Plant Conservation Network & NZ Threat Classification Series 43, 2024)

GRASSES & GRASS-LIKE		NZPCN Assessment 2023/24	NZ Threat Classification Series	Binomial
Browntop	AGR cap			*Agrostis capillaris*
Silver hairgrass	AIR car			*Aira caryophyllea*
Blue wheatgrass (Erect culms)	ANT apr	Threatened – Regionally Vulnerable	At Risk – Naturally Uncommon	*Anthosachne aprica*
Blue wheatgrass (Trailing culms)	ANT sol	Not Threatened Nationally or Regionally	Not Threatened	*Anthosachne solandri*
Sweet vernal	ANT odo			*Anthoxanthum odoratum*
Tall Oat Grass	ARR ela			*Arrhenatherum elatius*
Ripgut Brome	BRO dia			*Bromuis diandrus*
Soft brome	BRO hor			*Bromus hordaceus*
Downy brome	BRO tec			*Bromus tectorum*
Sedge - Mat	CAR aci	Not Threatened Nationally or Regionally	Not Threatened	*Carex acicularis*
Rautahi - Cutty Grass	CAR cor	Not Threatened Nationally or Regionally	Not Threatened	*Carex coriacea*
Snow Tussock - slim	CHI mac	Not Threatened Nationally or Regionally	Not Threatened	*Chionochloa macra*
Snow Tussock - narrow leaf	CHI rig	At Risk – Regionally Declining	Not Threatened	*Chionochloa rigida*
Cocksfoot	DAC glo			*Dactylis glomerata*
Matthews fescue	FES mat	Regionally Data Deficient	Not Threatened	*Fectuca matthewsii*
Hard fescue	FES n-z	Not Threatened Nationally or Regionally	Not Threatened	*Fectuca novae-zelandiae*
Red fescue	FES rub			*Festuca rubra*
Yorkshire fog	HOL lan			*Holcus lanatus*
Barley grass	HOR mur			*Hordeum murinum*
Tall fescue	LOL aru			*Lolium arundinaceum sspp arund..*
Ryegrass	LOL per			*Lolium perenne*
Plume grass (*Dichelachne*)	PEN cri	Not Threatened Nationally or Regionally	Not Threatened	*Pentapogon crinitus*
Silver tussock	POA cit	Not Threatened Nationally or Regionally	Not Threatened	*Poa cita*
Blue tussock	POA col	Not Threatened Nationally or Regionally	Not Threatened	*Poa colensoi*
Kentucky bluegrass	POA pra			*Poa pratensis*
Danthonia - slender	RYT gra	Not Threatened Nationally or Regionally	Not Threatened	*Rytidosperma gracile*
Danthonia - small	RYT pum	Not Threatened Nationally or Regionally	Not Threatened	*Rytidosperma pumilum*
Danthonia - bristle	RYT set	Not Threatened Nationally or Regionally	Not Threatened	*Rytidosperma setifolium*
Hair grass (*Vulpia*)	FES bro			*Festuca bromoides*
HERBS				
Bidi bid	ACA ans / n-z	Not Threatened Nationally or Regionally	Not Threatened	*Acaena anserinifolia / novae-zelandiae*
Bidi bid - sheeps bur	ACA agn			*Acaena agnipila*
Bidi bid	ACA cae	At Risk – Regionally Declining	Not Threatened	*Acaena caesiiglauca*
Yarrow	ACH mil			*Achillea millifolium*
Spaniard / taramea	ACI aur	Not Threatened Nationally or Regionally	Not Threatened	*Aciphylla aurea*
Scarlet pimpernel	ANA arv			*Anagallis arvensis*
Haast's brachyglottis	BRA haa	Not Threatened Nationally or Regionally	Not Threatened	*Brachyglottis haastii*
Maori Onion	BUL ang	Not Threatened Nationally or Regionally	Not Threatened	*Bulbinella angustifolia*
Celmisia - Grasslike	CEL gra	Not Threatened Nationally or Regionally	Not Threatened	*Celmisia gracilis*
Celmisia - Sticky	CEL vis	Not Threatened Nationally or Regionally	Not Threatened	*Celmisia viscosa*
Centaury	CEN ery			*Centaurium erythraea*
Chickweed	CER glo			*Cerastium glomeratum*
Calif. thistle	CIR arv			*Cirsium arvense*
Scotch thistle	CIR vul			*Cirsium vulgare*
Hawksbeard	CRE cap			*Crepis capillaris*
Erect colobanthus	COL str	At Risk – Regionally Declining	Not Threatened	*Colobanthus strictus*
Dichondra	DIC rep	Not Threatened Nationally or Regionally	Not Threatened	*Dichondra repens*
Vipers Bugloss	ECH vul			*Echium vulgare*
Storksbill	ERO cir			*Erodium cicutarium*
Creeping cudweed	EUC aud	Not Threatened Nationally or Regionally	Not Threatened	*Euchiton audax*
Cranesbill	GER bre			*Geranium brevicaule(syn sessiliflorum)*
Tussock hawkweed	HIE lep			*Hieracium lepidulum*
Mouse ear hawkweed	HIE pil			*Hieracium pilosella*
St John's Wort	HYPE perf			*Hypericum perforatum*
Catsear	HYPO rad			*Hypochaeris radicata*
Edgars Rush, Wiwi	JUN edg	Not Threatened Nationally or Regionally	Not Threatened	*Juncus edgariae*
Purging flax	LIN cath			*Linum catharticum*
Mallow	MAL par			*Malva parviflora*
Horehound	MAR vul			*Marrubium vulgare*
Cotton thistle	ONO aca			*Onopurdum acanthium*
Creeping oxalis	OXA exi	Not Threatened Nationally or Regionally	Not Threatened	*Oxalis exilis*
Wild mignonette	RES lut			*Reseda luteola*
Grassland buttercup	RAN mul	Not Threatened Nationally or Regionally	Not Threatened	*Ranunculus multiscapus*
Scabweed - scabweed	RAO aus	At Risk – Declining	At Risk – Declining	*Raoulia australis*
Scabweed - Beauverd's	RAO bea	Threatened – Regionally Vulnerable	At Risk – Declining	*Raoulia beauverdii*
Scabweed - celadon	RAO par	Threatened – Regionally Vulnerable	At Risk – Declining	*Raoulia parkii*
Scabweed - turf mat	RAO sub	Not Threatened Nationally or Regionally	Not Threatened	*Raoulia subsericea*
Sorrel	RUM ace			*Rumex acetosella*
Scleranthus	SCL uni	Not Threatened Nationally or Regionally	Not Threatened	*Scleranthus uniflorus*
Stonecrop	SED acr			*Sedum acre*
Grasslike chickweed	STE gra	Not Threatened Nationally or Regionally	Not Threatened	*Stellaria gracilenta*

Dandelion	TAR off			*Taraxacum officinale*
Haresfoot trefoil	TRI arv			*Trifolium arvense*
Clover - Suckling	TRI dub			*Trifolium dubium*
Clover - White/Red	TRI rep/pra			*Trifolium repens/pratense*
Clover - Striated	TRI str			*Trifolium striatum*
Mullein - woolly	VERB tha			*Verbascum thapsus*
Speedwell	VERO ver			*Veronica verna*
Vetch	VIC sat			*Vicia sativa*
Lichen	LICHEN			*Lichen (Certraria, Chondropsis, Thamnolia, Xanthoparmelia)*
Moss	MOSS			*Moss (Grammitis, Polytrichum, Racomitrium)*
Ferns	FERN			*Fern (Asplenium, Cheilanthes, Pellaea, Polystichum, Pteridium)*
SHRUBS				
Mingimingi, Colenso's	ACRO cole	Not Threatened Nationally or Regionally	Not Threatened	*Acrothamnus colensoi*
Broom - Cromwell	CARM comp	At Risk – Regionally Declining	At Risk – Naturally Uncommon	*Carmichaelia compacta*
Broom - desert	CARM petr	At Risk – Regionally Declining	At Risk – Declining	*Carmichaelia petrieii*
Mingimingi, Cheeseman's	COPR che	Not Threatened Nationally or Regionally	Not Threatened	*Coprosma cheesemanii*
Mingimingi, prostrate	COPR dep	Not Threatened Nationally or Regionally	Not Threatened	*Coprosma depressa*
Mingimingi, Foweraker's	COPR fow	Not Threatened Nationally or Regionally	Not Threatened	*Coprosma foweraker*i
Mingimingi, creeping	COPR per	Not Threatened Nationally or Regionally	Not Threatened	*Coprosma perpusilla*
Mingimingi, common	COPR pro	Not Threatened Nationally or Regionally	Not Threatened	*Coprosma propinqua*
Corokia, Korokio	CORO cot	Not Threatened Nationally or Regionally	Not Threatened	*Corokia cotoneaster*
Matagouri	DISC tou	Not Threatened Regionally, Nationally Declining	At Risk – Declining	*Discaria toumatou*
Porcupine Shrub (*Hymenanthera*)	MELI alp	Not Threatened Nationally or Regionally	Not Threatened	*Melicytus (Hymenanthera) alpinus*
Pohuehue - scrubby	MUEL com	Not Threatened Nationally or Regionally	Not Threatened	*Muehlenbeckia complexa*
Olearia, scented tree daisy	OLEA odo	Not Threatened Regionally, Nationally Declining	Not Threatened	*Olearia odorata*
Olearia, twiggy tree daisy	OLEA vir	Not Threatened Nationally or Regionally	Not Threatened	*Olearia virgata*
Desert Pimelea	PIM ari	Threatened – Regionally Vulnerable	At Risk – Declining	*Pimelea aridula*
Brier Rose	ROSA rub			*Rosa rubignosa*
Bush Lawyer	RUBU sch	Not Threatened Nationally or Regionally	Not Threatened	*Rubus schmidelioides*
Kowhai	SOPH mic			*Sophora microphylla*
Pātōtara *(Cyathodes/Leucopogon fra*	STYP nes	Not Threatened Nationally or Regionally	Not Threatened	*Styphelia nesophila*

Notation: Green = Indigenous, Blank = exotic

Appendix 2: CODC DP Schedules 19.6B & 19.6.1 excerpt

SCHEDULE 19.6B : ACUTELY THREATENED AND CHRONICALLY THREATENED PLANTS PRESENT ON LAND WITHIN CENTRAL OTAGO DISTRICT (COD)

Nationally Critical (n=7)	**Type of Plant**	**Common Names**
Ceratocephala pungens	Herb	None known
Craspedia (a) (CHR 511522; Clutha River)	Herb	Woollyhead
Lepidium solandri	Herb	Alexandra Cress
Leptinella (a) (CHR 515297; Clutha River)	Herb	Button Daisy
Myosotis albosericea	Herb	Yellow forget-me-not
Myosotis cheesemanii	Herb	None known
Puccinellia raroflorens	Grass	Salt grass
Nationally Endangered (n=12)		
Cardamine (b) (CHR 511706; Pisa Range)	Herb	None known
Carex inopinata	Sedge	Grassy mat sedge
Carmichaelia curta	Shrub	Whip broom
Carmichaelia kirkii	Scrambling shrub	Climbing broom
Lepidium kirkii	Herb	Salt pan cress
Lepidium sisymbrioides	Herb	Kawarau cress
Myosotis pygmaea var. *glauca*	Herb	None known
Myosurus minimus subsp. *novae-zelandiae*	Herb	NZ mousetail
Oreomyrrhis colensoi var. *delicatula*	Herb	Mountain myrrh
Simplicia laxa	Grass	Simplicia
Triglochin palustris	Herb	Marsh arrow grass
Uncinia strictissimi	Sedge	None known
Nationally Vulnerable (n=4)		
Leonohebe cupressoides	Shrub	Cypress hebe
Myosotis pygmaea var. *minutiflora*	Herb	None known
Olearia hectorii	Tree	Hectors tree daisy
Ranunculus ternatifolius	Herb	None known

Serious Decline (n=3)		
Isolepis basilaris	Dwarf rush	Pygmy clubrush
Luzula celata	Dwarf woodrush	Dwarf woodrush
Olearia fimbriata	Tree	None known
Gradual Decline (n=14)		
Acaena buchananii	Herb	Bidibid
Carmichaelia crassicaule	Shrub	Coral broom
Carmichaelia vexillata	Dwarf shrub	Dwarf broom
Deschampsia cespitosa	Grass	Tufted hair grass
Hebe pimeleoides subsp. *faucicola*	Shrub	Herb
Pachycladon cheesemanii	Herb	None known
Leptinella serrulata	Herb	Dryland button daisy
Montigena novae-zelandiae	Herb	Scree pea
Raoulia monroi	Herb	Fan-leaved mat daisy
Raoulia parkii	Herb	Celadon mat daisy
Tetrachondra hamiltonii	Herb	None known
Teucridium parvifolium	Shrub	Teucridium

SCHEDULE 19.6.1 : AREAS OF SIGNIFICANT INDIGENOUS VEGETATION, HABITATS OF INDIGENOUS FAUNA AND WETLANDS

Item	Description	Area	Legal Description
1	Cromwell Chafer Beetle Reserve	81 ha	Lot 1 DP 18203
2	Lindis Pass	250 ha (approx)	Pt Sec 1 & 2 Blk III Lindis SD
3	Lauder Basin	1516 ha	Sec 1 SO 23583
4	Clutha/Lindis River Islands	65 ha	Islands in Clutha R adj Sec 7 Blk III
5	Flat Top Hill, Butchers Creek & Gully	819 ha	Sec 11 Blk XVII Cairnhill, Sec 25 Blk III Fraser SD & Closed Road
6	Bains Block	2080 ha (approx)	Pt Run 758 Blks III, VI & IX Whitecoomb, Blk III Cairnhill, Obelisk & Blks V & VIII Teviot SD
7	Hawkdun	2990 ha	Secs 1, 2 & 4 SO 24042
8	Hawkdun Conservation Area	1415 ha	Run 791 Blk II Idaburn, Blk IV Naseby & Run 793 Blk II Idaburn SD
9	Allens Peak Conservation Area	1413 ha	Run 738 Blks II & III Naseby & Blk VII Kyeburn SD
10	Upper Taieri Wetlands	2450 ha (approx)	Miscellaneous (see planning maps)
11	Serpentine Reserve	750 ha	Secs 1 & 2 Manor SD SO 19711 & 19712
12	Serpentine Wildlife Management Reserve	135 ha	Sec 2 Blk III Serpentine SD
13	Mt Kyeburn	437 ha	Sec 1 Blk I Mt Buster SD
14	Taieri Lake	4 ha (approx)	Sec 2 Blk XII
15	Bendigo Wetlands	154 ha	Pt Sec 38 Blk I & Pt Secs 28 & 34 Blk II Wakefield, Pt Sec 22 Blk II Tarras, Closed Road Blk I and Crown Land & Pt Bed of Clutha Blks I & II Wakefield & Crown Land Blk II Tarras SD
16	Pisa Waiorau	4018 ha	Run 629 Blks VIII, XII & XVI Cardrona & Blks IX & X Cromwell SD
17	Old Woman Range	3492 ha	Run 339F, Lornside & Obelisk, Blk VII Bannockburn & Blk V Nevis SD

18	Cone Peak	380 ha	Pt Run 345C Cone Burn & Kawarau SD
19	Cairnmuir	2321 ha	Secs 1 & 3 SO 24276
20 21	Earnscleugh Earnscleugh (Aldinga)	7839 ha 370 ha	Blk IV Fraser & Runs 249 & 249A Leaning Rock, Bannockburn, Fraserside, Obelisk & Cairnhill SD
22	Waikerikeri	330 ha	Pt Run 221 I
23	Bendigo	3077 ha	Run 238 M Wakefield & Tarras & Run 238 L Wakefield SD
24	Blackstone Hill	1447 ha	Pt Run 227
25	Locharburn	679 ha	Pt Run 808 & Sec 38 Blk VIII Tarras SD
26	Glenroy	1580 ha (approx)	Pt Run 345D Kawarau & Nevis SD
27	Mt Rosa	808 ha	Pt Run 345E Kawarau SD
28	Wentworth	3740 ha (approx)	Run 330C Kawarau & Nevis & Run 331 Nevis SD
29	Long Gully/Mt Difficulty	295 ha	Sec 1 SO 23879
30	Loch Linnie	680 ha (approx)	Pt Sec 2 SO 23209
31	Mt Pisa	2100 ha	Runs 730 & 731 Blks X, XII, XV & XVI Cardrona & Blks II & IV Tarras SD
32	Queensberry Ridges	570 ha	Blk VIII Cromwell SD
33	Ardgour	350 ha	Pt Run 238 K
34	Belmont Saline Area	21 ha	Lot 2 DP 9807
35	Blackmans Saline Area	2 ha	Pt Secs 4 & 18 SO 24510
36	Chapman Road Saline Area	8.4 ha	Lot 1 DP 24020
37	Conroy's Dam Saline Area	35 ha	Pt Sec 27 SO 24510 & Pt Sec 1 Blk IV Fraser SD
38	Conroy's Road Saline Areas	2 ha	Lot 5 DP 15300 & Lots 10, 11, 12, 16, 18 & 26 DP 15301
39	Dunard Saline Area	4 ha	Sec 22 Blk VI Leaning Rock SD
40	Fortification Creek Wetland	470 ha	Pt Sec 1 Blk VIII Lammerlaw SD & Pt Run 656 Blk XIV Long Valley SD Blk I St Abbs SD & Blk VIII Lammerlaw SD
41	Galloway No 1 Saline Area	2 ha	Pt Run 565 Blk VI Tiger Hill SD
42	Galloway No 2 Saline Area	5 ha	Pt Run 565 Blk VI Tiger Hill SD
43	Kirkwoods Creek Wetland	235 ha	Pt Run 582 Blk XIII St Bathans SD &