Proposed Timaru District Plan - He Po. He Ao. Ka Awatea

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Background

I set up my landscape architecture practice in Canterbury 45 years ago to work around Aotearoa NZ, initially based in Geraldine and then Ōtautahi Christchurch. Following interest expressed at workshops and field days addressing rural landscape management, at the request of local organisations in 1980-1981 I published "**Landscape Guidelines for Rural South Canterbury**". This included an appendix with a native planting guide for the Hills, Downs and Plains of the South Canterbury lowlands, including the Timaru District. With reasonable knowledge of the lands of the district I have been involved in providing landscape advice for various parties regarding Timaru District development, management and restoration over the last few decades.

First addressing all of Canterbury in 1993, our team undertook land typing to provide a timeless method addressing the underlying nature of land, using mapping, models and charts at various scales, as a base information method for land use planning and management. This has since been extended across Aotearoa NZ and uploaded to www.landtyping.nz Our Native Plant Guides for the Hills, Downs and Plains of South Canterbury Lowlands have been added to this information system to assist landowners, councils and others in progressing nature-based solutions.

Proposed Timaru District Plan regarding North-South Transport Corridor Experience

The District Plan is an important statutory tool for promoting the sustainable management of natural and physical resources. Restoring and enhancing natural and physical resources can be sought through planning provisions. The main transport

corridors that run north-south through the District contribute importantly to people's experience of the District, both for locals and for visitors and those merely passing through.

I have reviewed PTDP submission # 74 and provide analysis and recommendations regarding its various complementary dimensions but in this statement focus on Point 74.3, re GRUZ-R15, the submission point addressing Rural Zone provisions.

GENERAL RURAL ZONE

GRUZ-R15	**Shelterbelts**
General rural zone	**Activity status: Permitted** **Where:** **PER-1** The height of any trees located within 100m of a residential unit on an adjoining site are contained within an envelope defined by a recession plane of 1m vertical for every 3.5m horizontal that originates from the closest point of the residential unit; and **PER-2** Trees are not in such a position that they cause icing of a road as a result of shading the road between 10 am and 2 pm on the shortest day.

In addition, for GRUZ-R15

Activity status where compliance is not achieved: Restricted Discretionary

With matters of discretion restricted to:

1. *height and setback of trees from property boundaries and roads; and*
2. *shading of houses; and*
3. *shading of roads; and*

4. *traffic safety; and*
5. *tree species*.

Thus the provisions address the location and potential off-site effects from shelter belt plantings, particularly shading. I note that species selection is also part of the consideration of effects.

PDP Part 1 identifies that *'shelterbelt'* '*means any trees planted primarily to provide shelter for stock, crops or buildings from the prevailing wind(s). Shelterbelts are no greater than 30 metres in width and are not clear felled (unless the clear if for replanting of new shelterbelt)."* An edit is suggested for the ungainly clause in parenthesis – 'unless the clearance is for replanting of trees'. And also, adding 'native species are encouraged'.

I note the S.42A assessment recognises (para. 10.26.7) the usefulness of the GRUZ-R15 provisions requiring consideration of cross-boundary effects of shelterbelts. I agree.

However, rather than limiting such planning provisions to only the utilitarian considerations of shelter, shade and frost, there is an opportunity for consideration of the character experienced by users along the main highway corridor particularly in consideration of the tree species used.

Submission # 74.3 seeks an amendment to add to GRUZ-R15 to address this in a spatially limited area of the Rural Zone but potentially having considerable effect over time. The submission seeks the addition that:

- ***No trees or shelterbelts shall be planted within 15m of SH1 unless they are of an indigenous variety.***

That is, the amendment would directly encourage native plantings but only in this very small sliver of land alongside the highway.

STATUTORY CONTEXT

I note the S.42A does not support this amendment (para 10.26.8) as he is unaware of adequate justification to preclude exotic plantings.

However considering the statutory context, firstly, the maintenance and enhancement of amenity values are to be had regard to (RMA Pt 2. s.7c). Provision of a method that would encourage local native plantings near the highway would sequentially contribute to addressing the amenity. As *'amenity values'* include t*hose natural or physical qualities and characteristics of an area that contribute to people's appreciation of its pleasantness, aesthetic coherence, and cultural and recreational attributes*. I have thus considered the opportunity potentially provided by the additional provision to enhance the amenity experienced in Timaru District.

In the National Policy Statement for Indigenous Biodiversity relevant provisions include:

> Policy 13: Restoration of indigenous biodiversity is promoted and provided for
>
> Policy 14: Increased indigenous vegetation cover is promoted in both urban and non-urban environments.

(3) Regional councils must:

> (a) set a target of at least 10% indigenous vegetation cover for any urban or non-urban environment that has less than 10% cover of indigenous vegetation;

Local authorities must promote the increase of indigenous vegetation cover in their regions and districts through objectives, policies, and methods in their policy statements and plans

> (a) having regard to any targets set under subclause (3) by regional councils.

Under 3.23 of the NPS local authorities must have regard to the relevant regional biodiversity strategy when developing restoration objectives, policies, and methods for inclusion in regional policy statements and plans.

Canterbury Biodiversity Strategy Goal 3 states the desire to increase the integration and use of indigenous species in modified environments (e.g. farm, urban, lifestyle blocks).

Canterbury Regional Policy Statement notes that halting the current decline in biodiversity will only be achieved by adopting an integrated and coordinated management approach.

Thus these various provisions provide appropriate guidance to address the increase of indigenous flora along the main highway corridor to contribute to this management approach. I consider there is scope to preclude future exotic plantings on this small sliver of the district's rural zone.

As recognised in the Table 2.1 Summary of issues of significance to Ngāi Tahu relevant to the Canterbury Regional Policy Statement is the importance of ecological corridors. They seek that green corridors for bird and other animal passage are restored and maintained. Whilst most wildlife corridors might be more remote, State Highway 1 is an important regional corridor and provides some opportunity for delivering on national, regional and local ecological restoration.

HIGHWAY SETTING

Over the decades I have regularly heard criticism of the character of the highway corridor through the Canterbury lowlands, particularly the lengths through the main plains landscape. With such flat terrain supporting extensive pastoral and crop production and little tree cover, for many travelling on the highway the landscape experience is dismissed as 'boring'.

Whilst these lowlands currently suffer from a serious lack of indigenous biodiversity, there is a wide diversity of species native to the plains, downs and hills of these Timaru lowlands. The information is available. Landowners, developers and designers can variously interpret this natural flora to provide a considerable diversity of shelter plantings, and of tree groups and specimen trees, with or without understorey plantings.

However to avoid confusion and ensure local native species are utilised, I propose the word "*variety*" be deleted in the GRUZ-15 amendment. Preferably state 'from a local indigenous source'.

I recognise that woodlots and shelterbelts are a traditional characteristic within the Rural Zone, particularly associated with farm nodes and boundaries. Changed farm management that introduced large-scale spray irrigation over the last few decades has frequently involved removal of shelter plantings within farms some involving both exotic and native plantings. On the Plains, many such shelter plantings had been established with government's 50:50 support for Water and Soil Conservation, but have since been removed.

With increased interest in improved water quality in runoff from farms, and, increased in insetting farm emissions and meeting market aspirations, native plantings are occurring on various farms, particularly along fencelines, boundaries and waterways.

I recognise that enhancement of indigenous species or habitats is a permitted activity in the Rural Zone as per GRUZ-R10. However encouraging the inclusion of visible native vegetation, even in a utilitarian hedging role, is to provide for some recognition of the underlying natural attributes of the District.

Encouraging the plantings only alongside the highway route is a very small area of the Rural Zone, but potentially providing for the emergence of some local characteristics and pride.

The proposed amendment supports the Objectives and Policies of the GRUZ. Bands of native plantings can potentially assist in reducing adverse effects and increasing positive

effects of some primary production activities on the public experience of the highway and perhaps on neighbouring activities too.

Such shelter plantings using native species can support the primary production and rural industry of the Rural Zone as intended by the provisions. The plantings can provide useful shelter as well as other benefits including insetting farm emissions and other nature based solutions. They can help protect and support primary production. Where there is an operational need for shelter plantings, a band of native plantings can provide that support.

Using native plantings will help maintain the character and even enhance the character and qualities of the rural zone.

LAND TYPES TRAVERSED

As shown on the attached Appendix 1, sheets 1-3, the Timaru District lowlands involve two Broad Land Types (BLT):

BLT 2 Low Altitude Plains and

BLT 3 Foothills and Downlands

Some 43 km of SH1 passes through BLT2 (PLAINS) and 15 km through BLT3 (DOWNS).

Kā Pākihi Whakatekateka o Waitaha (the Canterbury Plains) involve land type extending across most of lowland Canterbury down to Timaru on the downlands. The location of the city of Timaru as the district's central feature is defined by its position at the plains-downs-sea junction.

Along the seaward flank of the district, the character of the district lowlands strongly differs between the plains lands extending from Rangitata River to Timaru, and then the downlands from Timaru to Pureora (Pareora). The soft rock slopes of the Timaru downlands are naturally clothed in a thick layer of loess (wind-blown silt) that traditionally supported hardwood-podocarp forest. The plains deposition lands vary in their soil depth and drainage, with the deeper moister soils naturally supporting

podocarp forest, and with Kōwhai-Kanuka-TĪ Kōuka woodlands on drier areas as well as shrublands and grasslands.

The broad land types (BLT) generally align with the Ecological Districts of the area being considered, the Low Plains ED, and the Makikihi ED of the downlands. (Appendix 1, Sheet 4)

As is evident in travelling through the lowlands, there is scant native vegetation remaining. There is little to cue to the underlying nature of these lands. As many would say, it is highly monocultural, primarily pastoral, with little diversity or nature evident.

However the lands are naturally diverse. The different land types and different landform components provide conditions where different ecosystems typically thrived and where differing native plants might be re-established. The roadside revegetation in terms of the plains character and downlands character could emerge differently, in response to the differing conditions, the differing context, differing farmland management, as well as differing individual landowner aspirations.

I have considered the landscape of the two major transport corridors through the rural lowlands of the District road and rail. From the Rangitata to Timaru the two corridors are in relatively close proximity through the Rural lands (Appendix 1, Sheet 1). Considering the diversity of lands through the Low Plains, SH1 involves 43 km of driving through the L2 Lower Plains Land Type. Lengths of the L4 Recent Flood Plains and Low Terrace Land Type in association with the Rangitata, Ōrāri and Temuka-Ōpihi involves almost 13 km through these river-associated land types. (Appendix 1, Sheet 5; Appendix 2, Sheet 3)

Timaru extends from the Plains up on to the Hills and Downs. From the city southwards the highway runs for 15 km through the L14 Southern Loess Mantled Soft Rock Hills and Downs Land Type south to the Pureora and District boundary. (Appendix 1, Sheet 5; Appendix 2, Sheet 4)

PLAINS

L2

Considering the highway length north of the city through the lower plains lands, as shown on the model and chart (Appendix 2, sheet 2) the more elevated fans, terraces and ridges traditionally hosted woodlands, shrublands and grasslands. Kōwhai woodlands would have been signature vegetation, but they are not evident today. The lower landforms typically had moister habitat and supported Kahikatea forest plus Harakeke and other wetland flora.

L4

Either side of the main floodplains of the Rangitata, Ōrāri and Temuka-Ōpihi, the lengths of highway cross abandoned floodplains, terraces and backswamps that typically supported Kōwhai, Tī Kōuka, Kanuka woodland and divaricating shrublands such as Tūmatakuru (matagouri). (Appendix 2, sheet 3) Bracken remains an important coloniser for such woodlands, and would naturally have involved succession to the Kahikatea-Matai-Totara forest (as in the relic remaining at Arowhenua Bush).

HILLS & DOWNS

L14

South of Timaru, the 15 km of rural highway across the coastal fringe to the downlands naturally involves broadleaved forest on the more lush lands plus Kōwhai woodland and grey shrublands.

The Canterbury Plains are evident and known as deprived of indigenous biodiversity. By gradually introducing some areas of local native plants the local character, amenity values and corridor highway experience would be enhanced.

The amendment specifically seeks plantings. To also encourage support for natural regeneration, such as forest regeneration through bracken, shrubland, and other colonising species - even gorse, I propose the word ‘plantings’ be replaced with

'revegetation'. 'Revegetation' includes all forms of re-establishing the native flora whether planted, seeded or encouraged to succeed through natural processes.

Whilst currently fairly invisible, there are at least a dozen native Plains species and a dozen native Downs species that can usefully be utilised in shelter plantings and other revegetation. Appendix 3 provides Downs and Plains plant list excerpts with useful shelter species highlighted. Thus, whether for simple planting of rows or for mixed bands, or regeneration, it is clear there is no paucity for selection.

Combining the gradual and diverse re-establishment of some native flora along the highway corridor, along with encouragement for a cycleway as is addressed in other submission #74 submission points, would introduce constructive and complementary methods for sustainable management of local resources.

SIGNIFICANT NATURAL AREAS (SNA)

Considering what biodiversity remains in the district's lowlands, as well as the public and private protected areas, I am informed by the SNA that have been identified. Appendix 1, sheet 6 shows the SNA overlain with the Land Types.

Plains

L4

For the Low Plains, State Highway 1 crosses the three major river corridors of the Timaru lowlands – the Rangitata, Ōrāri and Ōpihi - involving three lengths of L4 Plains – Recent Floodplains and Low Terraces LT, with a total highway length through the non-urban corridor of 12.5 km. (Appendix 1, sheet 5)

Extensive long narrow SNA are evident along the berms of the major rivers across the low plains, that is, within L 4, the Recent Floodplains and Low Terraces LT (Appendix 1, sheet 6). As shown at Appendix 2, sheet 3, this LT includes abandoned floodplains and low terraces (landform components 2 and 3) which typically support some terrestrial woody flora.

Recognising SH1 intersects a series of important river habitats, this council has been one of very few districts to responsibly include Significant Natural Areas along many of their roads. Three SNAs - 115, 116a and 116b – are recognised close or adjacent to SH1 as it passes through L4. (Appendix 1, Sheet 6)

The only low plains remnant of native forest is within L4, being the Matai-Kahikatea forest remnant of Arowhenua Bush in which a Totara stump is evident. This is an important demonstration of the former forest of these L4 lands.

The combination of protection of the small remnants as SNA and also encouraging native plantings to complement these is identified as a very small but important opportunity for TDC to contribute to its statutory obligations and aspirations with regard to indigenous vegetation cover and amenity.

L2

The low plains between these river corridors and through to the downlands at Timaru involve three highway lengths of L2, the Lower Plains LT, which total 29 km, a considerable length. (Appendix 1, sheet 5)

As is evident at Appendix 1, sheet 6, there are very few SNA identified on the L2 Lower Plains lands. In fact scarcely any. Appendix 2 includes the models and charts for this land type. They show that the well-drained stoney fans and terraces (landform component 1) retain some remnant Kowhai and Kanuka plus shrubland and grassland somewhere. The small backswamps (landform component 4) would naturally support Kahikatea forest.

With the 29 km length of this type of land having State Highway 1 passing through it, the amendment to GRUZ-R15 to preclude exotics near the highway and instead encourage native plantings would seem entirely appropriate, as so very little remains.

The provision addresses only small slivers of these L2 lands, but gradually revegetating them can form a cue to the nature of the place and a potential inspiration for others.

The scarcity of plains biodiversity is such that whilst miniscule in scale the SNA and proposed rule could together assist in the ongoing understanding and survival of the nature of these lands.

DOWNLANDS

L14

Timaru city is located on the lower downlands to the coast. The non-urban land along SH1 adjoining to the south of the city passes through the L14 Southern Loess Mantled Soft Rock Hills and Downs LT for 15 km down to cross the narrow Lower Plains LT at the Pureora (Pareora) district boundary. (Appendix 1, sheet 5).

Considering these low altitude downlands in proximity to SH1, Appendix 1, sheet 6 shows the SNA in the vicinity including 95e by the highway. For the 15 km length there are just a few SNA down at the Normanby coast and inland of Kingsdown.

However these lands were likely hardwood-podocarp forest, but no cue to this remains evident on the highway corridor. Encouraging revegetation near the highway would be appropriate in terms of providing nature-based solutions for shelter, screening, shade, amenity, runoff management and insetting farm emissions. The annotated native plant list for the Downs at Appendix 3 provides some guidance.

The suggested amendments to the GRUZ-R15 shelterbelt planting provisions supporting the preclusion of exotic plantings and encouragement of native revegetation within 15 m of this highway are assessed as appropriate.

WILDFIRE RISK

The TDC submission 42.46 seeks the addition of a wildfire risk provision to consideration of shelterbelts and woodlots, which in my opinion would be appropriate.

Roadsides are an example of locations in proximity to people that have higher fire risk. Where there is connectivity between shelterbelts and woodlots, and proximity to buildings, fire risk and fire spread is increased. Many of the utilitarian shelter and woodlot species of these lowlands are of high fire risk, but so is Kanuka. Encouraging location and design of shelterbelts and woodlots that minimise wildfire risk is important, along with appropriate fuel management of associated areas as rank dry grass also carries high wildfire risk. Ensuring evacuation routes remain accessible is very important.

Suggest add -

> In terms of design and ongoing management, consider the wildfire risk when considering planted buffers such as for visual screening, shelter, shade, runoff management and insetting.

As shown in my Appendix 3, and in information from FENZ, knowledge of lower flammability ratings can assist in informing design for green firebreaks. The appended Downs and Plains plant list excerpts show more than 10 species that are not highly flammable for each area. However management of other potential fuel loadings also needs to be considered, including of adjoining dry grassland.

SUMMARY

The proposed amendment in #74.3 and my other suggested refinements complement the statutory provisions and intent of the plan as He Ao. Ka Awatea, welcoming a new beginning. In summary, the refined amendments are appropriate as provisions addressing shelterbelts (and woodlots) appropriately also addressing issues regarding biodiversity and climate change.

The proposed rule would not force any landowner to plant. It would not override existing use rights. But it could set a default position for indigenous revegetaion and ultimately the improvement of ecological connectivity across the district.

Whilst intended as functional additions, many landowners are interested in the amenity and landscape character of shelterbelts being newly established particularly if adjoining their property frontage such as to the highway.

The amendment drafting provides for flexibility. Limiting them to native plantings is triggered only when it is within 15m. of the State Highway 1 boundary of rural-zoned land. This is practical.

Di Lucas July 2024

Appendix 1 **Maps of Timaru District Lowlands** showing:

Sheet 1 Broad Land Types (BLT)

Sheet 2 BLT 2 model

Sheet 3 BLT 3 model

Sheet 4 BLT & Ecological Districts

Sheet 5 Land Types

Sheet 6 Land Types & Significant Natural Areas (SNA)

Appendix 2 **Land Type Models & Charts**

L1 Plains – Coastal Fringe Land Type

L2 Lower Plains Land Type

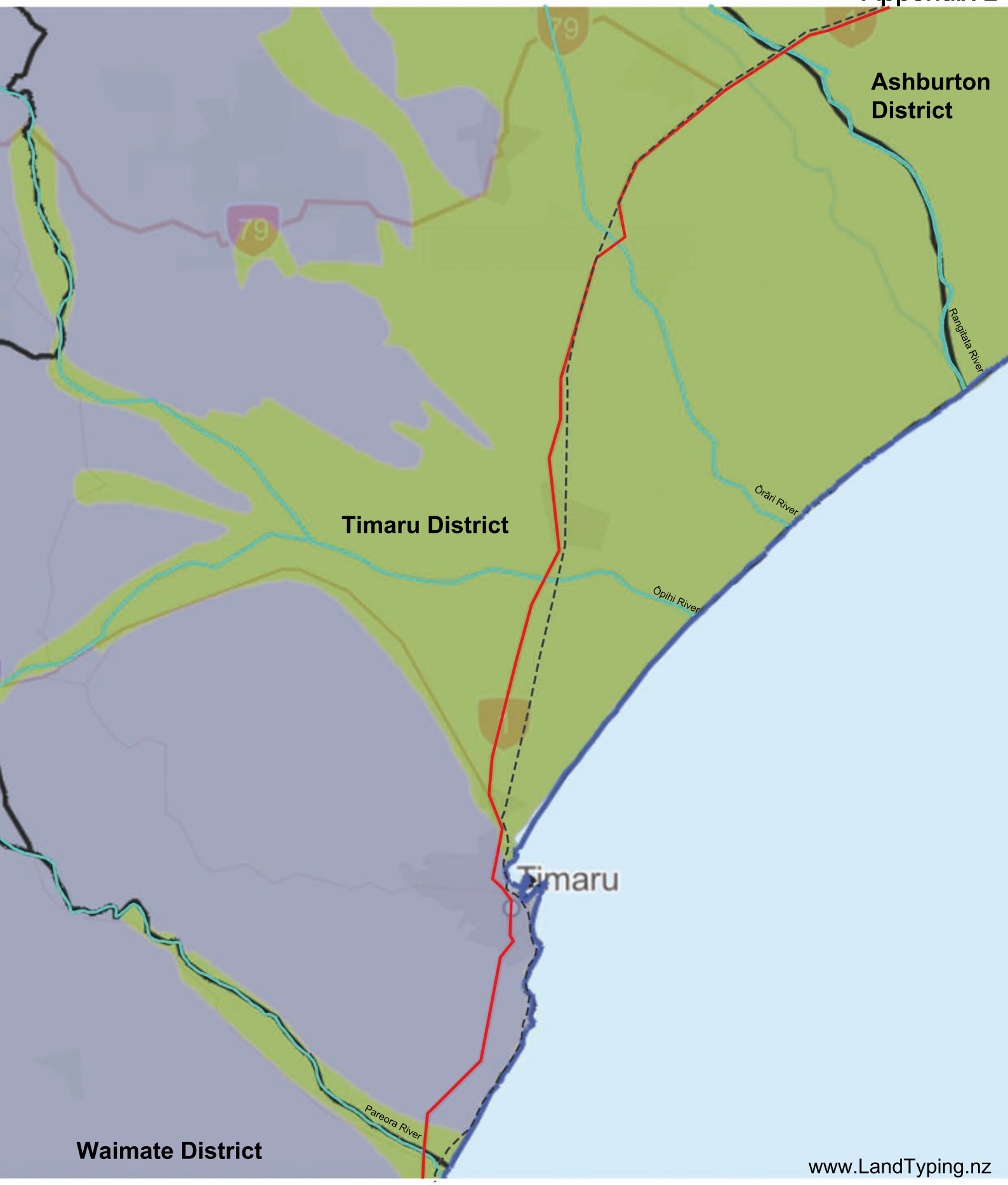
L4 Plains – Recent Floodplains & Low Terraces Land Type

L14 Southern Loess Mantled Soft Rock Hills & Downs Land Type

Appendix 3

Native Plants of the Downs (excerpt with shelter species identified)

Native Plants of the Plains (excerpt with shelter species identified)



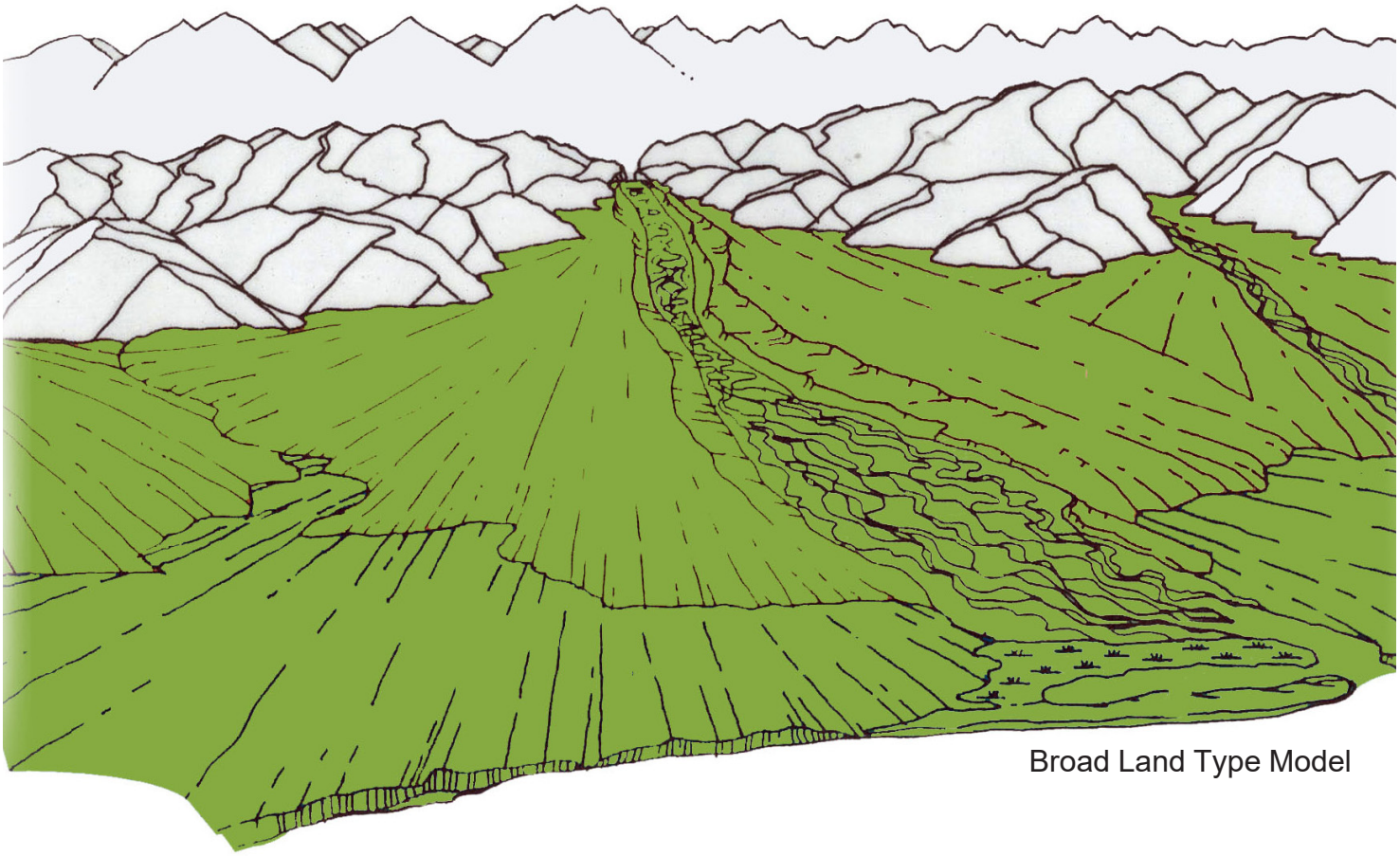
Sheet 1

Broad Land Types (BLT)

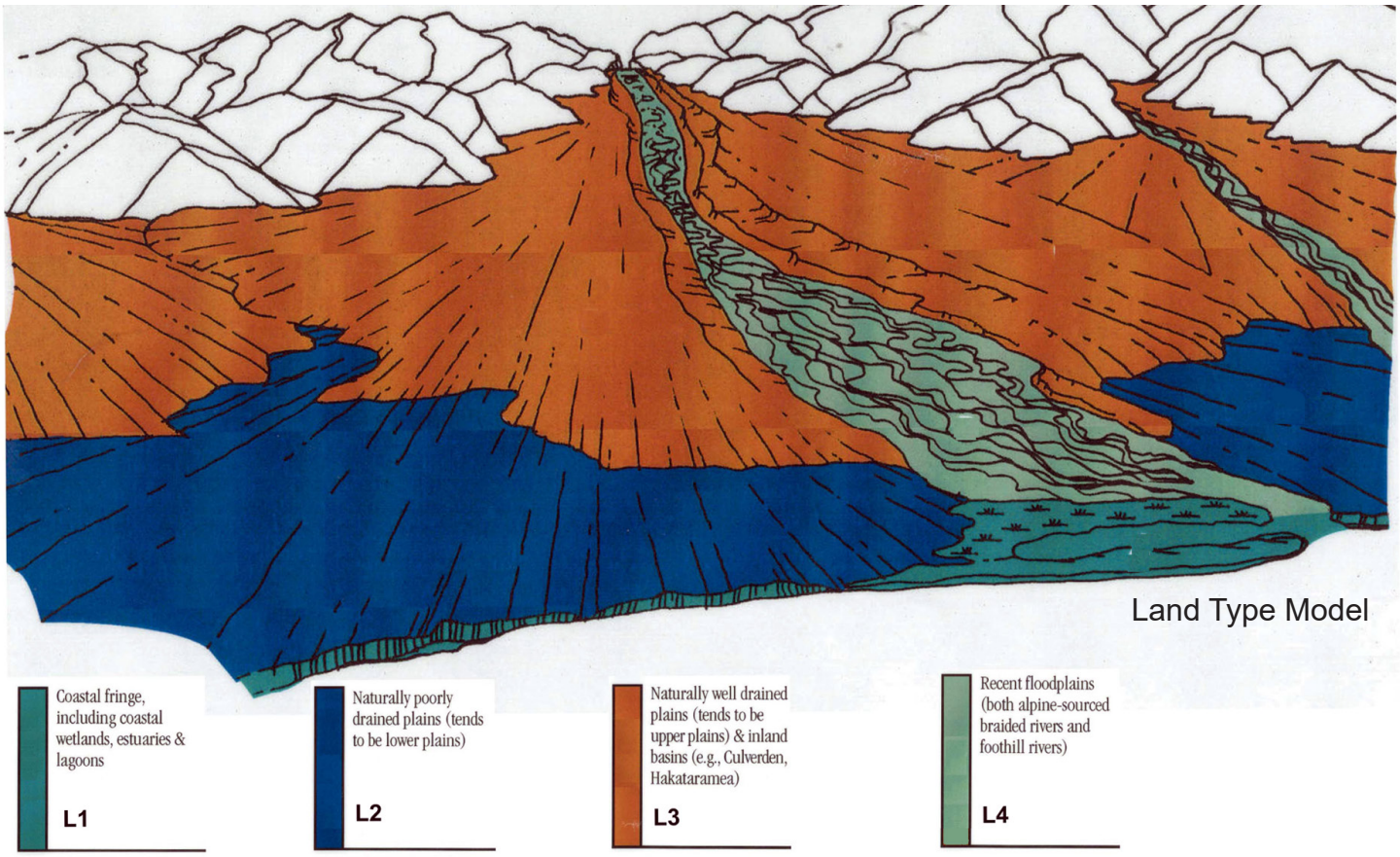
- State Highway 1
- Kiwi Rail
- District boundary
- BLT 2: Low Altitude Plains
- BLT 3: Foothills and Downlands

Sheet 2: BLT 2 model

Broad Land Type 2 - Low Altitude Plains



Broad Land Type Model



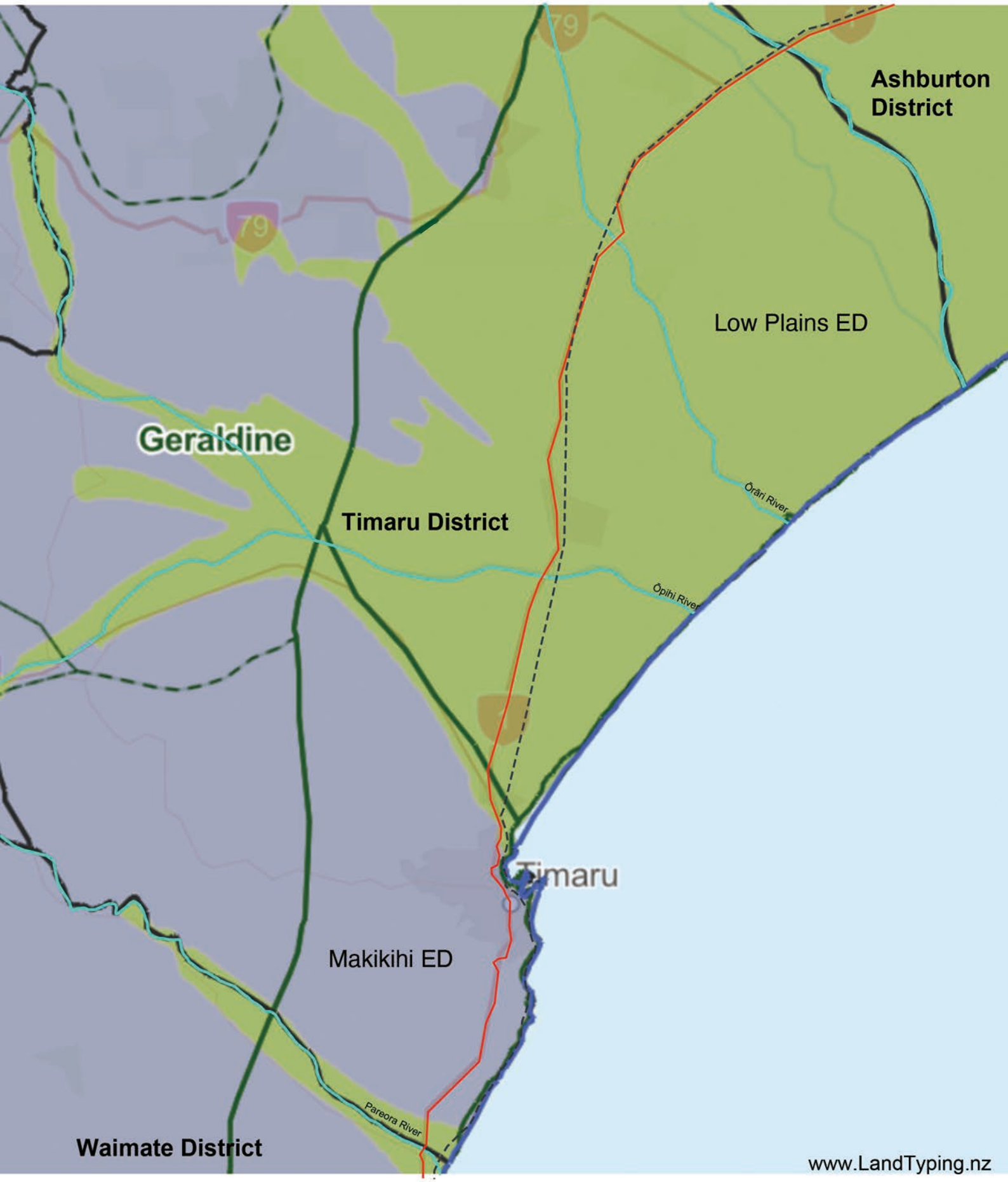
Land Type Model

Sheet 3: BLT 3 model

Broad Land Type 3 - Foothills and Downlands

Hard Rock Foothill and Downlands (L21 +L22)

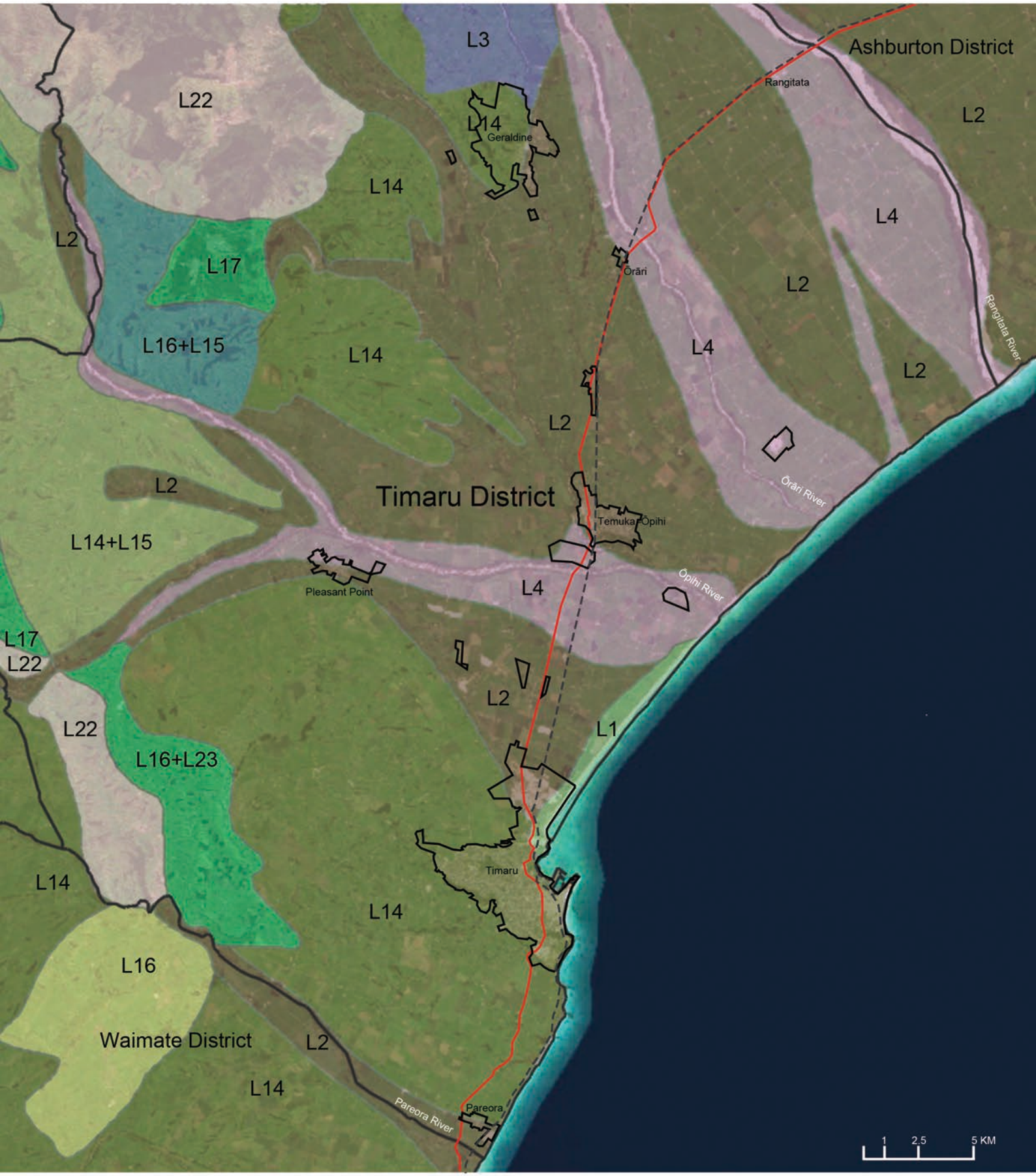
Soft Rock Foothill and Downlands (L11+12, L14+15, L13, L16)



State Highway 1
Kiwi Rail
District boundary
Ecological Regions
Ecological Districts

Sheet 4

BLT & Ecological Regions & Districts



sheet 5

Land Types (LT)

Plains: L1, L2, L3, L4

Hills & Downs: L14, L14+15, L15+16, L23

Hills: L16, L16+23, L17, L22

State Highway 1

Kiwi Rail

non-rural areas

District boundary

L1 Coastal Plains Fringe LT

L2 Lower Plains LT

L3 Upper Plains LT

L4 Plains - Recent Floodplains and Low Terraces LT

L14 Southern Loess Mantled Soft Rock Hills and Downs LT

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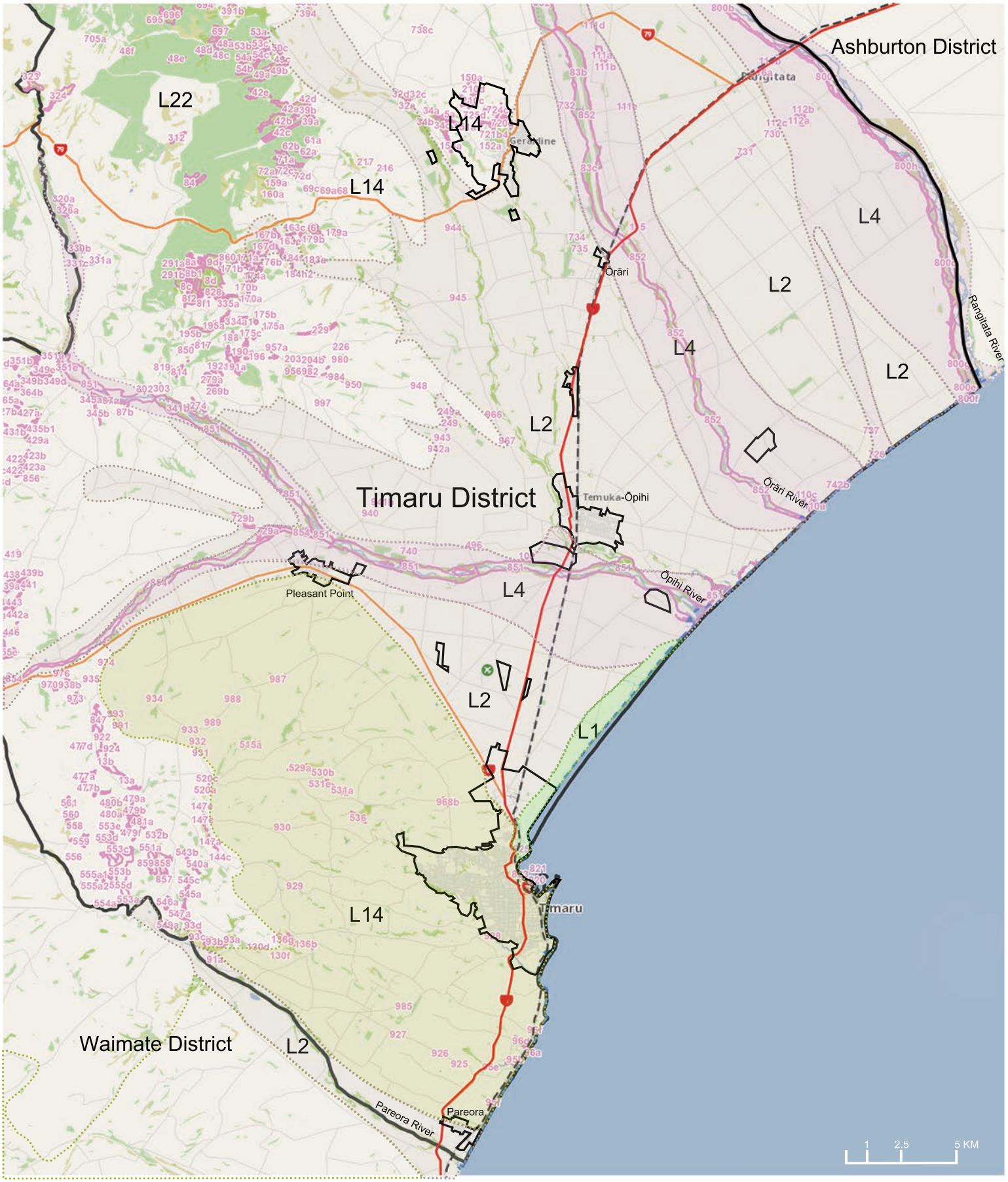

sheet 6

Land Types (LT) & Significant Natural Areas (SNA)

State Highway 1

Kiwi Rail

non-rural areas

District boundary

SNA areas

Plains: L1, L2, L3, L4

Hills & Downs: L14, L14+15, L15+16, L23

Hills: L16, L16+23, L17, L22

L1 Coastal Plains Fringe LT

L2 Lower Plains LT

L4 Plains - Recent Floodplains and Low Terraces LT

L14 Southern Loess Mantled Soft Rock Hills and Downs LT

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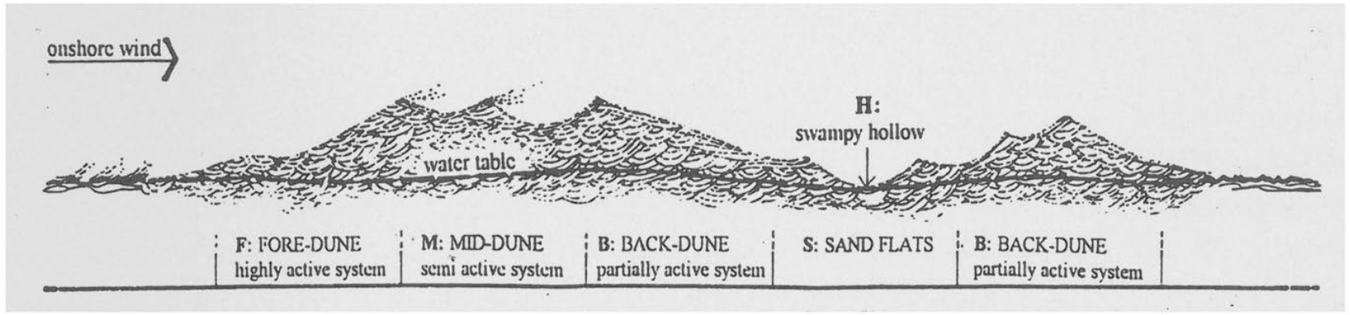
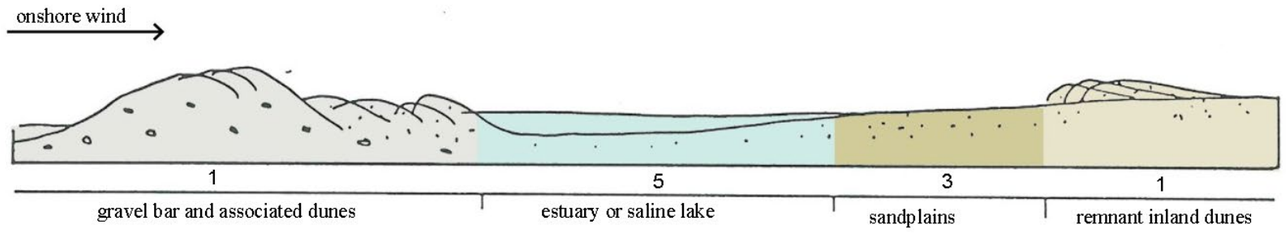
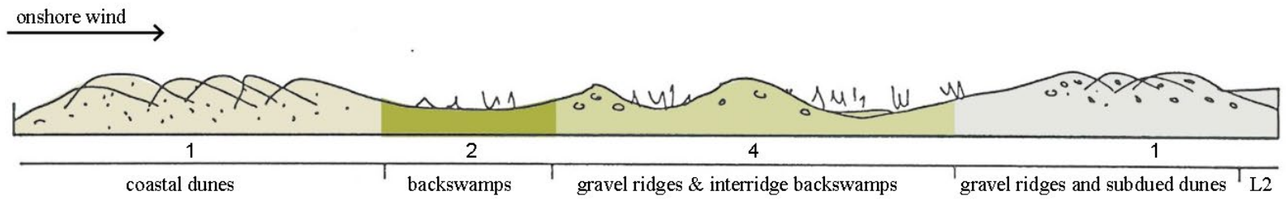
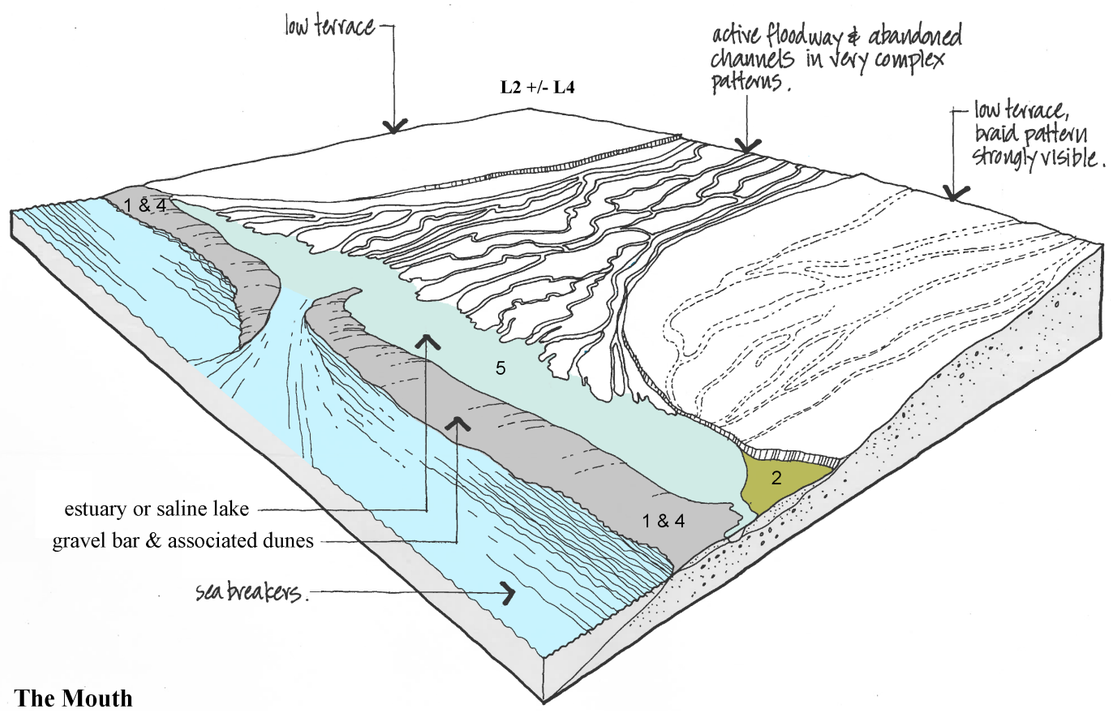








The Mouth
including Waimakariri, Rakaia, Rangitata and Waitaki Rivers

Description:

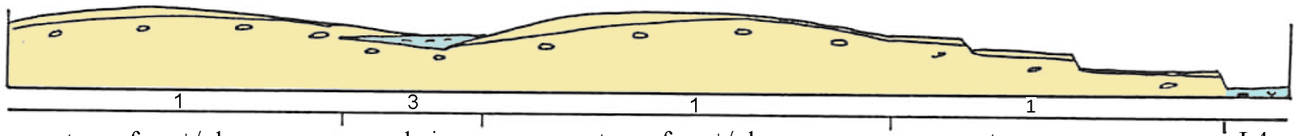
Canterbury plains coastal fringe incorporating undulating to rolling coastal beach sand dunes and associated interdune backswamps, sand plains, gravel beach ridges and bars, and saline lake and lagoonal fringe wetlands. Elevation ranges from 0 - 20 m and rainfalls from 600 - 800 mm/A. The land type includes the coastal fringe from the Waipara River mouth to Banks Peninsula, the margins of Lake Ellesmere and the coastal fringe north and south of Timaru.

	landform component	geological formation	elevation m	remnant native vegetation	present land use	agronomic potential	potential land use	potential impacts
1	**Beach sand dune complexes**	Holocene and Recent dune sand	0 - 20	pingao, dune slack, danthonia grassland	extensive grazing, exotic forestry, conservation, recreation, stabilized waste land	low	exotic forestry, extensive grazing, stabilization, recreation	exotic trees, recreational impacts, loss of native vegetation
2	**backswamps**	Holocene and Recent alluvium and organic deposits	0 - 20	swamp, carr, lacustrine, slacks, saltmarsh	intensive grazing, feed cropping	medium	cash and feed cropping, horticulture, intensive grazing	intensified land use, drainage, windbreaks, subdivision
3	**sand plains**	Holocene and Recent sands and lagoonal deposits	0 - 50	*Scirpoides* sedgeland, dune slack, silver tussock, danthonia grassland	extensive grazing, waste land	low	semi intensive grazing, recreation	loss of native vegetation, increase in exotics, recreational impacts
4	**gravel bars and beach ridges**	Holocene and Recent beach gravel and dune sands	0 - 20	pingao, scrub, bracken	extensive grazing, waste land	low	semi intensive grazing, recreation, stabilization	loss of native vegetation, increase in exotics, recreational impacts
5	**saline lake and estuary fringes**	Holocene and Recent fluviatile and lagoonal deposits	0 - 3	salt marsh (esturine, lacustrine)	extensive grazing, feed and cash cropping	medium	intensive grazing, cash and feed cropping	intensified land use, drainage, windbreaks, subdivision

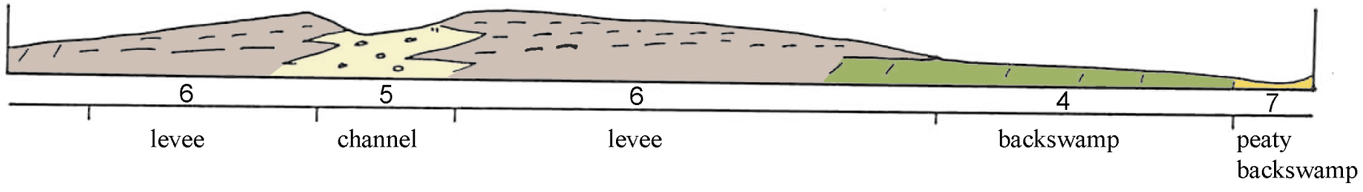
L2: Lower Plains Land Type
L4: Plains - Recent Floodplains and Low Terraces Land Type

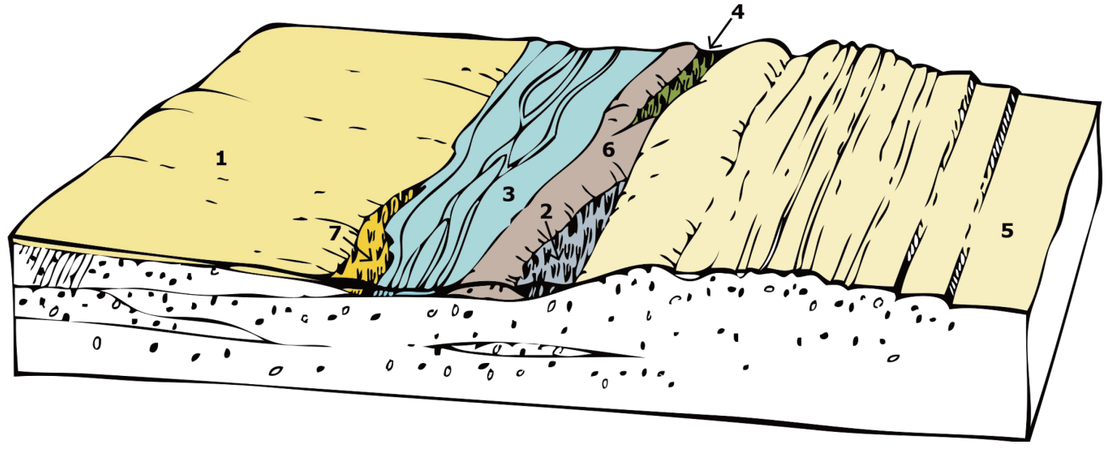
L2. LOWER PLAINS LAND TYPE

Mid to upper L2



Lower fan fringes





Description:

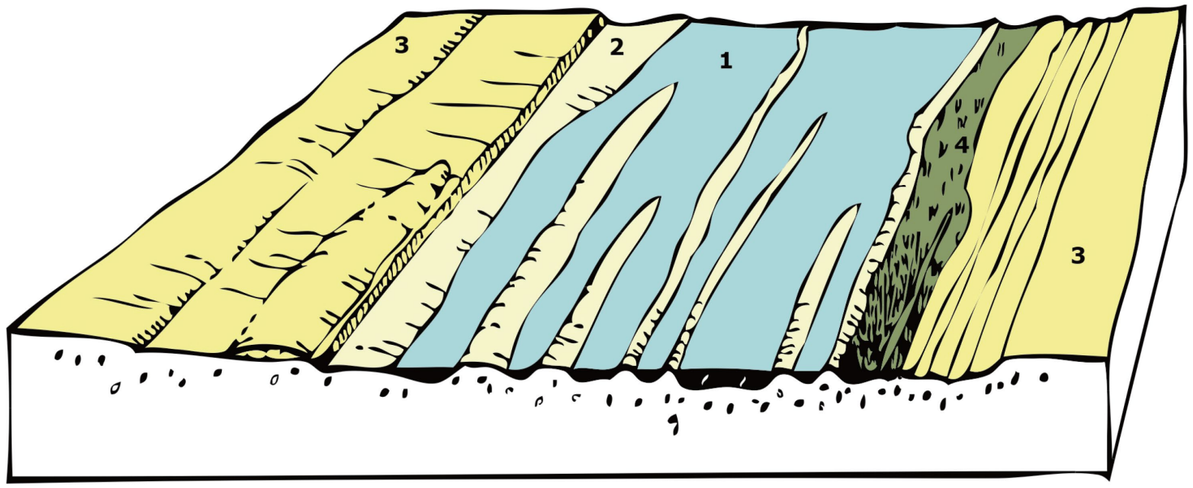
Lower Canterbury plains; broad very low angle coalescing outwash fans and associated low terraces of the major rivers (Waimakairi, Rakaia, Rangitata, and the Waitaki Rivers), comprising Pleistocene glacial outwash gravels with variable loess cover, and extensive Holocene alluvium, coastal swamp deposits and minor inland dune belts. Elevation ranges from 0 - 150 m, and rainfalls from 600 - 800 mm/A.

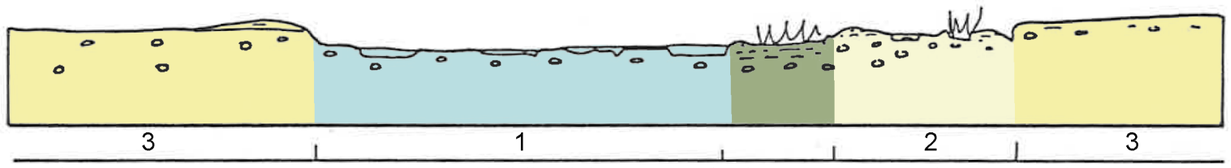
	landform component	geological formation	elevation m	remnant native vegetation	present land use	agronomic potential	potential land use	potential impacts
1	**well drained stony fans and terraces**	late Pleistocene and Holocene alluvium, variable loess cover	20 - 150	short tussock grassland, matagouri, kowhai, kanuka scrub / woodland	intensive grazing, cash and feed cropping, viticulture, orchards, exotic forestry	high	cash and feed cropping, horticulture, viticulture, orchards, intensive grazing	intensified land use, windbreaks, irrigation, forestry, subdivision, 'life style' blocks
2	**poorly drained lower fan fringes**	late Pleistocene and Holocene alluvium	5 - 150	wetland communities	intensive grazing, cash and feed cropping, orchards	high	cash and feed cropping, horticulture, orchards, intensive grazing	intensified land use, windbreaks, irrigation, subdivision
3	**floodbasins and meander floodplains**	Holocene and Recent alluvium	5 - 150	swamp, scrubland	intensive grazing, cash and feed cropping	high	cash and feed cropping, horticulture, intensive grazing	intensified land use, windbreaks, irrigation, subdivision
4	**backswamps**	Holocene and Recent alluvium	5 - 150	kahikatea forest, manuka, flax, raupo, sedge and rushland	intensive grazing, cash and feed cropping	high	cash and feed cropping, horticulture, intensive grazing	intensified land use, drainage, windbreaks, subdivision
5	**infilled channels and gravel ridges**	coarse Holocene and Recent alluvium	5 - 150	danthonia grassland - scrub	semi intensive grazing, feed cropping	medium	feed and cash cropping, viticulture, semi intensive grazing	intensified land use, windbreaks, irrigation, subdivision
6	**levees**	Holocene and Recent alluvium	5 - 150		intensive grazing, cash and feed cropping	high	cash and feed cropping, viticulture, horticulture, intensive grazing	intensified land use, windbreaks, irrigation, subdivision
7	**peaty backswamps**	Holocene and Recent alluvium and peat	1 - 30	wetland and flax communities	intensive grazing, cash and feed cropping, horticulture	high	horticulture, cash and feed cropping, intensive grazing	intensified land use, drainage, windbreaks, subdivision

L4: Plains - Recent Floodplains and Low Terraces Land Type

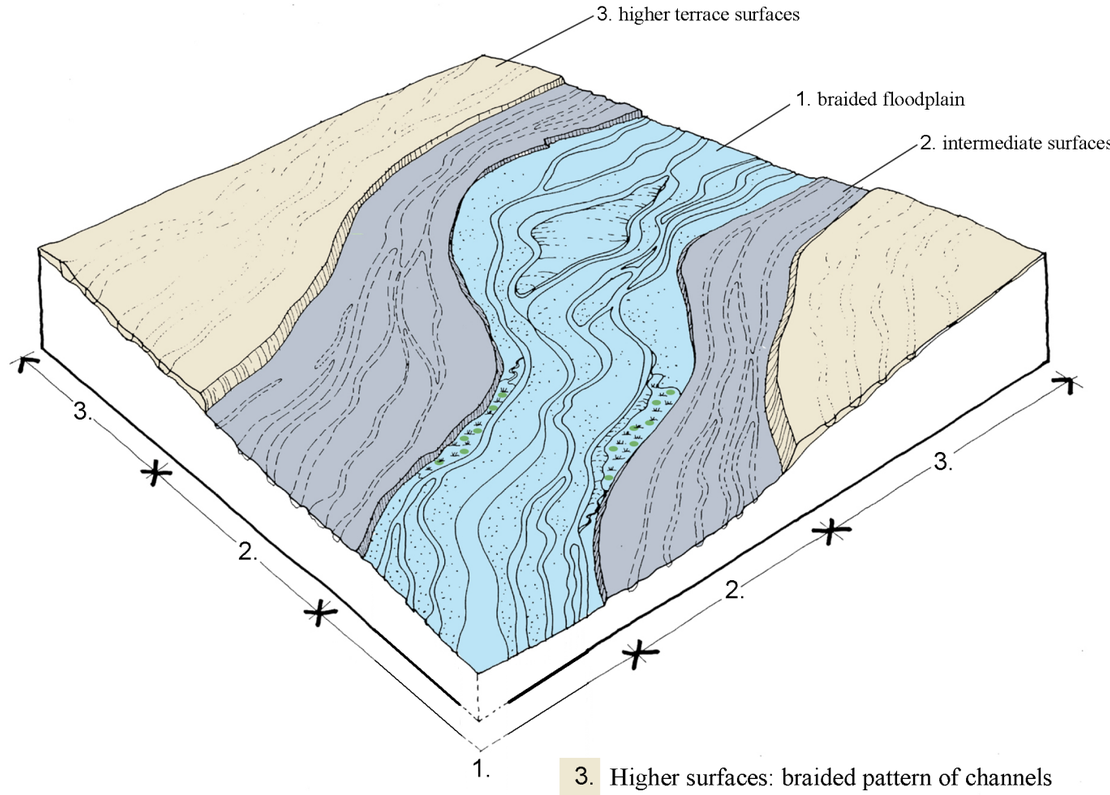
L2. LOWER PLAINS LAND TYPE

L4. PLAINS - RECENT FLOODPLAINS AND LOW TERRACES LAND TYPE





low terraces | active braided floodplain (braided islands, bars, channels etc) | backswamps | recently abandoned braided floodplain | low terraces



3. Higher surfaces: braided pattern of channels & bars largely smothered with a mantle of loess

2. Intermediate surfaces: braid pattern clearly visible, stony ridges & bars with finely textured infilled channels

1. Active braided floodplain: channels, bars, islands etc. recently abandoned braided floodplain; backswamps

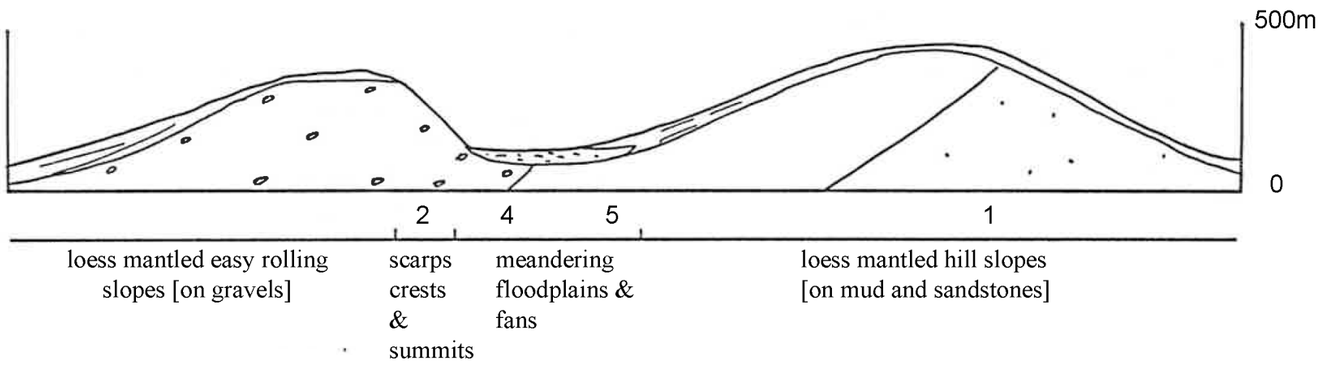
Description:

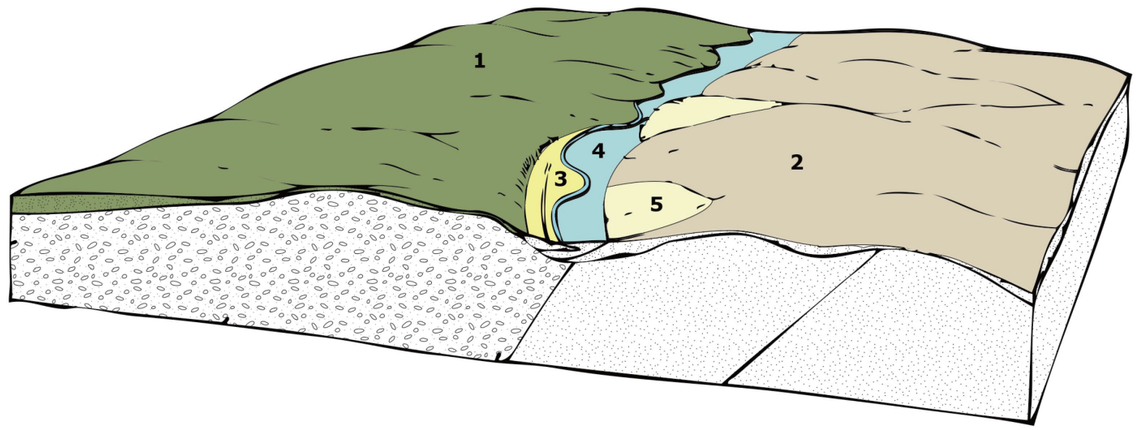
Active, Recent, major river floodplains incorporating wide, braided, active and recently active riverbeds, recent floodplain terraces and associated backswamp wetlands. Elevation ranges from 0 to 600 m and rainfall from 600 - 1000 mm/A. The land type includes the lowland sections of the Clarence, Conway, Wairau, Hurunui, Waimakariri, Rakaia, Rangitata, and Waitaki Rivers.

	landform component	geological formation	elevation m	remnnt native vegetation	present land use	agronomic potential	potential land use	potential impacts
1	**active braided floodplain**	Holocene and Recent fluvial deposits	0 - 600	ephemeral communities	opportunist grazing, scrub waste land	low	opportunist grazing	largely 'natural' environment, exotic 'river control' trees, exotic scrub
2	**recently abandoned braided floodplain**	Holocene and Recent fluvial deposits	0 - 600	danthonia grassland, kowhai, kanuka, matagouri scrub, bracken, cabbage trees	extensive grazing, opportunist grazing, scrub waste land, exotic forestry	low	extensive grazing, exotic forestry	exotic pasture, forestry, scrub establishment
3	**low terraces**	Holocene and Recent alluvium	5 - 600	danthonia grassland, kowhai, kanuka, matagouri, scrub, cabbage trees, bracken	intensive grazing, cash and feed cropping, viticulture, orchards	high	cash and feed cropping, horticulture, viticulture, orchards, intensive grazing	intensified land use, windbreaks, irrigation, subdivision
4	**backswamps**	Holocene and Recent alluvium and organic deposits	5 - 600	wetland, rush/sedge	intensive grazing, cash and feed cropping	high	cash and feed cropping, horticulture, intensive grazing	intensified land use, drainage, windbreaks, subdivision

L4. PLAINS - RECENT FLOODPLAINS AND LOW TERRACES LAND TYPE

L14. SOUTHERN LOESS MANTLED SOFT ROCK HILLS AND DOWNS LAND TYPE





Description:

Smooth, rounded, rolling to strongly rolling downland landscapes developed on loess mantled Cretaceous / Tertiary sedimentary and igneous strata, and early Pleistocene gravels, with minor associated terraces, floodplains and fans. Elevation ranges from 0 - 500 m and rainfall from 600 to 1000 mm/A. Exampe areas would include the Timaru Downlands and the Green Hills areas.

	landform component	geological formation	elevation m	remnant native vegetation	present land use	agronomic potential	potential land use	potential impacts
1	loess mantled 'soft' rock erosional hill slopes	Loess over Cretaceous-Tertiary sandstones, mudstones, conglomerate and tuff	0 - 500	silver tussock grassland matagouri and kowhai scrub, broadleaved scrub	intensive grazing, feed and cash cropping, exotic forestry	medium to high	intensive grazing, cash and feed cropping, exotic forestry	more intensive land use, windbreaks, subdivision, cultivation, exotic forestry
2	spur crests and summits	Loess over Cretaceous-Tertiary sandstones, mudstones, conglomerate and tuff	50 - 500	silver tussock grassland matagouri and kowhai scrub, broadleaved scrub	intensive grazing, feed and cash cropping, exotic forestry	medium to high	intensive grazing, cash and feed cropping, exotic forestry	intensive grazing, cash and feed cropping, exotic forestry
3	terraces	late Pleistocene and Holocene gravels, variable loess cover	0 - 500	short tussock grassland matagouri and kowhai scrub	intensive grazing, feed and cash cropping	high	intensive grazing, cash and feed cropping, horticulture, orchards	more intensive land use, windbreaks, subdivision, horticulture
4	minor meander floodplains	Recent alluvium and swamp deposits	0 - 450	wetlands	intensive grazing, feed and cash cropping	high	intensive grazing, cash and feed cropping, orchards	more intensive land use, drainage, windbreaks, subdivision, horticulture
5	fans	loess over late Pleistocene and Holocene fan deposits	0 - 450	short tussock grassland matagouri and kowhai scrub	intensive grazing, feed and cash cropping	high	intensive grazing, cash and feed cropping, orchards	more intensive land use, windbreaks, subdivision, horticulture

L14. SOUTHERN LOESS MANTLED SOFT ROCK HILLS AND DOWNS LAND TYPE

Downs & Plains

SOUTH CANTERBURY Lowland Land Types (between the Rangitātā & Waitaki Rivers)

Native Plants of the DOWNS

Plant Tolerances	Characteristics	Fire risk	Wildlife value	Use
■ = tolerates or needs □ = intolerant ½ = tolerant of some * = to establish , protect from frost	D = Deciduous sD = semi-Deciduous	H = high M = moderate L = low	F = fruit S = seed N = nectar B = bud/foliage I = insects L = fruit for lizards	R = rongoā K = kai H = hedging Shelterbelt

		Fire risk	Food	Tolerances: sun	shade	moist	dry	wind	Use
TALL TREES									
Dacrycarpus dacrydioides	kahikatea, white pine	H	F,I	■		■		■	R,K
Elaeocarpus dentatus	pōkākā		F,I	■					R,K
Fuscospora solandri	tawhairauriki, black beech			■					
Podocarpus totara	tōtara	H	F	■	■	■	■	■	R,K,H
Prumnopitys taxifolia	matai, black pine	M	F	■	■	■			R,K
TREES									
Aristotelia serrata	makomako, wineberry	L	F,I,B	■	■				
Carpodetus serratus	putaputawētā, marbleleaf	L	F,I,B			■			H
Cordyline australis	tī kōuka, cabbage tree	M	F,N,I	■	■	■	■	■	R,K
Fuchsia excorticata	kōtukutuku, tree fuchsia (D)	L	F	■	■	■			K
Hoheria angustifolia	houhere, narrow-leaved lacebark (sD)	M	I	■		■	■	■	R
Kunzea ericoides	kānuka	H	I	■			■	■	R,K
Leptospermum scoparium	mānuka, tea tree	H	N,I	■			■	■	R,K
Pennantia corymbosa	kaikōmako	L	F,N,I	■		■			
Pittosporum eugenioides	tarata, lemonwood	M	F		■				R,H
Pseudopanax arboreus	whauwhaupaku, five finger	L	F,N,I	■	■		■	■	
Pseudopanax crassifolius	horoeka, lancewood	L	F,N,I	■	■		■	■	
Sophora microphylla	kōwhai, South Island kōwhai	L	N,I	■		■	■	■	R
Streblus heterophyllus	tūrepo, milk tree					■			
SMALL TREES & TALL SHRUBS									
Griselinia littoralis	kāpuka, broadleaf	L	F,I		■	■	■	■	R,K,H
Melicope simplex	poataniwha		F,I	■	■		■	■	H
Melicytus ramiflorus	māhoe/ hinahina, whitey wood	L	F,L,I	■	■			■	
Myrsine australis	māpou, red matipo	L	F,L,I	■	■		■	■	R
Olearia avicenniifolia	mountain akeake	H	S,I	■			■	■	H
Olearia ilicifolia	mountain holly			■					
Pittosporum tenuifolium	kōhūhū, black matipo	M	F,I	■	■	■	■	■	H,R

plant list excerpts from www.landtyping.nz

Downs' Plants

		Fire risk	Food	Tolerances: sun	shade	moist	dry	wind	Use
Raukaua simplex	haumakāroa				■				
Schefflera digitata	patē, seven finger		F	■	■				
SHRUBS									
Acrothamnus colensoi	Colenso's mingimingi			■					
Carmichaelia crassicaulis subsp. racemosa	slender coral broom			■					
Coprosma areolata	thin-leaved twiggy coprosma		F	■	■		■	■	
Coprosma crassifolia	small-leaved twiggy coprosma	M	F,L	■	■		■	■	H
Coprosma linariifolia	mikimiki, yellow wood small-leaved twiggy coprosma		F	■	■		■	■	H
Coprosma petriei	turfy coprosma		F,L	■	■		■	■	
Coprosma rhamnoides			F	■	■		■	■	H
Coprosma rigida			F	■	■		■	■	H
Coprosma rotundifolia			F	■	■		■	■	
Coprosma rubra			F,L	■	■		■	■	H
Coprosma virescens			F,L	■	■		■	■	
Corokia cotoneaster	korokio	M	F,I	■			■	■	H
Discaria toumatou	tūmatakura, matagouri	H	I	■					
Dracophyllum longifolium	totorowhiti, inaka, grass tree		N	■	■	■	■	■	
Dracophyllum pronum	trailing neinei, turpentine shrub			■	■	■			
Dracophyllum uniflorum	sprawling inaka								
Lophomyrtus obcordata	rōhutu		F,I	■	■	■	■	■	H
Melicytus micranthus	swamp māhoe, manakura			■	■	■	■		
Myrsine divaricata	weeping māpou			■					R
Neomyrtus pedunculata	rōhutu		F			½	■		H
Ozothamnus leptophyllus	tauhinu, cottonwood		S,I	■			■	■	
Pseudowintera colorata	horopito, pepper tree	L		■	■	■		■	
Solanum laciniatum	poroporo, kohoho	L	F,I	■	■		■		R
Styphelia nesophila	pātōtara, dwarf mingimingi			■					
Teucrium parvifolium	teucridium			■					
Veronica salicifolia	koromiko, hebe		I	■	■		■	■	H,R
TREE FERNS									
Alsophila tricolor	ponga, silver fern	M	F	■	■	■			R
Alsophila smithii	kātote, Smith's tree fern	M	F	■	■	■			R
FLAXES									
Astelia fragrans	kakaha, bush flax, bush lily								
Astelia nervosa	mountain astelia								
Phormium cookianum	whaririki, mountain flax	M							
Phormium tenax	harakeke, flax	M							

Downs & Plains

SOUTH CANTERBURY Lowland Land Types (between the Rangitātā & Waitaki Rivers)

Native Plants of the PLAINS

Plant Tolerances	Characteristics	Fire risk	Wildlife value	Use
■ = tolerates or needs □ = intolerant ½ = tolerant of some * = to establish , protect from frost	D = Deciduous sD = semi-Deciduous	H = high M = moderate L = low	F = fruit S = seed N = nectar B = bud/foliage I = insects L = fruit for lizards	R = rongoā K = kai H = hedging Shelterbelt

		Fire risk	Food	Tolerances: sun	shade	moist	dry	wind	Use
TALL TREES									
Dacrycarpus dacrydioides	kahikatea, white pine	H	F,I	■		■		■	R,K
Elaeocarpus dentatus	pōkākā		F,I	■					R,K
Podocarpus totara	tōtara	H	F	■	■	■	■	■	R,K,H
Prumnopitys taxifolia	mataī, black pine	M	F	■	■	■			R,K
TREES									
Aristotelia serrata	makomako, wineberry	L	F,I,B	■	■				
Carpodetus serratus	putaputawētā, marbleleaf	L	F,I,B			■			H
Cordyline australis	tī kōuka, cabbage tree	M	F,N,I	■	■	■	■	■	R,K
Fuchsia excorticata	kōtukutuku, tree fuchsia (D)	L	F	■	■	■			K
Hoheria angustifolia	houhere, narrow-leaved lacebark (sD)	M	I	■		■	■	■	R
Kunzea ericoides	kānuka	H	I	■			■	■	R,K
Leptospermum scoparium	mānuka, tea tree	H	N,I	■			■	■	R,K
Plagianthus regius	mānatu, ribbonwood (sD)			■		■	■	■	
Pseudopanax crassifolius	horoeka, lancewood	L	F,N,I	■	■		■	■	
Pseudopanax ferox	horoeka, fierce lancewood			■					
Sophora microphylla	kōwhai, South Island kōwhai	L	N,I	■		■	■	■	R
Streblus heterophyllus	tūrepo, small-leaved milk tree		F	½	■	■	□	□	
SMALL TREES & TALL SHRUBS									
Carmichaelia arborea	South Island broom			■		■		■	
Griselinia littoralis	kāpuka, broadleaf	L	F,I		■	■	■	■	R,K,H
Melicope simplex	poataniwha		F,I	■	■		■	■	H
Melicytus ramiflorus	māhoe/ hinahina, whitey wood	L	F,L,I	■	■			■	
Myrsine australis	māpou, red matipo	L	F,L,I	■	■		■	■	R
Pittosporum tenuifolium	kōhūhū, black matipo	M	F,I	■	■	■	■	■	H,R
Raukaua simplex	haumakāroa				■				
SHRUBS									
Coprosma areolata	thin-leaved twiggy coprosma			■	■		■	■	

Plains' Plants

		Fire risk	Food	Tolerances					Use
				sun	shade	moist	dry	wind	
Coprosma crassifolia	small-leaved twiggy coprosma	M	F,L	■	■		■	■	H
Coprosma linariifolia	mikimiki, yellow wood small-leaved twiggy coprosma		F	■	■		■	■	H
Coprosma parviflora	mikimiki, mingimingi	L	F,L	■	■	■	■	■	H
Coprosma propinqua	mikimiki, mingimingi	L	F,L	■	■	■	■	■	H
Coprosma petriei	turfy coprosma		F,L	■	■		■	■	
Coprosma rhamnoides			F	■	■		■	■	H
Coprosma rigida			F	■	■		■	■	H
Coprosma rotundifolia			F	■	■		■	■	H
Coprosma rubra			F,L	■	■		■	■	H
Coprosma virescens			F,L	■	■		■	■	
Corokia cotoneaster	korokio	M	F,I	■			■	■	H
Discaria toumatou	tūmatakura, matagouri	H	I	■			■	■	
Helichrysum glomeratum				■			■	■	
Helichrysum selago				■			■	■	
Lophomyrtus obcordata	rōhutu, NZ myrtle		F,I	■	■	■	■	■	H
Melicytus micranthus	swamp māhoe, manakura			■	■	■	■		
Myrsine divaricata	weeping māpou		F,L,I	■					R
Neomyrtus pedunculata	rōhutu		F			½	■		H
Olearia paniculata	akiraho, golden akeake	H	S,I	■			■	■	H
Ozothamnus leptophyllus	tauhinu, cottonwood			■			■	■	
Ozothamnus vauvilliersii	tauhinu, cottonwood			■			■	■	
Raukaua anomalus	raukaua		F,N	½	½	■	½	■	
Teucrium parvifolium	teucridium			■		■	■	■	H
Veronica salicifolia	koromiko, hebe		I	■	■		■	■	HR
TREE FERN									
Dicksonia fibrosa	wheki-ponga, kuripaka				■	■			
FLAXES									
Phormium tenax	harakeke, flax	M							