

Wellington Region

Riversdale

Wairarapa Coast

Masterton District

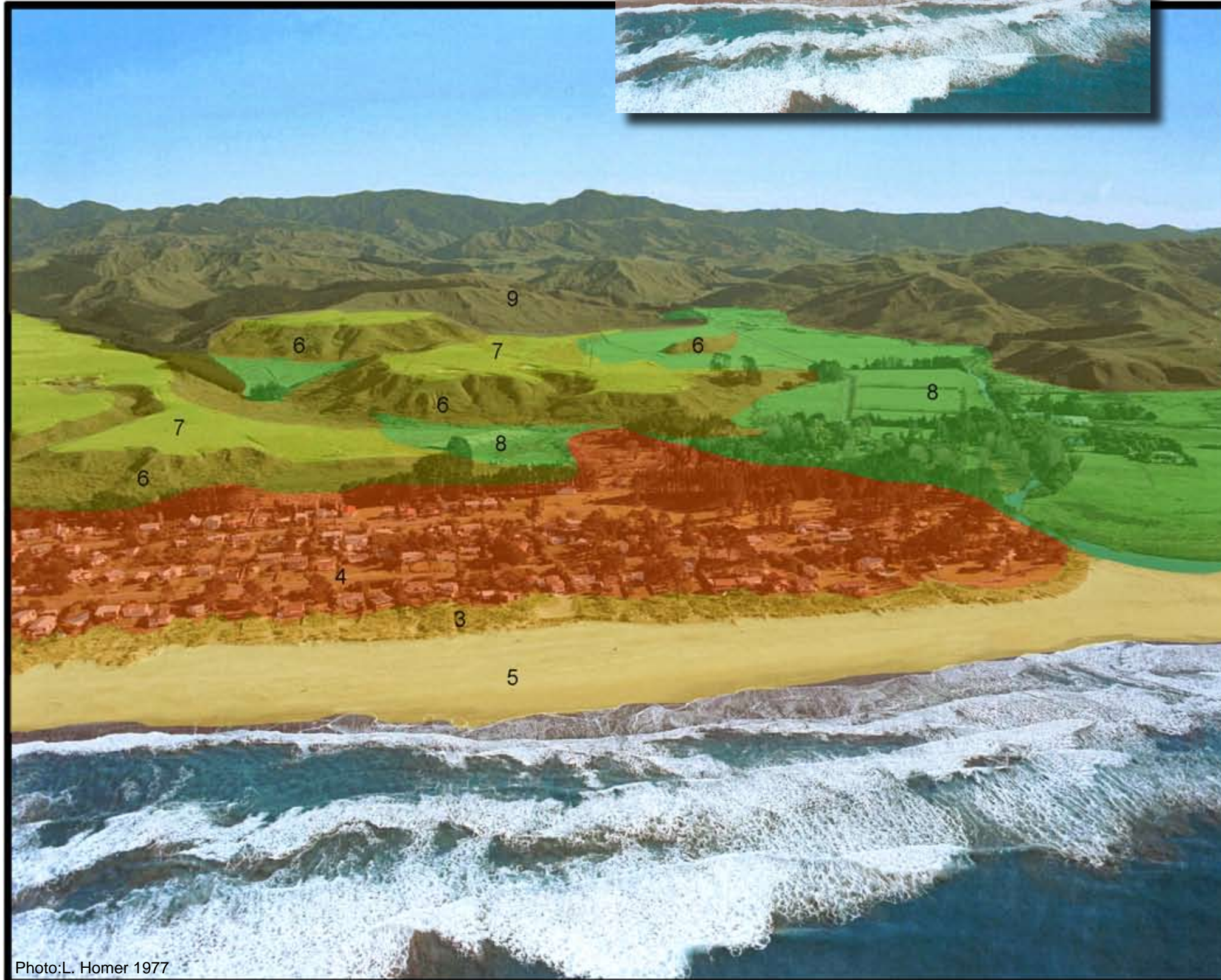
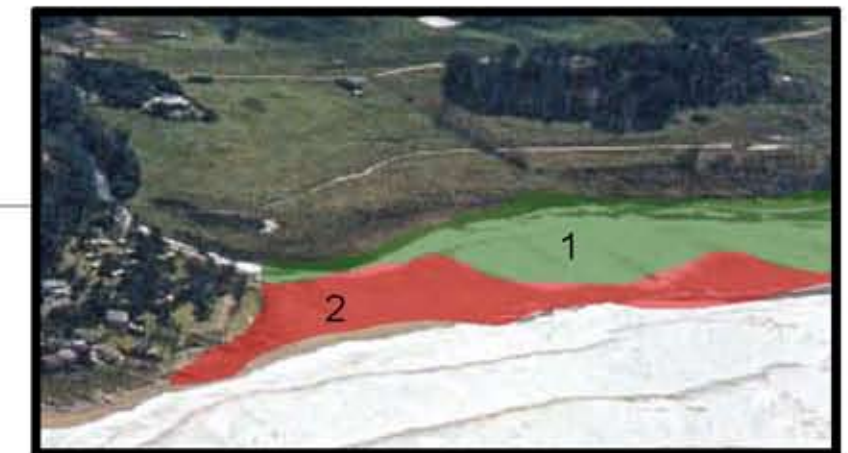
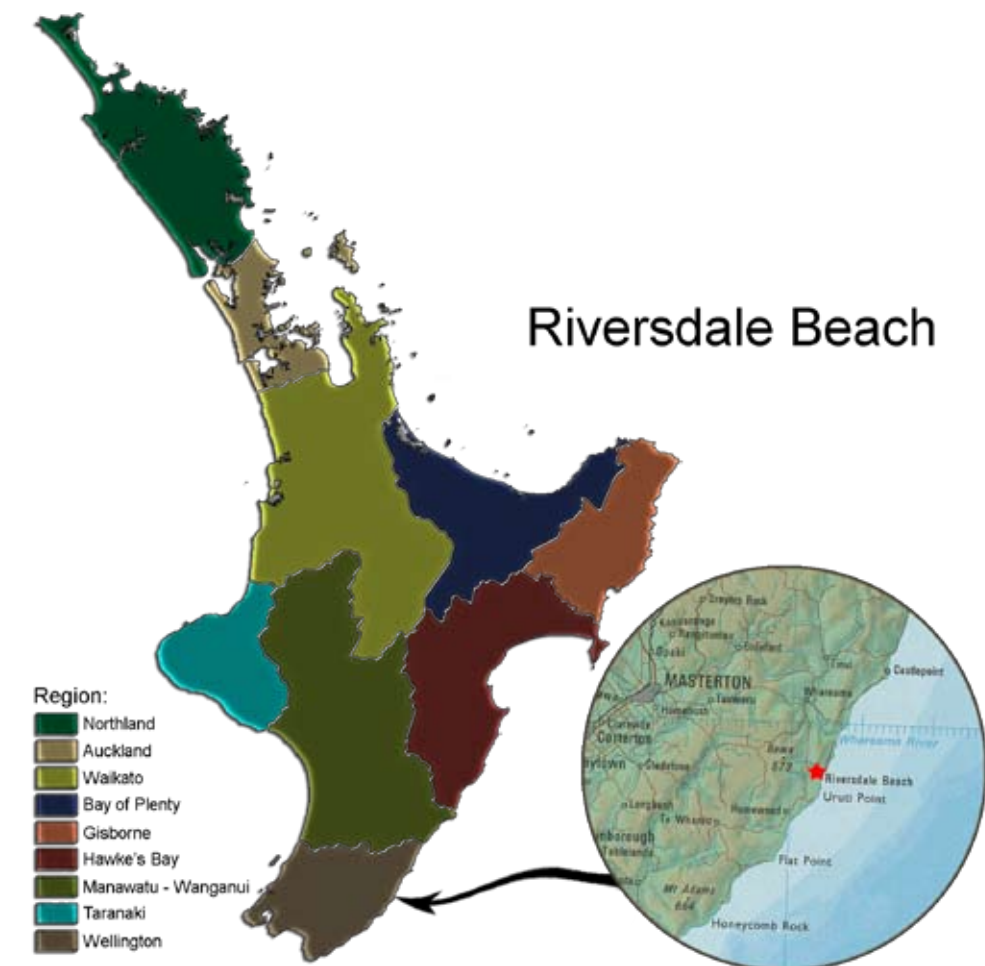


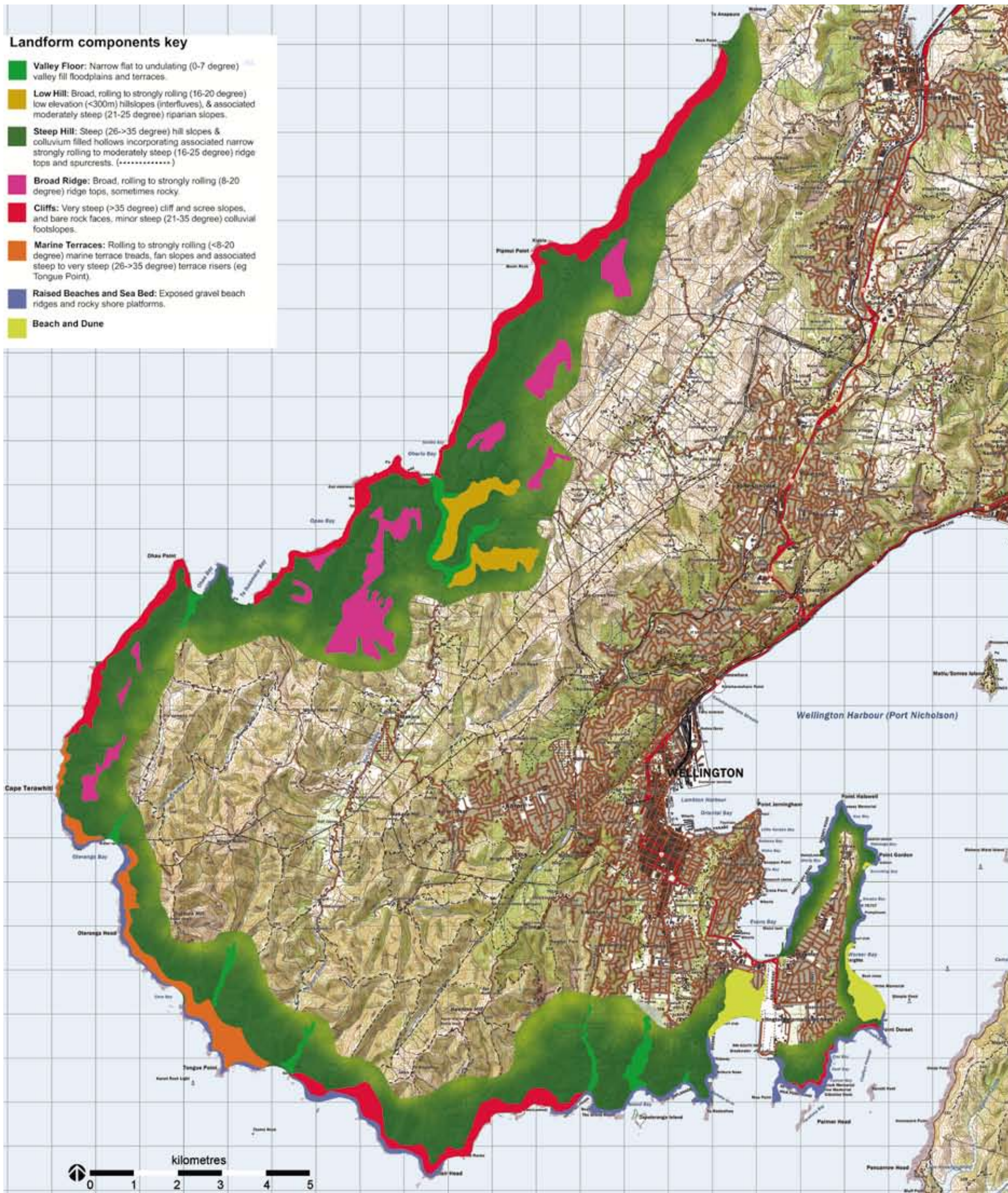
Photo: L. Homer 1977



Land Types:

- 1. Elongated estuary
- 2. Prograding sand spit
- 3. Active foredune
- 4. Stabilised dunes and interdune complex
- 5. Beach
- 6. Lower riser slope
- 7. Uplifted dissected marine terraces cut into weakly indurated mid Tertiary aged calcareous siltstones and sandstones
- 8. Uplifted marine terraces
- 9. Weakly indurated mid Tertiary aged calcareous siltstones and sandstones

- Landform components key**
- Valley Floor:** Narrow flat to undulating (0-7 degree) valley fill floodplains and terraces.
 - Low Hill:** Broad, rolling to strongly rolling (16-20 degree) low elevation (<300m) hillslopes (interfluvies), & associated moderately steep (21-25 degree) riparian slopes.
 - Steep Hill:** Steep (26->35 degree) hill slopes & colluvium filled hollows incorporating associated narrow strongly rolling to moderately steep (16-25 degree) ridge tops and spurcrests. (-----)
 - Broad Ridge:** Broad, rolling to strongly rolling (8-20 degree) ridge tops, sometimes rocky.
 - Cliffs:** Very steep (>35 degree) cliff and scree slopes, and bare rock faces, minor steep (21-35 degree) colluvial footslopes.
 - Marine Terraces:** Rolling to strongly rolling (<8-20 degree) marine terrace treads, fan slopes and associated steep to very steep (26->35 degree) terrace risers (eg Tongue Point).
 - Raised Beaches and Sea Bed:** Exposed gravel beach ridges and rocky shore platforms.
 - Beach and Dune**



Wellington Region Wellington City

Region:

- Northland
- Auckland
- Waikato
- Bay of Plenty
- Gisborne
- Hawke's Bay
- Manawatu - Wanganui
- Taranaki
- Wellington

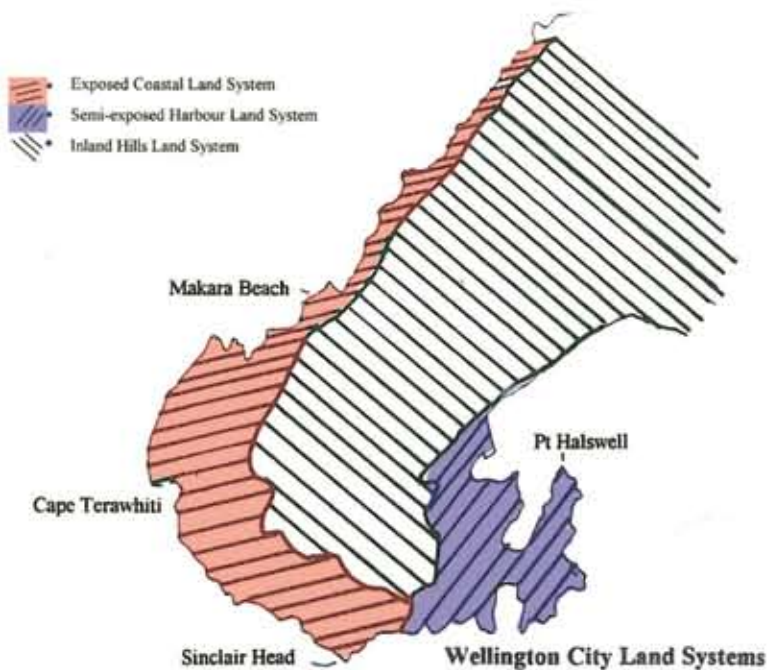
Wellington



LAND SYSTEMS

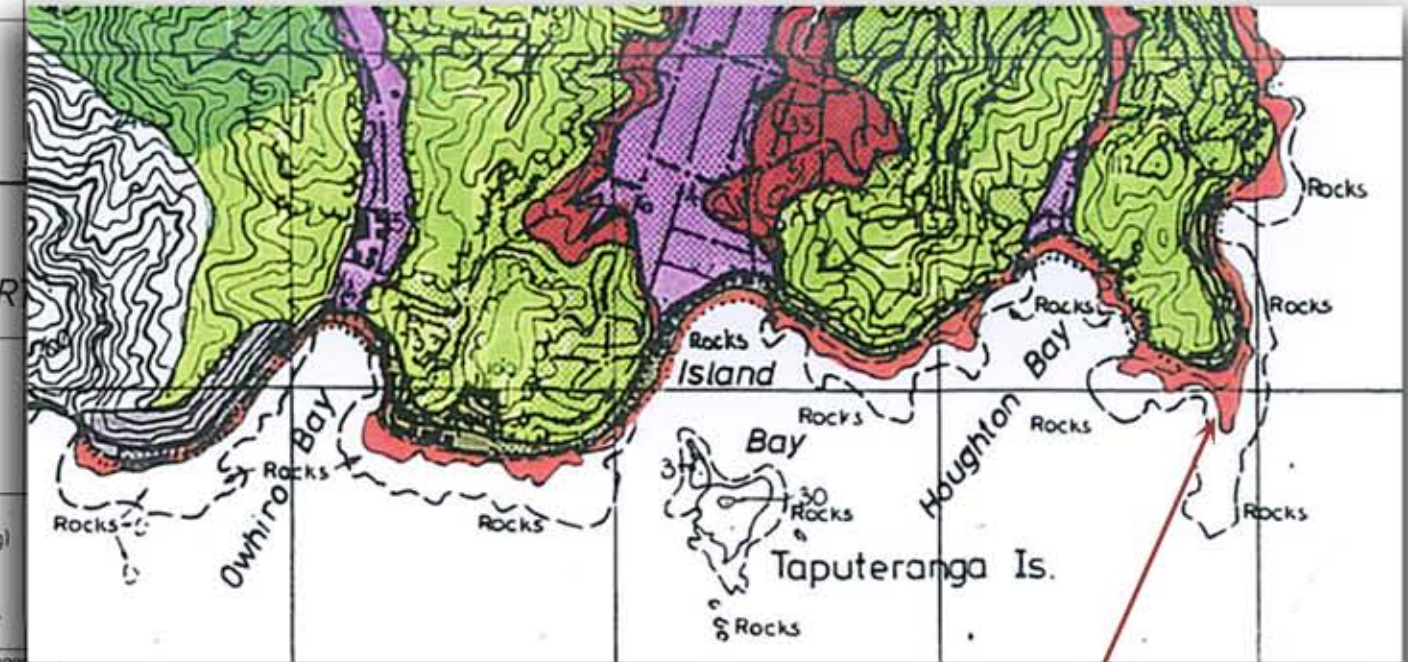
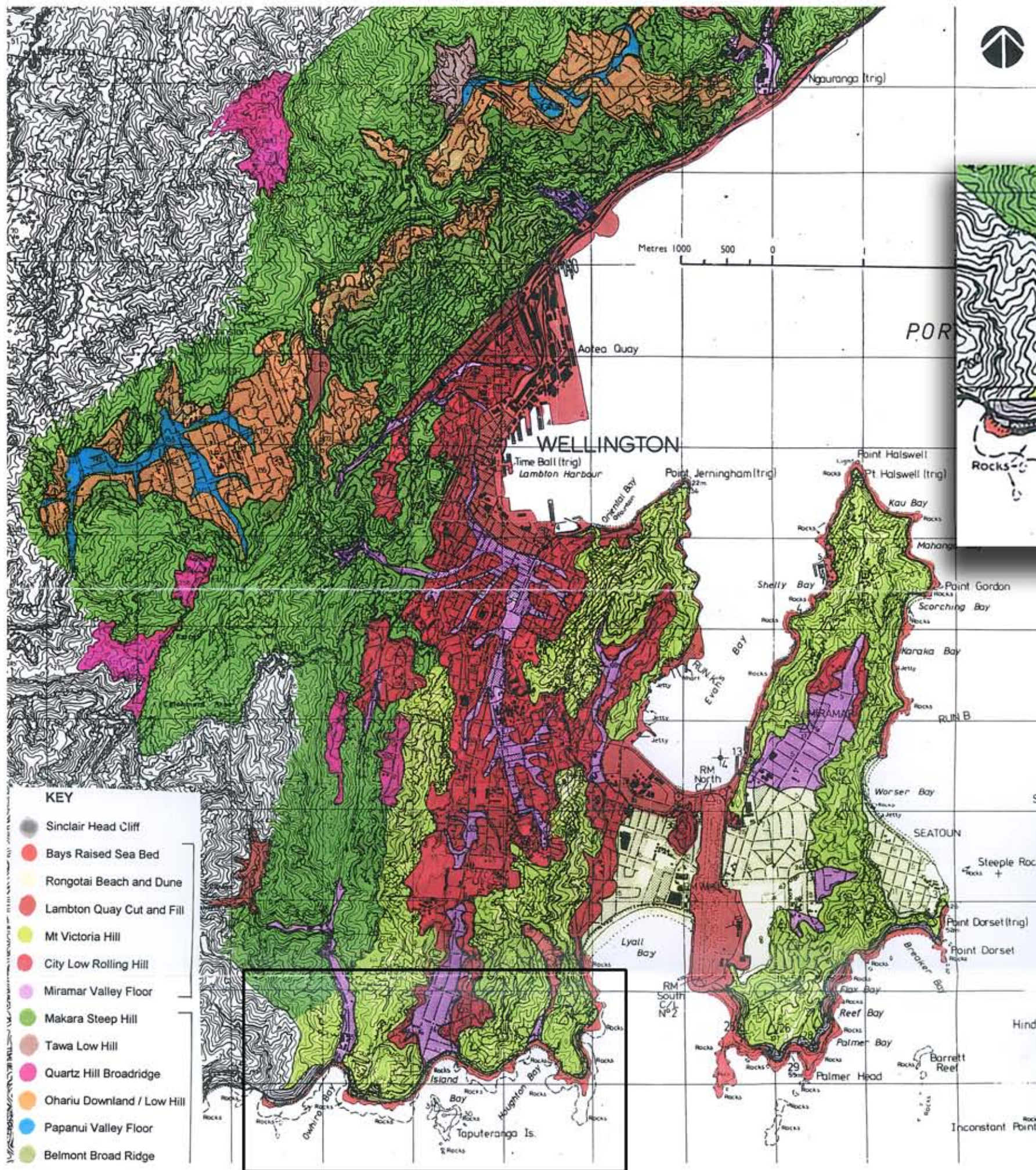
The following three land systems were established, based on major physiographic pattern and climate:

- Exposed Coastal Land System
- Semi-exposed Harbour Land System
- Inland Hills Land System



Landcare Research
Contract Report:
LC9899/022

Wellington City landforms

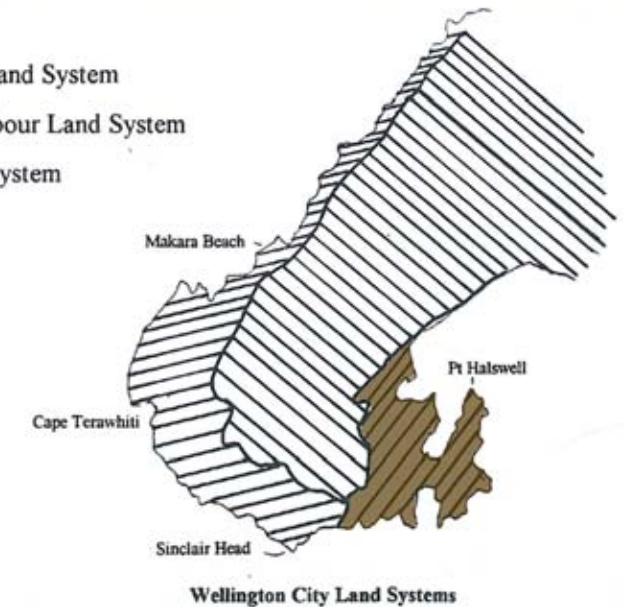


Te Rae Kaihau

LAND SYSTEMS

The following three land systems were established, based on major physiographic pattern and climate:

- Exposed Coastal Land System
- Semi-exposed Harbour Land System
- Inland Hills Land System

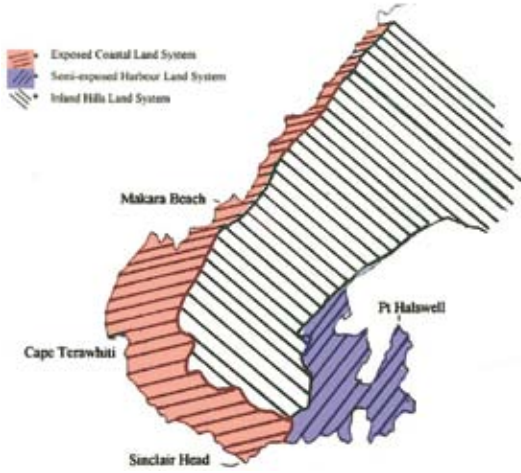


Landcare Research
Contract Report:
LC9899/022

Land Types of Wellington City

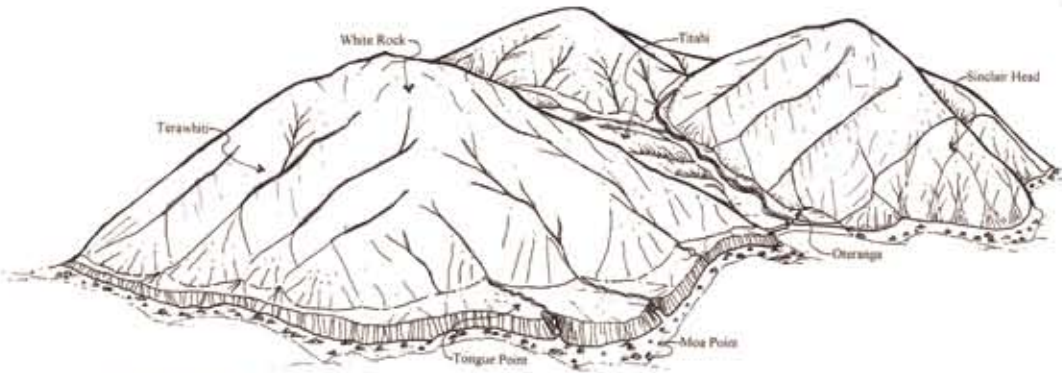
Exposed Coastal Land System

- Terawhiti steep hill
- White Rock broad ridge
- Sinclair Head cliff
- Tongue Point marine terrace
- Oteranga stream
- Moa Point raised sea bed
- Titahi low hill



Sinclair Head Cliff Land Type - viewed from Red Rocks

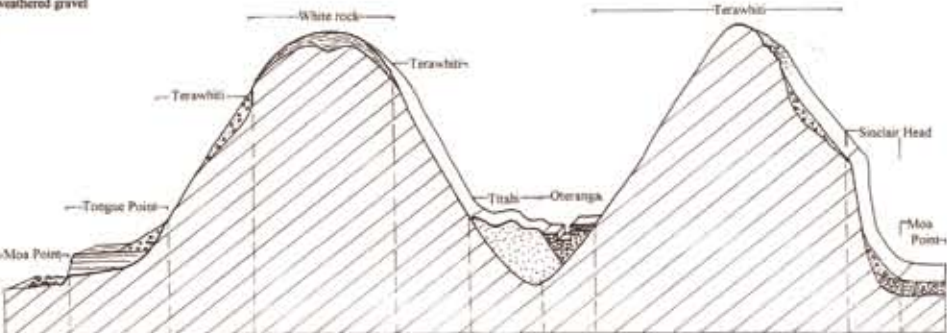
EXPOSED COASTAL LAND SYSTEM



LAND TYPES

- KEY
- greywacke
 - greywacke platform / beach gravel
 - windblown sand
 - colluvium and scree
 - consolidated, weathered gravel
 - alluvial gravel
 - loess

EXPOSED COASTAL LAND SYSTEM
Cross Section . 1 .



LAND TYPES

TERAWHITI STEEP HILL LAND TYPE

Landform component	Rock type	Regolith depth	Slope	Soil	Altitude	Exposure	Erosion	Vegetation	Climate
narrow, rocky ridge tops	greywacke	0 - 30 cm with some rock outcrops	16 - 25°	Terawhiti hill soils (terrace): stony silt loam, stony sandy loam, drainage: well to somewhat excessively drained	200 - 500 m	exposed	slight sheet slight wind	pasture <i>Cassinia</i> coastal scrub	
broad ridge tops and spur crests	greywacke	30 - 60 cm	16 - 25°	Terawhiti hill soils (terrace): stony silt loam, stony sandy loam drainage: well to somewhat excessively drained	300 - 450 m	exposed	slight sheet slight wind	pasture <i>Cassinia</i> coastal scrub	
steep rocky bluffs	greywacke	0 - 30 cm with rock outcrops	26 - >35°	Terawhiti steepened soils (terrace): stony sandy loam, stony silt loam drainage: somewhat excessively drained	200 - 500 m	exposed	slight sheet slight wind	pasture coastal scrub <i>Cassinia</i> gorse	
steep mid slopes	greywacke	30 - 60 cm	26 - >35°	Terawhiti steepened soils (terrace): stony sandy loam, stony silt loam drainage: somewhat excessively drained	300 - 450 m	exposed	moderate scree moderate soil slip moderate sheet	pasture coastal scrub <i>Cassinia</i> gorse manuka	
colluvium filled troughs and hollows	colluvium and some greywacke	50 - 200 cm	26 - >35°	Terawhiti steepened soils (terrace): stony sandy loam, stony silt loam drainage: well drained	100 - 450 m	exposed	slight scree slight sheet slight soil slip	pasture coastal scrub <i>Cassinia</i> gorse manuka	
steep scree slopes	greywacke scree	0 - 20 cm	26 - >35°	Terawhiti steepened soils (terrace): stony sandy loam, stony silt loam drainage: well to somewhat excessively drained	30 - 400 m	exposed	severe scree moderate gully	pasture coastal scrub <i>Cassinia</i> gorse manuka	
steep rippled slopes	greywacke	30 - 60 cm	26 - >35°	Terawhiti steepened soils (terrace): stony sandy loam, stony silt loam drainage: well to somewhat excessively drained	100 - 300 m	moderately exposed	moderate soil slip moderate sheet	pasture coastal scrub broad leaved scrub pasture	
low and colluvial foot slopes	scree colluvium	10 - 50 cm	0 - 15°	Hawthorpe stony silt loam (terrace): stony silt loam drainage: well to somewhat excessively drained	50 - 150 m	moderately exposed	slight gully slight deposition	pasture coastal scrub <i>Cassinia</i>	

WHITE ROCK BROAD RIDGE LAND TYPE

Landform component	Rock type	Regolith depth	Slope	Soil	Altitude	Exposure	Erosion	Vegetation	Climate
broad rocky ridge tops	basal over greywacke (some colluvium)	0 - 50 cm with some rock outcrops	0 - 20°	Kaitake silt loam (terrace): silt loam sandy loam drainage: moderately well to well drained	200 - 400 m	exposed	slight sheet slight wind	pasture <i>Cassinia</i> gorse	
broad ridge tops	basal over greywacke (some colluvium)	50 - 100 cm	0 - 20°	Kaitake silt loam (terrace): silt loam sandy loam drainage: moderately well to well drained	200 - 400 m	exposed	slight sheet slight wind	pasture <i>Cassinia</i> gorse	

SINCLAIR HEAD CLIFF LAND TYPE

Landform component	Rock type	Regolith depth	Slope	Soil	Altitude	Exposure	Erosion	Vegetation	Climate
basal rock faces	greywacke	0 cm	>35°	basal rock	0 - 300 m	exposed	severe gully, slight scree	bare	
steep scree slopes	greywacke scree	0 - 20 cm	>35°	Terawhiti steepened soils (terrace): stony sandy loam drainage: excessively drained	0 - 200 m	exposed	severe scree	coastal scrub	
very steep slopes	greywacke	10 - 30 cm	>35°	Terawhiti steepened soils (terrace): stony sandy loam drainage: excessively drained	0 - 300 m	exposed	moderate sheet moderate wind slight scree	coastal scrub short tussock pasture	
colluvial foot slopes	colluvium and some over greywacke	10 - 40 cm	21 - 25°	Terawhiti steepened soils (terrace): stony sandy loam drainage: well drained to somewhat excessively drained	0 - 100 m	exposed	moderate scree moderate deposition slight gully slight sheet	coastal scrub short tussock pasture	

TONGUE POINT MARINE TERRACE LAND TYPE

Landform component	Rock type	Regolith depth	Slope	Soil	Altitude	Exposure	Erosion	Vegetation	Climate
low slopes	colluvium	60 - 200 cm	4 - 15°	Patana silt loam (terrace): stony silt loam drainage: well drained	30 - 100 m	exposed	slight deposition	pasture coastal scrub	
terrace surfaces	colluvium and faces over gravel and greywacke	60 - 200 cm	0 - 30°	Patana silt loam (terrace): silt loam, fine sandy loam drainage: imperfectly to moderately well drained	50 - 100 m	exposed	slight	pasture coastal scrub	
terrace faces	sandy consolidated gravel greywacke	0 - 60 cm	>35°	Terawhiti steepened soils (terrace): stony sandy loam drainage: excessively drained	0 - 80 m	exposed	slight scree slight gully slight sheet slight wind	pasture short tussock coastal scrub	

OTERANGA STREAM LAND TYPE

Landform component	Rock type	Regolith depth	Slope	Soil	Altitude	Exposure	Erosion	Vegetation	Climate
gravelly river beds	greywacke gravel	0 - 2 cm	0 - 1°	Waikanae gravelly sand (terrace): stony drainage: excessively drained	0 - 20 m	moderately exposed	severe deposition	bare grass	
low stony terraces	alluvium over gravel	5 - 15 cm	0 - 1°	Waikanae gravelly sand (terrace): stony to gravelly sand drainage: somewhat excessively drained	0 - 20 m	moderately exposed	moderate to severe moderate erosion	pasture grass	
medium height stony terraces	alluvium over gravel	20 - 60 cm	0 - 1°	Hawthorpe stony silt loam (terrace): stony silt loam drainage: somewhat excessively drained	10 - 20 m	moderately exposed	slight	pasture grass	

MOA POINT RAISED SEA BED LAND TYPE

Landform component	Rock type	Regolith depth	Slope	Soil	Altitude	Exposure	Erosion	Vegetation	Climate
gravel beach ridges	greywacke gravel	<15 cm	0 - 1°	Kaitake gravelly sand (terrace): gravelly sand drainage: excessively drained	0 - 10 m	exposed	deposition	bare coastal scrub	
rocky exposed sea bed	greywacke	0 cm	0 - 15°	basal rock	0 - 10 m	exposed	slight	bare	

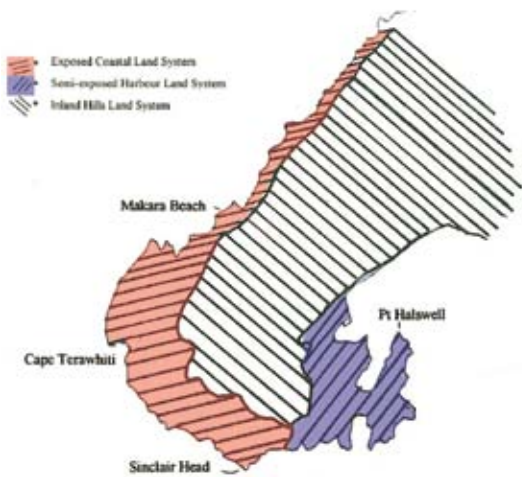
TITAHU LOW HILL LAND TYPE

Landform component	Rock type	Regolith depth	Slope	Soil	Altitude	Exposure	Erosion	Vegetation	Climate
broad rising surfaces	slightly consolidated sands	>100 cm	16 - 20°	Titahi hill soils (terrace): fine sandy loam, loamy sand drainage: well to somewhat excessively drained	20 - 100 m	moderately exposed	slight sheet	pasture gorse manuka	
moderately steep riparian slopes	slightly consolidated sands	>100 cm	21 - 25°	Titahi hill soils (terrace): fine sandy loam, loamy sand drainage: well to somewhat excessively drained	20 - 100 m	moderately exposed	slight sheet slight gully	pasture gorse manuka	

Land Types of Wellington City

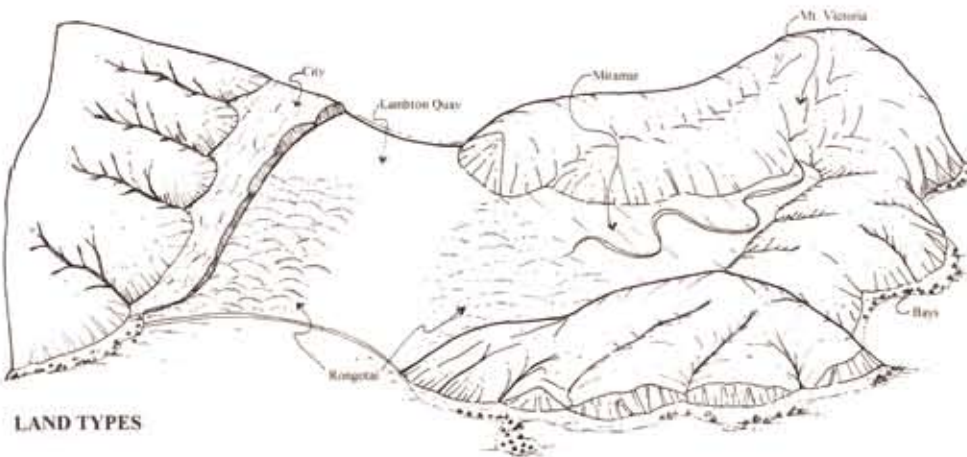
Semi-exposed Harbour Land System

- Bays raised sea bed
- Rongotai beach and dune
- Lambton Quay cut and fill
- Mt Victoria hill
- City low rolling hill
- Miramar valley floor



Bays Raised Sea Bed Land Type - Kau Point viewed from Gordon Point

SEMI - EXPOSED HARBOUR LAND SYSTEM

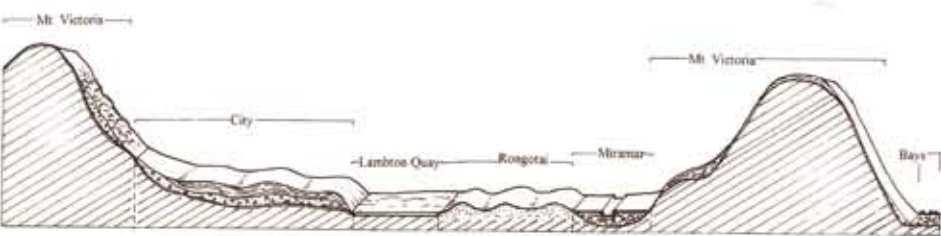


LAND TYPES

KEY

- greywacke
- greywacke platform / beach gravel
- windblown sand
- colluvium and scree
- consolidated, weathered gravel
- alluvial gravel
- loam

SEMI - EXPOSED HARBOUR LAND SYSTEM Cross Section . 2 .



LAND TYPES

MT VICTORIA HILL LAND TYPE

Landform component	Rock type	Regolith depth	Slope	Soil	Altitude	Exposure	Erosion	Vegetation	Climate
ridge tops and open crests	loam and colluvium over greywacke (moderately to highly weathered)	> 100 cm	0 - 15°	Parental silt loam, Parental hill soils Korokoro hill soils texture: silt loam or sandy loam over clay loam drainage: moderately well to imperfectly drained	100 - 200 m	moderately sheltered	slight short slight wind	grass exotic trees coastal scrub	
steep mid slopes	greywacke	0 - 60 cm with some rock outcrops	30 - 35°	Terawhiti colluvial soils texture: stony sandy loam, stony silt loam drainage: well drained to somewhat excessively drained	0 - 200 m	moderately exposed	moderate soil slip slight scree slight short	grass coastal scrub exotic trees broad-leaved scrub	
moderately steep mid slopes	greywacke	30 - 60 cm	21 - 35°	Terawhiti hill soils texture: stony sandy loam, stony silt loam drainage: well drained to somewhat excessively drained	0 - 200 m	steep slopes moderately exposed, landward slopes moderately sheltered	slight soil slip slight scree slight short	grass coastal scrub broad-leaved scrub exotic trees	
colluvium filled troughs and hollows	colluvium, loam and silt over greywacke	50 - 200 cm	10 - 25°	Korokoro hill soils texture: sandy loam, silt loam drainage: moderately well to well drained	0 - 200 m	steep slopes moderately exposed, landward slopes moderately sheltered	slight soil slip slight scree	grass broad-leaved scrub exotic trees	

CITY LOW ROLLING HILL LAND TYPE

Landform component	Rock type	Regolith depth	Slope	Soil	Altitude	Exposure	Erosion	Vegetation	Climate
low rolling ridges, interfluvial and valley sides	loam and colluvium over greywacke (moderately to highly weathered)	100 - 200 cm	4 - 15°	Parental silt loam, Parental fine sandy loam texture: silt loam or fine sandy loam over clay loam drainage: moderately well to imperfectly drained	0 - 100 m	moderately sheltered	silt	grass exotic trees broad-leaved scrub	

BAYS RAISED SEA BED LAND TYPE

Landform component	Rock type	Regolith depth	Slope	Soil	Altitude	Exposure	Erosion	Vegetation	Climate
gravel beach ridges	greywacke gravel	< 15 cm	0 - 7°	Tararua gravelly sand texture: gravelly sand drainage: excessively drained	0 - 10 m	moderately exposed	deposition	bare coastal scrub	
rocky exposed sea bed	greywacke	0 cm	0 - 15°	hard rock	0 - 10 m	moderately exposed	silt	bare	

RONGOTAI BEACH AND DUNE LAND TYPE

Landform component	Rock type	Regolith depth	Slope	Soil	Altitude	Exposure	Erosion	Vegetation	Climate
foredunes	wind blown sand	> 500 cm	4 - 15°	Waikare sand texture: sand drainage: excessively drained	0 - 10 cm	moderately exposed	moderate to severe wind	herbaceous sand dune vegetation bare	
low back dunes	windblown sand	> 500 cm	4 - 15°	Waikare sand texture: sand drainage: excessively drained	0 - 10 cm	moderately exposed	slight wind	herbaceous sand dune vegetation grass	
sand plains	windblown sand	> 500 cm	0 - 3°	Hokio weakly mottled sand texture: sand drainage: somewhat excessively drained	0 - 10 cm	moderately exposed	slight wind	grass	

LAMBTON QUAY CUT AND FILL LAND TYPE

Landform component	Rock type	Regolith depth	Slope	Soil	Altitude	Exposure	Erosion	Vegetation	Climate
excavated areas	greywacke regolith	< 100 cm	0 - 3°	-	0 - 20 m	moderately exposed	silt	bare grass	
filled areas	greywacke regolith	> 100 cm	0 - 3°	-	0 - 100 m	moderately exposed	silt	bare grass	

MIRAMAR VALLEY FLOOR LAND TYPE

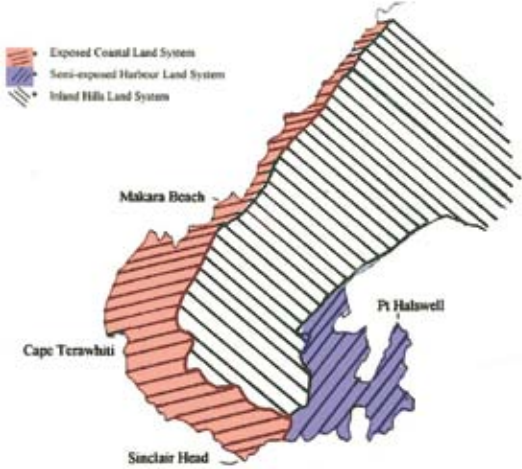
Landform component	Rock type	Regolith depth	Slope	Soil	Altitude	Exposure	Erosion	Vegetation	Climate
narrow, steeply to poorly drained valley floors	alluvium, alluvium over gravel	50 - 100 cm	0 - 3°	Waikare silt loam Gulliver silt loam texture: silt loam drainage: imperfectly to poorly drained	0 - 60 m	sheltered	silt	grass	
narrow, well drained valley floors	alluvium, alluvium over gravel	50 - 100 cm	0 - 3°	Waikare silt loam texture: silt loam drainage: well to moderately well drained	0 - 60 m	sheltered	silt	grass	

Land Types of Wellington City



Inland Hills Land System

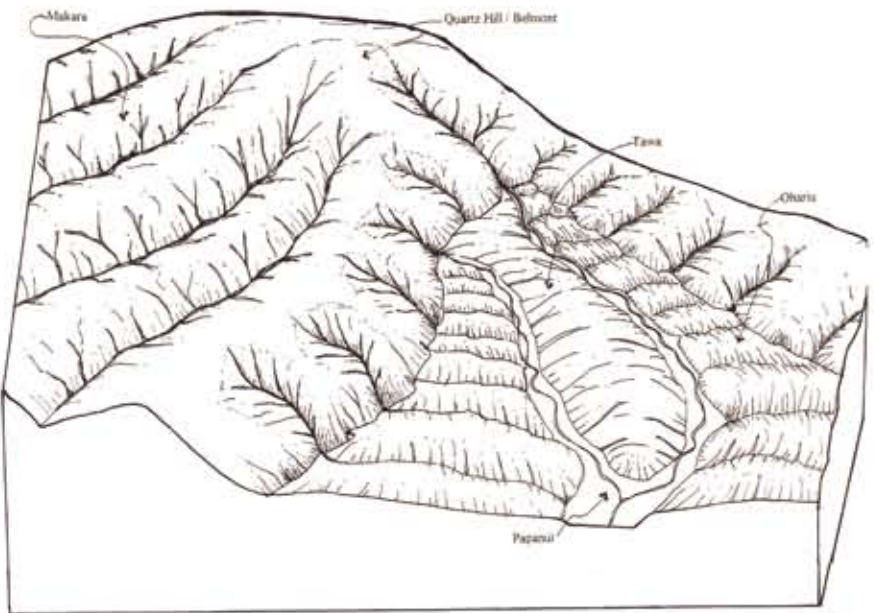
- Makara steep hill
- Tawa low hill
- Quartz Hill broad ridge
- Ohariu downland / low hill
- Papanui valley floor
- Belmont broad ridge



Makara Steep Hill Land Type - Makara Smiths Gully, from top of coastal escarpment, north of Makara Beach



INLAND HILLS LAND SYSTEM

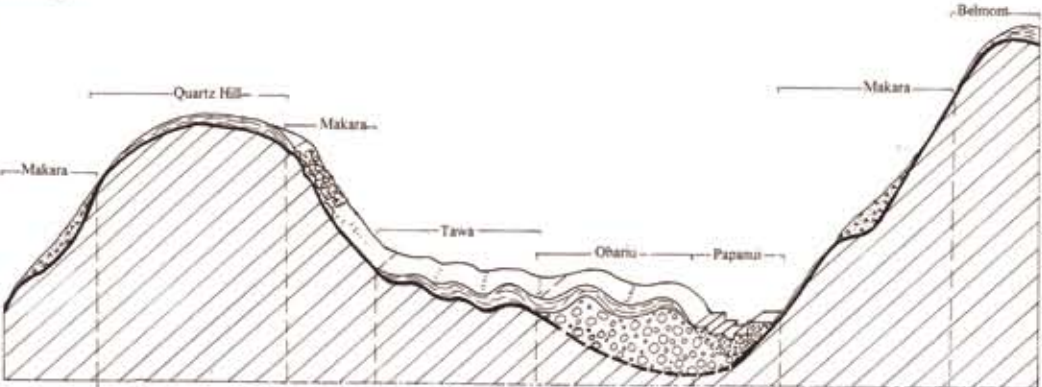


LAND TYPES

INLAND HILLS LAND SYSTEM
Cross Section . 3 .



- KEY**
- greywacke
 - greywacke platform / bench gravel
 - windblown sand
 - colluvium and scree
 - consolidated, weathered gravel
 - alluvial gravel
 - loess



LAND TYPES

MAKARA STEEP HILL LAND TYPE

Landform component	Rock type	Regolith depth	Slope	Soil	Altitude	Exposure	Erosion	Vegetation	Climate
narrow, rocky ridge tops	greywacke	0 - 50 cm with some rock outcrops	18 - 25°	Makara hill soils texture: silt loam, many silt loam drainage: well to somewhat excessively drained	200 - 400 m	moderately exposed	slight short slight wind	pasture gorse Casuarina	
narrow ridge tops and spot areas	greywacke	50 - 100 cm	18 - 25°	Makara hill soils Koromara hill soils texture: silt loam, many silt loam drainage: moderately well to well drained	100 - 400 m	moderately exposed	slight short slight wind	pasture gorse Casuarina	
steep rocky bluffs	greywacke	0 - 30 cm with rock outcrops	28 - 35°	Makara steepland soils texture: silt loam, many silt loam, many sandy loam drainage: somewhat excessively drained	200 - 450 m	moderately exposed	slight short slight wind	pasture gorse Casuarina broad leaved scrub	
steep and slopes	greywacke	30 - 75 cm	28 - 35°	Makara steepland soils texture: silt loam, many silt loam, fine sandy loam drainage: well drained to somewhat excessively drained	30 - 400 m	moderately exposed	moderate severe moderate soil slip	pasture gorse Casuarina broad leaved scrub fern exotic conifer forest	
colluvium-filled troughs and hollows	colluvium and some greywacke	40 - 200 cm	28 - 35°	Makara steepland soils texture: silt loam, many silt loam, fine sandy loam drainage: moderately well to well drained	100 - 400 m	moderately exposed	slight severe slight soil slip	pasture gorse Casuarina broad leaved scrub fern exotic conifer forest	
steep scree slopes	greywacke scree	0 - 30 cm	28 - 35°	Makara steepland soils texture: silt loam, many silt loam, fine sandy loam drainage: well drained	50 - 400 m	moderately exposed	moderate severe	gorse manuka Casuarina broad leaved scrub pasture fern exotic conifer forest	
steep riparian slopes	greywacke	30 - 75 cm	28 - 35°	Makara steepland soils texture: silt loam, many silt loam, fine sandy loam drainage: well drained	30 - 200 m	moderately sheltered	moderate severe moderate soil slip	pasture gorse Casuarina broad leaved scrub pasture fern exotic conifer forest	

TAWA LOW HILL LAND TYPE

Landform component	Rock type	Regolith depth	Slope	Soil	Altitude	Exposure	Erosion	Vegetation	Climate
low rolling hills	loam over greywacke	50 - 80 cm	18 - 25°	Koromara hill soils texture: silt loam, sandy loam drainage: well drained	30 - 300 m	sheltered	slight short slight soil slip	pasture gorse exotic conifer forest	
moderately steep riparian slopes	loam over greywacke	50 - 80 cm	21 - 25°	Koromara hill soils texture: silt loam, sandy loam drainage: well drained	20 - 300 m	sheltered	slight short slight soil slip	pasture gorse exotic conifer forest broad leaved scrub	

QUARTZ HILL BROAD RIDGE LAND TYPE

Landform component	Rock type	Regolith depth	Slope	Soil	Altitude	Exposure	Erosion	Vegetation	Climate
broad rolling ridge tops	loam over greywacke (some colluvium)	100 - 200 cm	8 - 20°	Papanui silt loam Koromara hill soils texture: silt loam or sandy loam over clay loam drainage: moderately well to imperfectly drained	150 - 400 m	moderately exposed	slight short slight wind	pasture gorse	

OHARIU DOWNLAND/LOW HILL LAND TYPE

Landform component	Rock type	Regolith depth	Slope	Soil	Altitude	Exposure	Erosion	Vegetation	Climate
broad rolling downland	loam over consolidated gravels (moderately to highly weathered)	60 - 100 cm	8 - 20°	Ngauru silt loam Ngauru hill soils texture: silt loam over silty clay loam drainage: moderately well drained	20 - 200 m	sheltered	slight	pasture gorse	
broad strongly rolling hills	loam over consolidated gravels (moderately weathered)	50 - 80 cm	18 - 25°	Ngauru hill soils Ngauru hill soils texture: silt loam over silty clay loam drainage: moderately well to well drained	20 - 240 m	sheltered	slight soil slip slight short	pasture gorse exotic conifer forest	
moderately steep riparian slopes	loam over consolidated gravels (moderately weathered)	50 - 80 cm	21 - 25°	Ngauru hill soils Ngauru hill soils texture: silt loam over silty clay loam drainage: moderately well to well drained	20 - 200 m	sheltered	slight soil slip slight short	pasture gorse exotic conifer forest	

PAPANUI VALLEY FLOOR LAND TYPE

Landform component	Rock type	Regolith depth	Slope	Soil	Altitude	Exposure	Erosion	Vegetation	Climate
narrow, steeply sloping to poorly drained valley floors	alluvium	50 - 80 cm	0 - 3°	Waikanae silt loam Waikanae silt loam texture: silt loam drainage: imperfectly to poorly drained	0 - 100 m	sheltered	moderate streambank	pasture rubus	
various, well drained valley floors	alluvium over gravels	50 - 80 cm	0 - 3°	Waikanae silt loam texture: silt loam drainage: well to moderately well drained	0 - 100 m	sheltered	moderate streambank	pasture rubus	
medium height terraces	alluvium over gravels	50 - 80 cm	0 - 3°	Waikanae silt loam texture: silt loam, sandy silt loam drainage: well to somewhat excessively drained	0 - 100 m	sheltered	slight	pasture gorse	

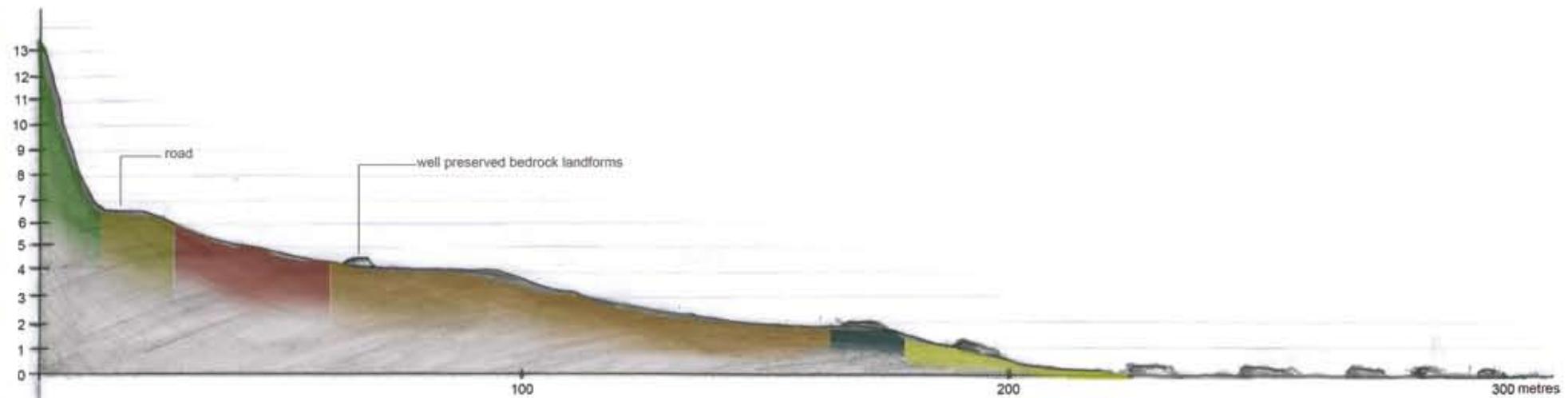
BELMONT BROAD RIDGE LAND TYPE

Landform component	Rock type	Regolith depth	Slope	Soil	Altitude	Exposure	Erosion	Vegetation	Climate
broad rolling ridge tops	loam and colluvium deposits over greywacke	100 - 150 cm	8 - 20°	Belmont silt loam Belmont hill soils texture: silt loam drainage: well drained	300 - 450 m	moderately exposed	slight	pasture gorse broad leaved scrub	October 29, 1998



Breaker Bay 1931

Frederick de Jersey Clere
Watercolour
175 x 252 mm



- Pre- 3468 BC seacliff
- 3468 BC-430 BC (platform substrate of road)
- 3468 BC - 430 BC seacliff
- 430 BC - 1855 platform with stacks
- 430 BC - 1855 Beach Ridge
- Modern Beach Ridge

(Sourced: Dr Little)

Section A--A