

Coastal Environment of Otago

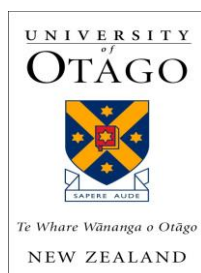
Natural Character and Outstanding Natural Features and Landscapes Assessment

Waitaki District Section Report

26 June 2015



Prepared by



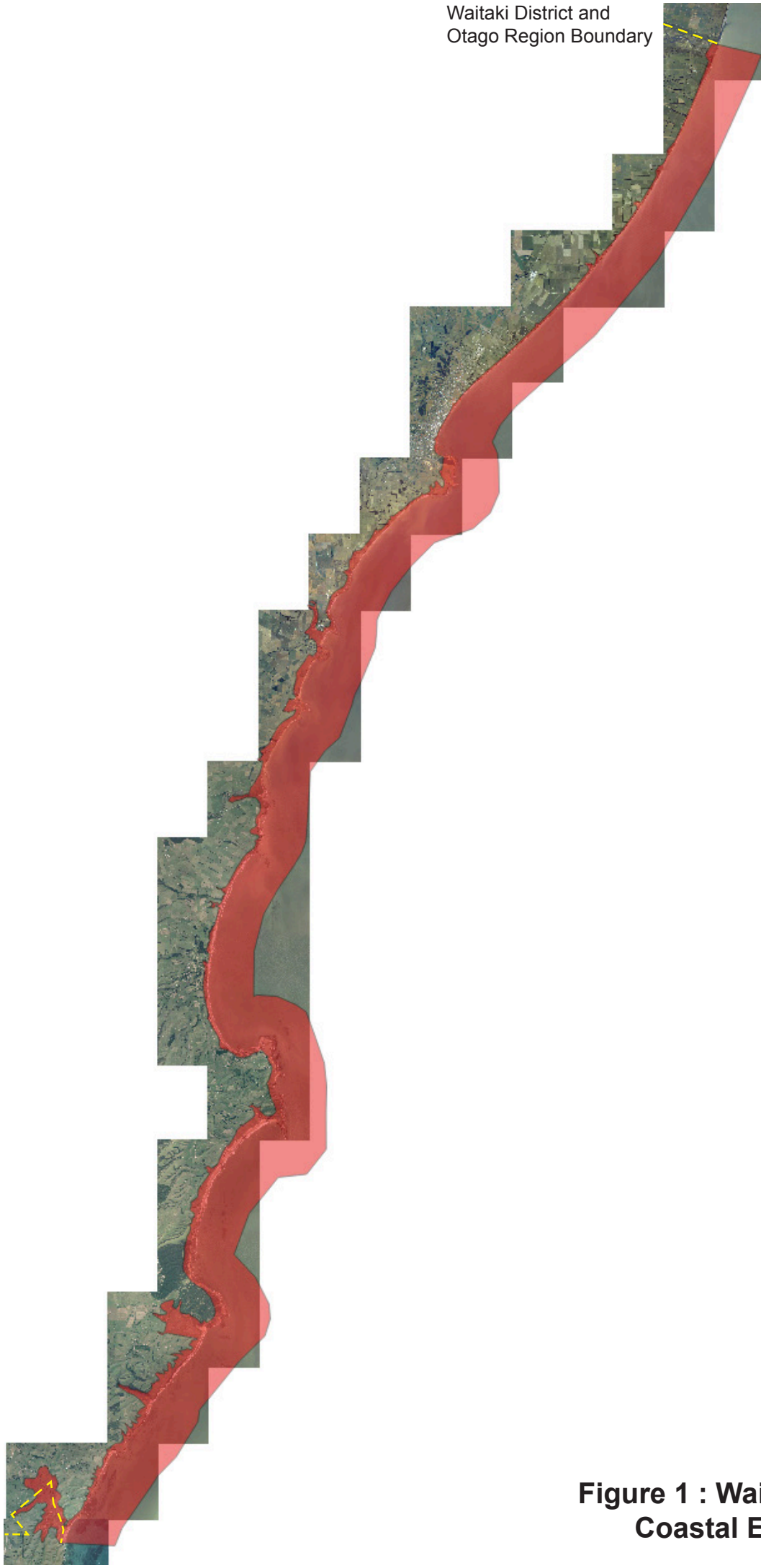
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Waitaki District and
Otago Region Boundary



Waitaki District
Boundary

**Figure 1 : Waitaki District
Coastal Environment**

Introduction

This report has been commissioned by the Otago Regional Council, and Waitaki District Council to inform the reviews of the Otago Regional Policy Statement and Waitaki District Plan. It is required to assist the Councils to fulfil their obligations under Section 6 of the Resource Management Act 1991 (RMA) and the New Zealand Coastal Policy Statement 2010 (NZCPS) and is part of a set of reports covering the coastline of the Otago Region.

Section 6 of the RMA deals with 'matters of national importance' and requires councils to 'recognise and provide for':

- (a) 'The preservation of the natural character of the coastal environment (including the coastal marine area), wetlands, and lakes and rivers and their margins, and the protection of them from inappropriate subdivision, use and development.*
- (b) The protection of outstanding natural features and landscapes from inappropriate subdivision, use and development.'*

Regional policy statements, regional plans and district plans must all give effect to the NZCPS. Of particular relevance to this report is Policy 13 which requires:

- (1) To preserve the natural character of the coastal environment and to protect it from inappropriate subdivision, use and development:*
- (2) Recognise that natural character is not the same as natural features and landscapes or amenity values...*

and Policy 15 which is:

To protect the natural features and natural landscapes (including seascapes) of the coastal environment from inappropriate subdivision, use and development:

This report presents the results of the assessment of the coastline of Waitaki District and explains the background to the assessment and the methods utilised.

The report and assessment work have been undertaken by a team put together for the project. The team members are:

- Mike Hilton and Teresa Konlechner, University of Otago (Coastal geomorphology)
- Brian Stewart, Ryder Consulting Ltd (Marine ecology)
- Mark Sanders, Ryder Consulting Ltd (Terrestrial ecology)
- Marion Read, Read Landscapes Ltd (Landscape assessment)
- Mike Moore, Mike Moore Landscape Architect (Landscape Assessment)

GIS mapping was provided by Ryder Consulting Ltd.

The Coastal Environment – Waitaki District

The Waitaki District coastline extends from the Waitaki River mouth in the north, to the Pleasant River estuary in the south (Figure 1). The coastal environment spans Mean High Water Springs (MHWS), with Waitaki District Council holding jurisdiction above this, and Otago Regional Council below. Although not reflected in the maps (which adopt an approximate 2km off-shore limit for convenience) the coastal environment includes the Coastal Marine Area (CMA), the outer limit of which extends to the limit of the territorial sea.

The character of the Waitaki District coast varies along this length. In very broad terms, it can be described as follows:

From the Waitaki River mouth to Oamaru (see Figure 2) the delta of the Waitaki River forms a plain with minor alluvial terraces. The coastline is characterised by a gravel beach and low cliff, reflecting a wave dominated coast with strong longshore drift (Forsyth, 2001). The land behind is intensively farmed and the city and port of Oamaru is located at the southern end of this plain.

From Cape Wanbrow to Shag Point the North Otago downlands are overlain by weathered gravels and loess along with areas of more resistant limestone and basalt, and their seaward edge is characterised by sweeping sandy beaches and a degraded sea cliff (see Figures 3 and 4). More resistant headlands punctuate the coastline and help define discrete coastal landscape units. This is an area of fertile farmland and the settlements at Kakanui, Hampden, Moeraki and Shag Point are on or close to, the coast. The main transportation corridors are mainly away from the coast but run close-by near Hampden and Katiki Beach. Coastal erosion is a particular issue in places. Small estuaries at river mouths (most notably

the Kakanui and Waianakarua River's) are features along this stretch of coast and the famous Moeraki Boulders are located on the beach between Hampden and Moeraki.

As shown in Figure 5, the landscape south of Shag Point has gently rolling landforms of sedimentary geology with some areas of more resistant volcanic rock. The coastline is characterised by generally higher cliffs compared with the coast further north, with or without sandy beaches in front. The estuaries associated with the Shag and Pleasant Rivers are notable elements. Agriculture is the dominant land use and there are no coastal settlements. The main transportation routes do not follow the coast.



Figure 2: View northward along the coastline of the Waitaki Delta



Figure 3: View northward toward Orore Point and Kakanui. Cape Wanbrow is in the distance.



Figure 4: View northward toward Hampden. The Moeraki Boulders are in the foreground.



Figure 5: View northward toward Shag Point from near Stony Creek.

Definition of the Coastal Environment

Policy 1 of the New Zealand Coastal Policy Statement 2010 provides guidance on the extent of the coastal environment, and states that it includes:

- a) the coastal marine area;
- b) islands within the coastal marine area;
- c) areas where coastal processes, influences or qualities are significant, including coastal lakes, lagoons, tidal estuaries, saltmarshes, coastal wetlands, and the margins of these;
- d) areas at risk from coastal hazards;
- e) coastal vegetation and the habitat of indigenous coastal species including migratory birds;
- f) elements and features that contribute to the natural character, landscape, visual qualities or amenity values;
- g) items of cultural and historic heritage in the coastal marine area or on the coast;
- h) inter-related coastal marine and terrestrial systems, including the intertidal zone; and

- i) physical resources and built facilities, including infrastructure, that have modified the coastal environment.

The key parameters that have been used in defining the inland extent of the coastal environment are as follows:

In the case of estuaries, rivers and low lying areas the coastal environment has been defined with regard to:

- The extent of areas previously mapped as being subject to coastal hazards and / or;
- The extent of tidal reach (where salinity affects the ecology rather than simply water movement) and / or;
- The top of the coastal escarpment where this exists and / or;
- The extent of landforms which are primarily a product of coastal processes.

In the case of cliffed or hilly areas the coastal environment has been defined with regard to:

- Significant changes of slope defining land adjacent to the coast with coastal aspect and / or;
- The extent of landforms which are primarily a product of coastal processes and / or;
- Areas that are visually prominent in wider coastal views (e.g. headlands).

Assessment method

General comments

It is fairly standard, for a project like this, to present the research method as a linear process.

This would normally follow the following structure:

- Desk top analysis
- Preliminary mapping
- Field work
- Natural character assessment
- Landscape assessment
- Report preparation.

While this format provides the basic structure of the investigation, the actual process was iterative, particularly with regard to the identification of natural character areas which were modified following the field survey.

Field work was undertaken by helicopter, the entire length of the Otago coastline being flown at low altitude over two days. A photographic record of the entire coastline was created during this time, save for the seaward sides of Taiaroa Head and Moeraki Peninsula, both of which have no-fly zones around them (Taiaroa Head was subsequently photographed from the sea). Rivers were surveyed as far as the tidal reach and / or saline influence extended, and the edges of estuaries were followed.

The inland extent of the coastal environment was mapped and natural character units were identified. These are defined as areas of generally similar character in terms of their geomorphological, ecological and human use characteristics. Where required, the boundaries of the coastal environment and natural character units were modified as a consequence of the observations made during the field work.

Natural character assessments

The assessment of the natural character of each unit was undertaken using the criteria provided by the Otago Regional Council. These were:

- Geomorphological and hydrological naturalness, broken into the following aspects:
 - The degree to which the landforms / seabed are the product of natural processes
 - The degree to which natural geomorphological and hydrological processes are operating unconstrained
 - The degree to which water quality and quantity are unaffected by land use activities

- Ecological naturalness, broken into the following aspects:
 - The degree to which the vegetation patterns are a product of natural processes
 - The degree to which the vegetation cover is indigenous to the area

- The (apparent) health and level of modification of intertidal and aquatic habitats
- The degree to which wildlife is present and sustained;
- Experiential naturalness, broken into the following aspects:
 - The degree to which buildings, structures and earthworks (including dredging) influence the character of the landscape or seascape.
 - The degree to which there are wild and scenic qualities.

A scale of five possible ratings (high, medium - high, medium, medium – low, low) was used for the assessment of each of these aspects.

Geomorphological and hydrological naturalness

The assessments of the geomorphological and hydrological naturalness were made with regard to the photographic record, the background knowledge of the areas involved by the team members and published data from a variety of sources including investigations commissioned by local authorities (ORC and DCC) and local commercial enterprises, research projects undertaken by staff and students at the University of Otago, and books detailing the natural history of the Otago coastline.

To assess the degree to which landforms are the result of natural processes and the degree to which these processes are operating unconstrained, the effect of structures, non-native species and landuse, both past and present, were considered. Important processes in the terrestrial coastal environment for this assessment included aeolian sand transport from the beach inland on sandy coasts and wave erosion on rocky coasts. Important processes in the marine coastal environment were alongshore and onshore/offshore movements of sediment, and tidal water circulation and freshwater inflows in estuarine environments. Consideration was given to whether modification of these processes has altered both landforms/seabed and the overall geomorphic or hydrologic 'function' of the unit.

Assessments of water quality and quantity were based on published data where available. Where no data was available assessments were based on the geomorphology and geology of the unit in question, the regional marine process and the history of land management.

Ecological naturalness

Ecological assessments are based largely on Abby Smith's (Smith 1994) "Eastward to the Sea", prepared as a background report for the preparation of the current Regional Plan: Coast. This current assessment updates Smith's work by including data that has come to hand since. These data are derived from a variety of sources, including investigations commissioned by local authorities (ORC and DCC) and local commercial enterprises, research projects undertaken by staff and students at the University of Otago, publications from the Department of Conservation (DoC) and Ministry of Fisheries (now MPI), and books detailing the natural history of the Otago coastline.

For example, investigations of estuaries were undertaken as part of the ORC's state of the environment (SOE) monitoring and were carried out in accordance with the New Zealand Estuary Monitoring Protocol (Robertson *et al.* 2002). Likewise, investigations of many of the local inlets have been undertaken at the behest of local aquaculture concerns (e.g. Southern Clams Ltd). These conform to standard ecological methods investigating shellfish resources and associated community structure. Investigations within the Otago harbour comprise assessments of the shoreline, carried out as ecological assessments of likely effects of road improvement and road maintenance work, and assessments of the wider harbour to gauge the effects of dredging operations and clam harvesting. Other investigations include assessments of the effects of sewage and waste disposal, both offshore and coastal, stormwater discharges to the local coastline and effects of other human activities on the CMA. A list of investigations, reports and accounts used in making ecological assessments is contained in the references section.

First-hand accounts have also been obtained from DoC staff, representatives from local iwi, representatives of the fishing and aquaculture industries, and through personal field experience gathered over the past twenty five years.

Experiential naturalness

The assessments of the influence of buildings, structures and earthworks, and of experiential naturalness were made with regard to the photographic record and the background knowledge of the team members.

Overall natural character rating

Once each specialised aspect of the natural character assessment was concluded a composite assessment was undertaken to identify the overall natural character rating, again using the five point scale. Areas assessed as having high natural character required high or predominantly high scores in all disciplinary areas. The areas assessed as having high natural character ratings were then reviewed and a judgement made as to which could be considered 'outstanding'. Reasons were recorded.

Natural features, landscapes and seascapes assessments

Landscape / seascape character units (hereafter referred to as 'landscape units) and natural features within the coastal environment were identified in parallel with the natural character assessments. The landscape units, defined as areas of generally similar character, were sometimes similar in extent to the natural character units, but were generally a composite of several (sometimes with the boundaries slightly adjusted to reflect spatial and experimental factors). In most cases the landscape units extend inland beyond the coastal environment, but this assessment focusses only on that part within the coastal environment. Seaward, the character units become increasingly indistinct with distance from the shore.

'Natural features' are distinct elements or groupings of elements forming subsets within a landscape. Natural features considered to be potential candidates for 'outstanding' status were identified through field observation, desktop research and the natural character assessments. An important source in identifying potentially outstanding natural features was the Inventory and Maps of Important Geological Sites and Landforms in the Otago Region (Hayward and Kenny, 1998).

Both the landscape units and natural features identified were described and assessed in accordance with the amended Pigeon Bay factors as listed below. These factors encompass all the factors listed in Policy 15 (c) of the NZCPS and reorganise them in a more useful manner for assessment (see Appendix 1).

- Natural science factors / legibility / expressiveness
- Aesthetic values (naturalness / memorability) wild and scenic
- Transient values

- Shared and recognized values
- Tangata whenua values
- Historic heritage values

Comments were recorded for each assessment factor and a rating applied using a five point scale. It is important to note that these are not criteria, *per se*, but rather, comprise important aspects of landscape appreciation and significance, and are not of equal value. Consequently there are no benchmarks for attainment; rather an overall judgement of pre-eminence is made on the basis of the defined qualities. Those that were rated as high were reassessed with regard to whether 'outstanding natural landscape' or 'outstanding natural feature' status in terms of S6b of the RMA was warranted (i.e. were they 'notable due to the expression of natural elements, patterns and processes' (NZILA 2010)). Those which were considered outstanding natural landscapes in the terms of S6b of the RMA were identified and the reasons recorded. A level of exceptionality within the Otago context is required for a landscape or feature to be assessed as outstanding.

The natural feature and landscape assessments have been informed by the natural character assessments and by desktop research, field observation and a high level of familiarity (amongst the assessors), with the coastal areas involved. Important information sources on landscape values include the following:

- Otago Regional Plan Coast, Otago Regional Council 2001.
- Otago Regional Plan Water, Otago Regional Council 2004
- Waitaki District Plan, Waitaki District Council 2010.
- Otago Conservation Management Strategy, Department of Conservation, 2013
- Otago Conservation Management Strategy, Department of Conservation, 1998
- Kai Tahu ki Otago Natural Resource Management Plan, Kai Tahu ki Otago Ltd, 2005
- Waitaki Landscape Study, Densem, 2004.

The assessments are based on the input of two landscape architects, and have been peer reviewed by the other team members.

Results - Natural Character

Overview

A total of 44 natural character areas were defined. These, along with the natural character ratings assigned are shown in Figures 6(a) – 6(c) and summarised in Table 1.

Table 1 : Natural character unit ratings – Summary table

Waitaki NC Unit Number	Unit NC Name	NC Unit Rating	Outstanding?
WNC1	Waitaki River Mouth	Medium	
WNC2	Waitaki Delta	Medium	
WNC3	Oamaru	Low	
WNC4	Cape Wanbrow	Medium High	
WNC5	Beach Road	Medium	
WNC6	Beach Road (limestone section)	Medium	
WNC7	North Kakanui Headland	Medium	
WNC8	Kakanui Beach	Medium	
WNC9	Kakanui Estuary	Medium Low	
WNC10	Kakanui Point	Medium Low	
WNC11	All Day Bay	Medium	
WNC12	All Day Bay Lagoon	Medium High	
WNC13	Orere Point	Medium	
WNC14	Te Hakapureirei Beach	Medium High	
WNC15	Bow Alley Creek	Medium Low	
WNC16	Waianakarua River	Medium	
WNC17	Lookout Bluff	Medium	
WNC18	Moeraki / Hampden Beach	Medium	
WNC19	Kakaho Creek	Medium	
WNC20	Moeraki	Medium	
WNC21	Moeraki Point and adjacent coast	Medium High	
WNC22	Katiki Point	Medium High	
WNC23	Kemp Road Lagoon	Medium	
WNC24	Katiki Beach	Medium High	
WNC25	Shag Point town	Medium	
WNC26	Shag Point	Medium High	
WNC27	Shag River sandspit	Medium	
WNC28	Shag River estuary	Medium High	
WNC29	Cliffs between Shag and	Medium High	

	Stoney Rivers		
WNC30	Stoney Creek Spit	Medium	
WNC31	Stoney Creek Estuary	Medium	
WNC32	Cliffs south of Stoney Creek	Medium High	
WNC33	Bobbys Head	Medium High	
WNC34	Tavora	Medium	
WNC35	Cliffs south of Tavora	Medium High	
WNC36	Pleasant River spit	Medium High	
WNC37	Pleasant River estuary	Medium High	

No areas in the Waitaki District rated high for overall natural character. The largest portion of natural character units were rated medium. These were typically areas where rural land use has impacted the landscape to various degrees, and / or where non-native plants have altered the morphology and ecology of the unit. Fourteen units rated medium-high. No units were assessed as having outstanding natural character.

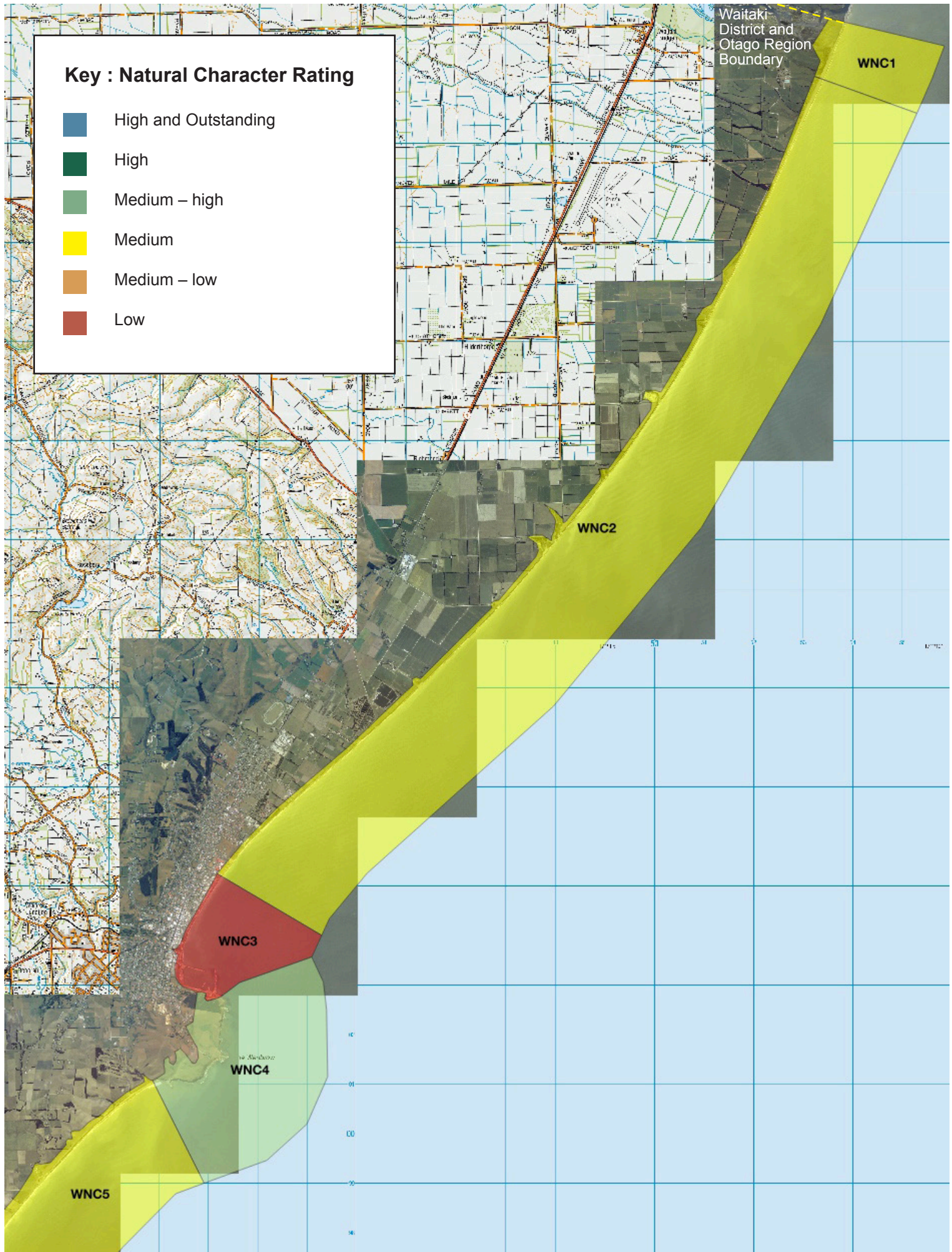
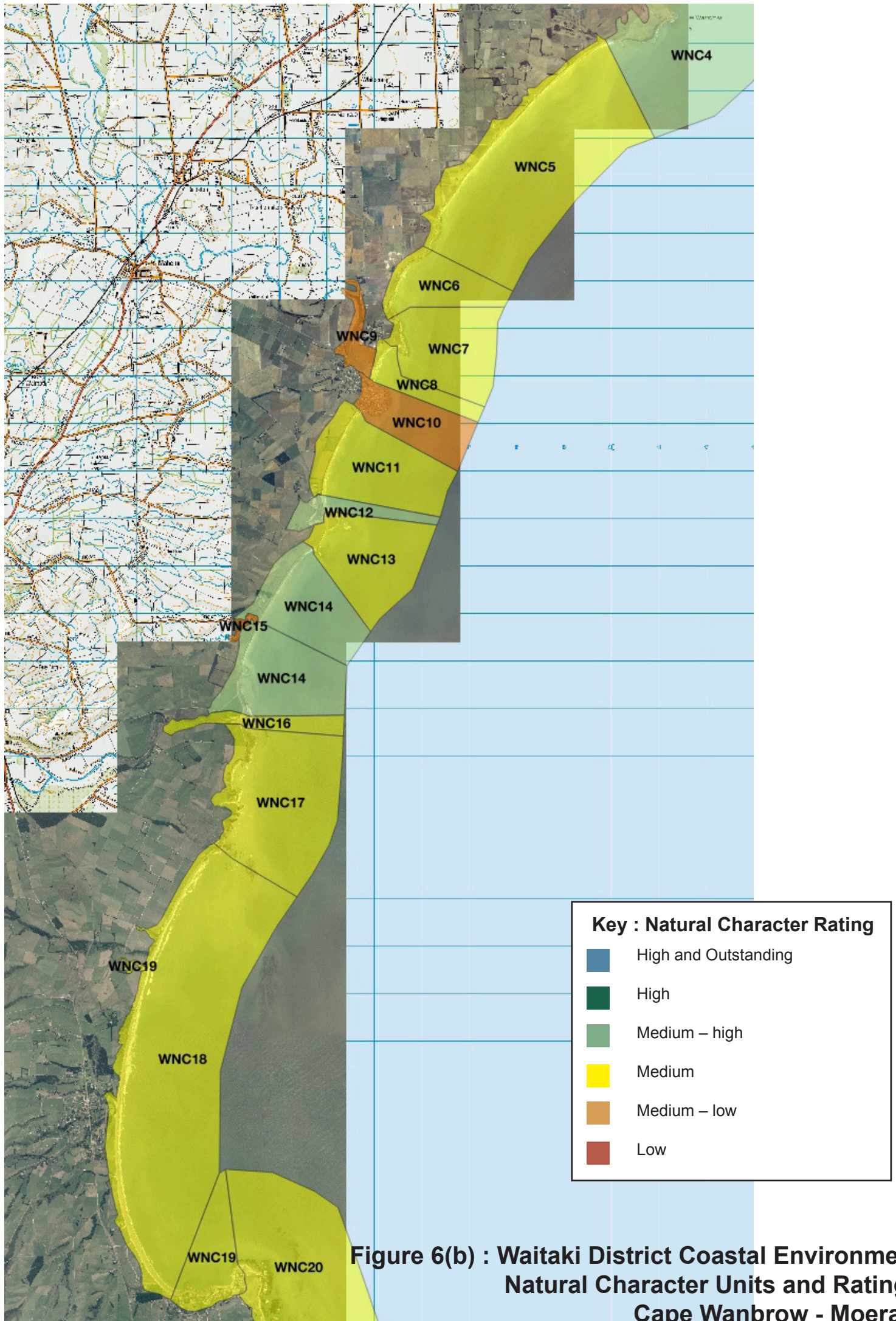


Figure 6(a) : Waitaki District Coastal Environment Natural Character Units and Ratings Waitaki River Mouth - Cape Wanbrow



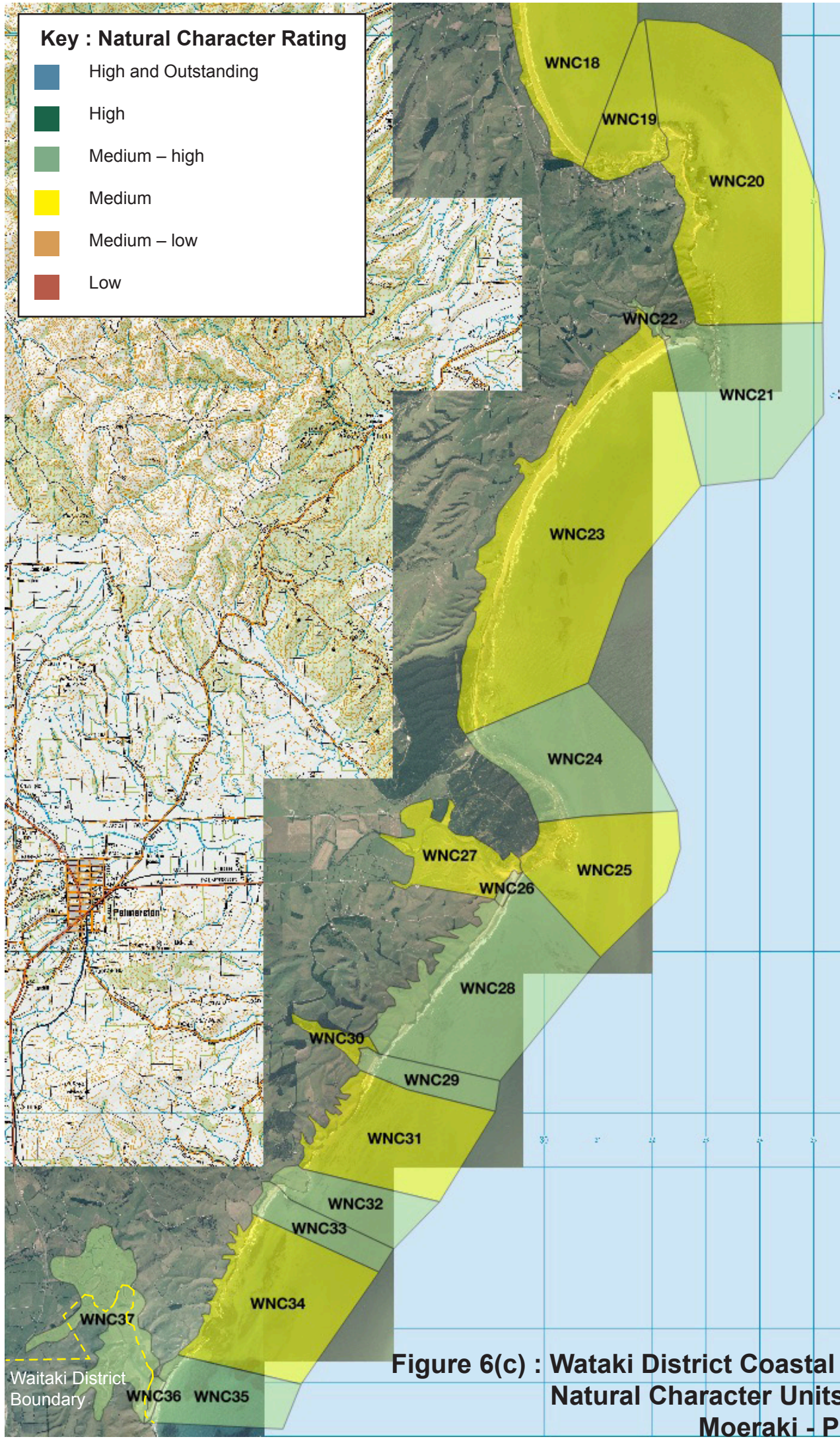


Figure 6(c) : Wataki District Coastal Environment Natural Character Units and Ratings Moeraki - Pleasant River

Results – Natural landscapes and seascapes

Overview

A total of 13 landscape / seascape character units (referred to as landscape character units) were identified, most being composites of the natural character units, sometimes with minor amendments to boundaries to account for spatial / experiential factors. Natural character units were combined when it was clear that they formed a single landscape. For example, the Awamoa landscape unit is an amalgam of the Beach Road and Beach Road Limestone Section natural character units.

The landscape character units, along with the landscape value ratings assigned are shown in Figures 7(a) – 7(c) and summarised in Table 2.

Table 2 : Landscape character unit value ratings – Summary table

Unit Number	Unit Name	Overall landscape values rating	Outstanding
WL1	Waitaki Delta	Medium - Low	
WL2	Oamaru	Medium	
WL3	Cape Wanbrow	High	
WL4	Awamoa	Medium	
WL5	Kakanui	Medium	
WL6	Waianakarua	Medium - High	
WL7	Hampden	Medium	
WL8	Moeraki	High	
WL9	Katiki Beach	Medium - High	
WL10	Shag Point	High	
WL11	Shag River Estuary	Medium - High	
WL12	Goodwood	Medium - High	
WL13	Pleasant River Estuary	Medium - High	

The highest values coincided with the significant promontories of Cape Wanbrow, Moeraki Peninsula and Shag Point. All of these were assessed as having high but not outstanding values. The areas of more gentle relief in between were assessed as having medium or medium – high values. Lower values (medium and medium – low) were assigned to the Oamaru and Waitaki Delta units. A review of both the Waimate District Plan 2014 and the Canterbury Regional Landscape Study suggests that there should be no cross boundary

inconsistencies as far as outstanding natural landscapes are concerned. There were no landscape character units assessed as outstanding.

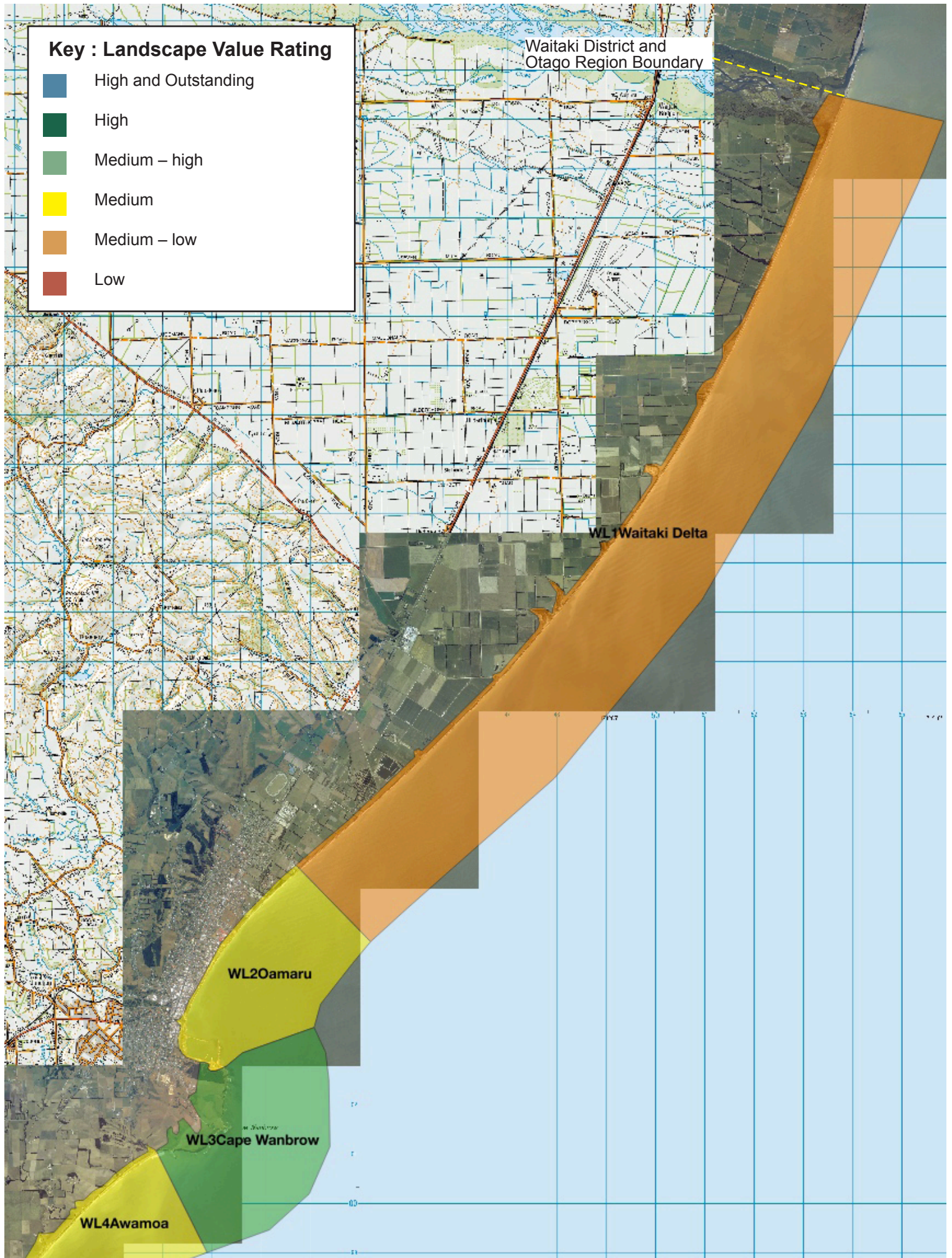


Figure 7(a) : Waitaki District Coastal Environment Landscape Character Units and Value Ratings Waitaki River Mouth - Cape Wanbrow

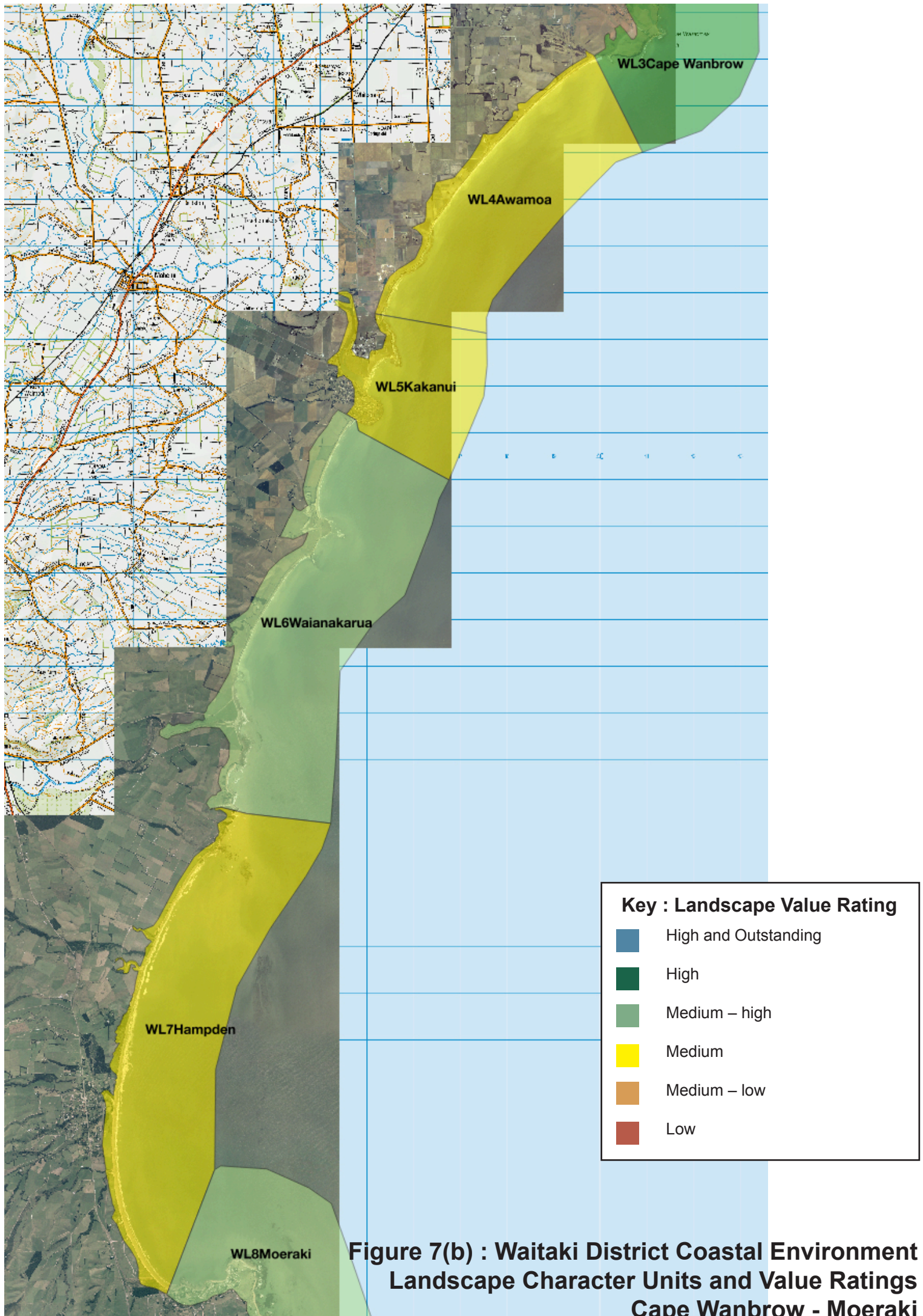


Figure 7(b) : Waitaki District Coastal Environment Landscape Character Units and Value Ratings Cape Wanbrow - Moeraki

Key : Landscape Value Rating

- High and Outstanding
- High
- Medium – high
- Medium
- Medium – low
- Low

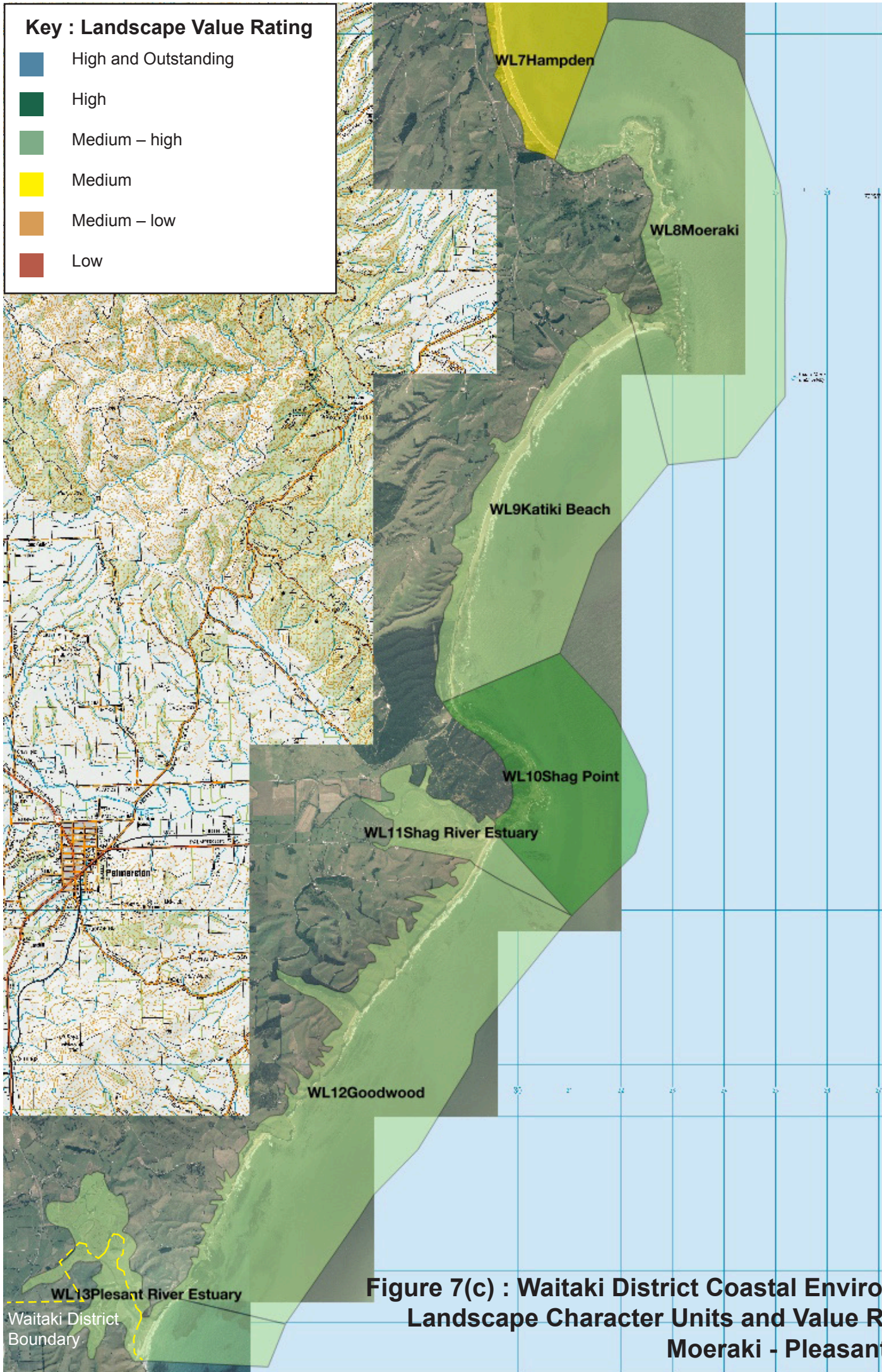


Figure 7(c) : Waitaki District Coastal Environment Landscape Character Units and Value Ratings Moeraki - Pleasant River

Results - Natural Features

Overview

A total of 6 potentially outstanding natural features were identified and these, along with the landscape value ratings assigned are shown in Figures 8(a) – 8(c) and summarised in Table 3.

Table 3 : Natural Feature value ratings – Summary table

Unit Number	Feature Name	Overall landscape values rating	Outstanding
WL1/F1	Waitaki River mouth	Medium - high	
WL3/F1	Cape Wanbrow wave cut notch and platform	Medium - high	
WL6/F1	Bridge Point	Medium - high	
WL7/F1	Moeraki Boulders	High	Yes
WL8/F1	Katiki Point	High	Yes
WL12/F1	Bobbys Head	High	

Of the 16 features considered, 2 were assessed as outstanding as follows:

- Moeraki Boulders (WL7/F1)
- Katiki Point (WL8/F1)



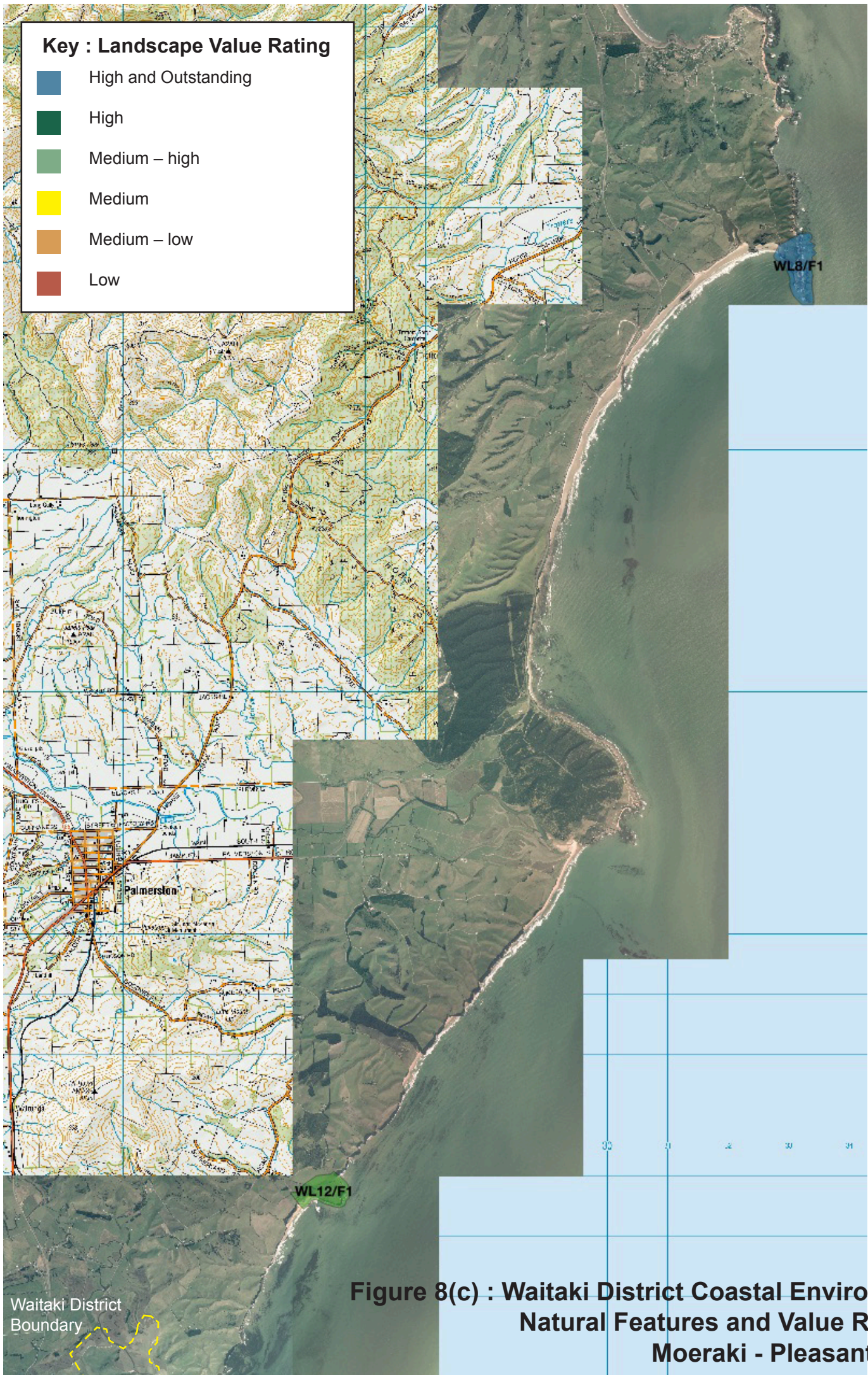
Figure 8(a) : Waitaki District Coastal Environment Natural Features and Value Ratings Waitaki River Mouth - Cape Wanbrow



Key : Landscape Value Rating

Blue	High and Outstanding
Dark Green	High
Light Green	Medium – high
Yellow	Medium
Orange	Medium – low
Red	Low

**Figure 8(b) : Waitaki District Coastal Environment
Natural Features and Value Ratings
Kakanui - Moeraki Boulders**



**Figure 8(c) : Waitaki District Coastal Environment
Natural Features and Value Ratings
Moeraki - Pleasant River**

Outstanding natural features

Feature WL7/F1. Moeraki Boulders



Character Description

This feature is the scattering of spherical concretions on the beach between Hampden and Moeraki, formed by the precipitation of calcite in the mudstone cliffs behind the beach and exposed as the cliffs erode. They are remarkable for their size (up to 2.2m), their concentration at a single site, and the degree to which they form perfect spheres (DOC, 1998). The feature is defined to include the boulders and their immediate beach setting, including the coastal scarp adjacent.

The Moeraki boulders have very significant natural science, shared and recognized and tangata whenua values. Transient values are also high. Aesthetic values are reduced to some extent by a degree of modification to their setting but are still high – medium. Outstanding status is justified.

Feature WL8/F1. Katiki Point



Character Description

Katiki Point is a low, lineal basalt headland that forms the southern tip of the Moeraki Peninsula and which defines the northern side of the Katiki Beach landscape. It has a segmented form with steep cliffed sides. There are sandy pocket beaches along with rocky benches and reefs on its eastern side. Vegetation cover is largely grassland but there is also a small patch of native bush. A lighthouse and associated keepers house stands on its summit within a context of shelter plantings, and there are other light-house related buildings on lower, east facing slopes to the north of the lighthouse. A walking track provides public access from a car park at the end of Lighthouse Road, to the end of the point. The feature has been mapped to include the lighthouse buildings. Katiki Point is a memorable landscape feature which has high values across all the assessment factors. Outstanding status is justified.

Conclusion

The coastal environment within Waitaki District generally exhibits less variation in character than other parts of the Otago Region. The majority of the natural character units were rated as either medium or medium – high. There were no areas assessed as having high or outstanding natural character.

Thirteen landscape character units were identified and whilst three were assessed as having high landscape values, none were assessed as outstanding in terms of section 6(b) of the RMA, using the Amended Pigeon Bay assessment factors.

Desktop research and field observation suggested six potential candidates for outstanding natural feature status. Assessment using the Amended Pigeon Bay factors has confirmed two of these. These were the Moeraki Boulders and Katiki Point.

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Appendix 1 : Comparison Table – Amended Pigeon Bay Factors and NZCPS Policy 15 Assessment Factors

Amended Pigeon Bay Factors as outlined in this report	NZCPS Policy 15 assessment factors (reordered to relate)
Natural science factors / legibility / expressiveness	(i) natural science factors, including geological, topographical, ecological and dynamic components (ii) The presence of water including in seas, lakes, rivers and streams (iii) Legibility or expressiveness – how obviously the feature or landscape demonstrates its formative processes. (v) Vegetation (native and exotic)
Aesthetic values (naturalness / memorability) Wild and scenic	(iv) Aesthetic values including memorability and naturalness (x) Wild or scenic values
Transient values	(vi) Transient values, including presence of wildlife or other values at certain times of the day or year
Shared and recognised values	(vii) Whether the values are shared and recognised
Tangata whenua values	(viii) Cultural and spiritual values for tangata whenua, identified by working, as far as practicable, in accordance with tikanga Maori; including their expression as cultural landscapes and features.
Historic heritage values	(ix) Historical and heritage associations

Appendix 2 : Natural Character Assessment Sheets

Appendix 3 : Natural Features and Natural Landscapes Assessment Sheets