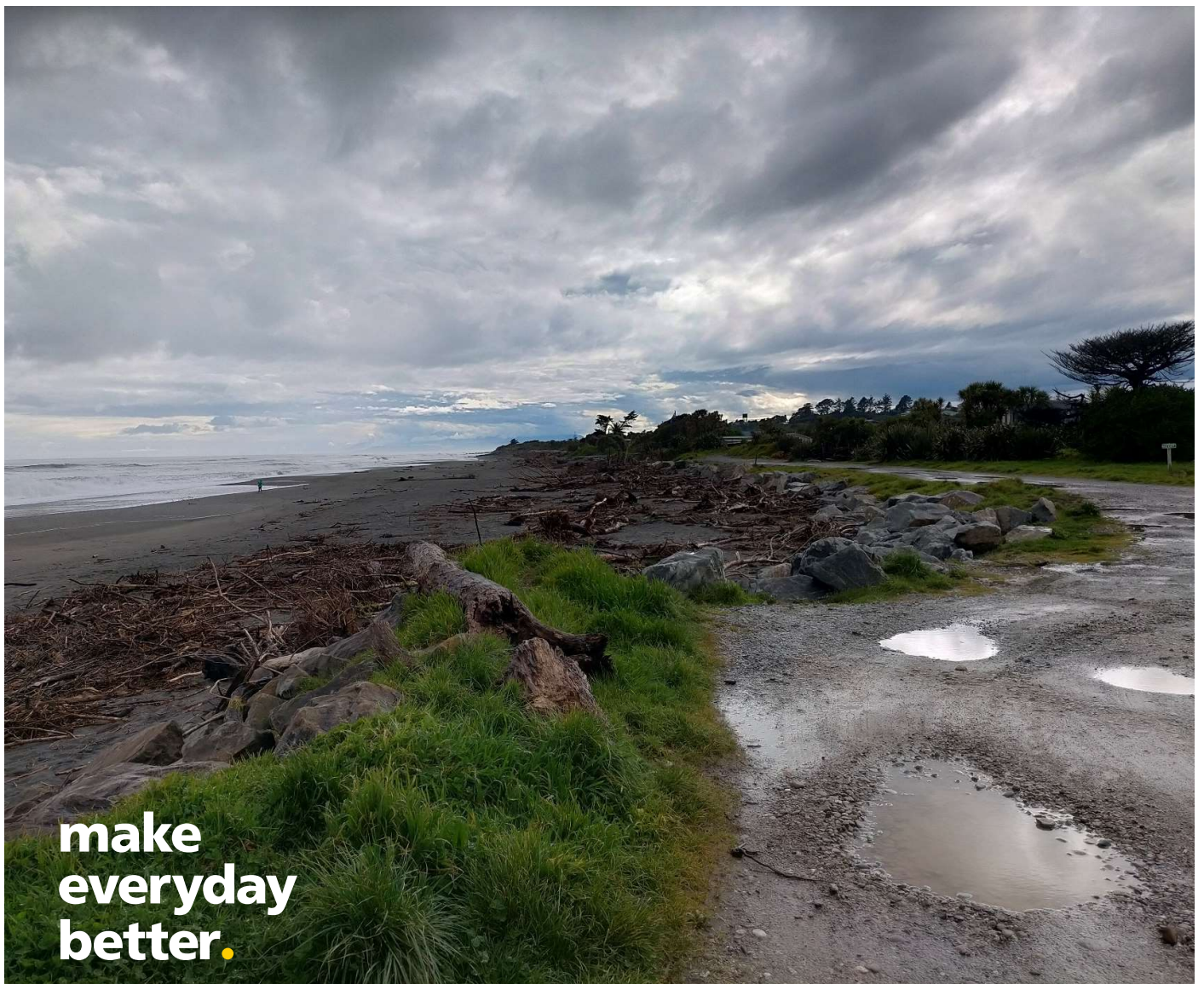


Hokitika Seawall Extension - Assessment of Effects on Environment

Prepared for West Coast Regional Council
Prepared by Beca Limited

11 April 2022



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Revision History

Revision N°	Prepared By	Description	Date
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B	Ian Goss, Reza Shafiei, Louisa Armstrong and Graeme Jenner	Final report	11 April 2022

Document Acceptance

Action	Name	Signed	Date
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Reviewed by	Paul Whyte		11 April 2022
Approved by	Jennifer Hart		11 April 2022
on behalf of	Beca Limited		

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1 Introduction

1.1 Overview

The West Coast Regional Council (WCRC) is proposing to construct an approximately 1100m long extension of the existing Hokitika seawall between Stafford Street and Richards Drive. The existing seawall is a 1000m long rock revetment constructed in 2013, to protect a portion of the township between Hokitika River mouth and Stafford Street (see **Figure 1-1**).

Between October 2019 until early October 2021, temporary emergency works were undertaken in sections along the beach north of the existing wall, with rock now placed on the upper beach for almost the entire frontage from Stafford Street to Richards Drive.

Areas of the Hokitika township are under threat from sea level rise and erosion events and the construction of a seawall extension along the beach frontage to Richards Drive will provide interim protection to low lying properties presently between 25 and 40m from the upper beach erosion scarp¹.

The seawall extension option is a short to medium term interim solution. The design life and design event are aligned with this short to medium term (up to 15 years) timeframe. The proposed 15-year consent term will allow for the WCRC to plan and implement a longer term adaptive coastal management strategy, in response to Central Government legislation. The proposed seawall extension is therefore considered to be consistent with the intent of the New Zealand Coastal Policy Statement 2010.

The proposed work will require consents for construction, operation and maintenance of the structure from both the Westland District Council (WDC) and WCRC.

1.2 Background

Hokitika township was established in the 1860s with initial subdivision on the beachfront west of Revell Street in 1867. Since that time, it has been subject to coastal erosion and flooding episodes from the Hokitika River. Investigation and detailed assessment of significant events was undertaken (Gibb, 1987²) by the Water and Soil Directorate of the Ministry of Works following an episode of exposure to coastal erosion in 1983. In summary, the findings identified a long-term history of cyclic short-term erosion and accretion about a mean position (i.e dynamic equilibrium), with regular intervals of 10, 20 and 30 years. The outcome of this study was the construction of a series of presently existing groynes on the foreshore and a proposal for the creation of a Coastal Hazard Management Plan based on the prediction that the western side of Revell Street would be the natural shoreline position in 2050.

Following an episode of erosion over the first decade of the 2000s that threatened the commercial township frontage, a section of seawall was constructed in 2013 which, with the upgrade of the existing protection near the Hokitika River mouth, presently provides protection from Sunset Point at the mouth of the Hokitika River to the eastern end of Beach Street. Continued erosion, exacerbated by the remnants of tropical cyclones in 2018, has created further concern about the risk to properties seaward of Revell Street, and flooding risk in adjacent low-lying areas, and the subsequent application by WCRC to Central Government for funding to extend the seawall.

¹ Beca Ltd (2021) *Hokitika Revetment Extension – Basis of Design Report*; prepared for West Coast Regional Council

² Gibb J G (1987) *A Coastal Hazard Management Plan for Hokitika* – Water and Soil Technical Publication No 29, National Water and Soil Conservation Authority

This project is part of a wider package of works called “the Hokitika and Kaniere Resilience Project” that have received funding from Central Government’s “shovel ready” fund. The seawall extension is part of this project which also includes construction of a river flood protection scheme between Kaniere and Sunset Point.



Figure 1-1 Existing and proposed Hokitika seawall extension (Source: Google Earth)

1.3 Purpose of Report

The purpose of this report is to provide an assessment of effects on the environment (AEE) to support a consents application by WCRC for the construction and operation of the approximately 1100m long extension of the existing Hokitika seawall. Due to the nature of the proposal, one AEE report has been prepared to support applications to both WDC and WCRC.

The report is prepared in accordance with section 88 and Schedule 4 of the Resource Management Act (RMA) and includes:

- A description of the environment
- A summary of proposed activities
- An assessment of effects of the establishment and operation of the seawall
- A summary of consultation undertaken
- A consideration of relevant provisions of statutory and planning instruments
- A summary of conclusions and findings of the investigation
- Proposed consent conditions.

1.4 Resource Consents Required

Resource consents will be required in respect of the activities set out in **Tables 1-1** and **1-2**.

1.4.1 Westland District Council

Table 1-1 Resource consents required from Westland District Council

Activity	Rule/Regulation	Consent status
Coastal Protection Works	Part 5 Rule 5.2.4 Additional Control of Natural Coastal Processes of Westland District Plan	Restricted discretionary
Disturbance of contaminated soils	Regulation 11 of Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011 (NESCS) for the disturbance of contaminated soils	Discretionary

In respect of the above, a resource consent application under the Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011 (NESCS) for the disturbance of contaminated soils is included. A Detailed Site Investigation (DSI) has not been undertaken as yet and accordingly consent is sought under Regulation 11 of the NESCS.

1.4.2 West Coast Regional Council

Table 1-2 Resource consents required from West Coast Regional Council

Activity	Rule/Plan	Consent status
Occupation of the Coastal Marine Area	Rule 7.5.1.5 of West Coast Regional Coastal Plan	Coastal permit/ Discretionary
Erection of seawall extension	Rule 8.5.1.7 of West Coast Regional Coastal Plan Coastal Plan	Coastal permit/ Discretionary
Removal of existing structure (existing emergency rock structure)	Rule 8.5.3.2 of West Coast Regional Coastal Plan	Coastal permit/ Discretionary
Disturbance of foreshore and seabed	Rule 9.5.3.7 of West Coast Regional Coastal Plan	Coastal permit/ Discretionary
Temporary occupation of the Coastal Marine Area during construction	Rule 3 of the Proposed West Coast Regional Coastal Plan Coastal Plan	Coastal permit/ Discretionary
Occupation of the Coastal Marine Area by completed seawall	Rule 3 of the Proposed West Coast Regional Coastal Plan Coastal Plan	Coastal permit/ Discretionary

Activity	Rule/Plan	Consent status
Erection of seawall extension	Rule 13 of the Proposed West Coast Regional Coastal Plan Coastal Plan	Coastal permit/ Discretionary
Disturbance of foreshore and seabed	Rule 25 of the Proposed West Coast Regional Coastal Plan Coastal Plan	Coastal permit/ Discretionary
Undertaking of earthworks within 50m of the Coastal Marine Area	Rule 16 of West Coast Land and Water Plan	Landuse/Discretionary

1.5 Term of Consent

A 15-year consent term is proposed for the operation of the seawall (both WCRC and WDC applications) because it is not a permanent solution for the Hokitika when faced with ongoing rising sea levels and the impacts of climate change. The proposed seawall extension is a short to medium term solution on the basis of projected sea level rise and to be consistent with the intent of the New Zealand Coastal Policy Statement (NZCPS) 2010. The seawall design is based on this short to medium timeframe. The proposed consent term will allow time for WCRC, in conjunction with WDC and other stakeholders, to plan and implement an adaptive management strategy for the longer-term management of coastal hazards in Hokitika. This adaptive management strategy process is described in further detail in Section 1.6 below.

Legislation is also anticipated from Central Government to help guide climate change adaptation in New Zealand and a 15-year term for the seawall will allow time for WCRC and WDC to develop the management strategy under this framework.

A term of 5 years is sought for the construction related consents from WCRC to allow sufficient time for installation of the seawall.

1.6 Adaptive Management Strategy

Climate change is expected to increase the risk of coastal erosion and flooding in Hokitika, in particular due to sea level rise and increased wind speeds and wave heights. There is significant uncertainty around the rate and magnitude of sea level rise towards the latter part of this century and beyond, highlighting the need for adaptive management frameworks (Lawrence et al)³.

The statutory framework operating in the coastal environment in New Zealand currently provides for the management of significant risks from natural hazards (section 6 (h), RMA), assessments of the actual and potential effects of climate change (section 7 (i), RMA), controlling the use of land for the purpose of avoidance or mitigation of natural hazard risks (section 30, 31 RMA) and a relatively prescriptive set of objectives and policies in the NZCPS that must be given effect to. For example, development of an adaptation strategy for significant existing development that could include various approaches, with transition mechanisms (NZCPS Policy 27).

MfE (2017)⁴, provides guidance around the uncertainty in the decision-making process by applying four critical elements; treatment of uncertainty and changing risk profile; different types and levels of community

³ Lawrence J et al (2018) *National Guidance for Adapting to Coastal Hazards and Sea Level Rise: Anticipating Change, When and How to Change Pathway*; Elsevier Environmental Science and Policy 82 (2018) 100-107

⁴ (Ministry for the Environment, (2017) *New Zealand Coastal Hazards and Climate Change Guidance*

engagement; dynamic adaptive pathways planning; and a monitoring regime, that enables flexibility while reducing path dependency.

The Ministry recommends that Councils develop flexible adaptation plans, rather than relying on a single sea-level rise value or scenario. This is because there is a wide range of possible coastal futures with ongoing sea-level rise. It also provides minimum transitional sea-level rise values for use in planning processes for two out of four broad categories of development.

Many New Zealand Councils have already started to plan for sea-level rise. Some have completed coastal hazard assessments and have developed maps showing areas which are expected to be affected by increasing sea levels.

Other activities being undertaken by Councils around New Zealand include:

- restricting development in coastal erosion areas
- planning for managed retreat
- rejecting consents for alterations or extensions to existing buildings in the coastal zone
- discouraging the construction of defences such as sea walls.

This consent application is proposed on the basis that the proposed seawall extension to Richards Drive will provide a short to medium term protection for low lying properties presently between 25 and 40m from the upper beach erosion scarp but that there will be a need for WCRC to develop a longer term adaptive management strategy, in collaboration with WDC, iwi and other key stakeholders, for the expected impacts of climate change, including sea level rise, on Hokitika. It is proposed that the requirement for WCRC to plan for and implement such a strategy within an appropriate timeframe be incorporated into a consent condition.

2 Description of Site

2.1 Overview

The proposed seawall extension is located on legal road on the seaward side of Revell Street properties between Stafford Street and Richards Drive in Hokitika (see **Figure 2-1**). The sea wall is proposed to occupy a section of land approximately 1100m long connecting at the southern end to the existing Hokitika seawall near the town centre. The northern end of the wall is proposed to end at the existing groyne at the end of Richards Drive.

The approximately 2.23ha site consists of small dunes, vegetated areas, a gravel road, and public accessways. Several existing buildings and gardens and other informal development associated with properties along Revell Street also occupy the legal road. The legal status of this development is not clear.

Temporary rock protection was placed along beach in the area of the proposed seawall extension in 2019-21 as emergency works to prevent further erosion from a series of coastal storm exposure events.



Figure 2-1 Overall site plan of extended seawall (Image source: Google Earth Pro)

2.2 Approach

As agreed with the applicant, the AEE has been prepared based mainly on available literature, studies and data. In addition, a pre-application discussion was held with Fiona Scadden (WDC Planning Manager) and

Colin Helem (Acting Consents and Compliance Manager, WCRC) on 5th October 2021. The need to apply for a consent for works below MHWS and consult with Iwi and neighbours was noted.

In addition, a specific survey and report was carried out by the West Coast Penguin Trust to assess the likely implications of the proposal on blue penguins that access the area.

No specific survey of fauna in the area of proposed disturbance in the intertidal or backshore was undertaken. Available information suggests that the dynamic nature of the beach will significantly limit the presence of biota. It is expected that any existing fauna (such as lizards) in the backshore will be ubiquitous in the area and likely to move during preconstruction activities. There is no mention of the presence of endangered or significant fauna noted in the Regional Coastal Plan.

The design of the seawall extension has been based on available existing information which includes historic records and interpretations of the beach characteristics and changes over the last 150 years, the performance assessment of the existing groyne field and southern section of the existing seawall, and regular survey monitoring of the exposed section of coastline by WCRC since 2003. Recent Lidar surveys provide more detailed coverage of these components. The assessment of coastal effects of the proposed seawall is based on these observations and understanding of seawall effects, the beach characteristics and wave climate exposure, and the effects of the Hokitika River discharge. Modelling of coastal processes has not been undertaken on the basis of the existing body of literature available, the complicated conditions at the site, and the WCRC’s timeframe for consenting and construction.

2.3 Legal Description and Mapping Layers

The site does not have a legal description on the WCRC GIS mapping system⁵ as it has been classified as road reserve within a coastal erosion zone. It follows an unformed legal road travelling along the coastline for the length of the proposed seawall that is administered by WDC.

As shown in Figure 4-1, the site is zoned Coastal Erosion Zone under the Westland District Plan (WDP).

Under the Operative West Coast Regional Coastal Plan, the site is identified as:

- A coastal hazard area under Schedule 3: Cross Boundary Areas, 3.3 Coastal Hazard Areas:

Areas	Main Recreational Uses
CHA 14 Arahura River to Hokitika River	Settlement (Hokitika, Three Mile, Kaihinu), Hokitika River industrial properties (Three Mile), farmland and road threatened by beach erosion, wave inundation and river migration

- A coastal recreational area under Schedule 2: Coastal Management Areas, 2.4 Coastal Recreation Areas:

Areas	Main Recreational Uses
CRA 11 beach on north side Hokitika River	Swimming, walking

Under the Proposed West Coast Regional Coastal Plan, the site is identified as:

- A coastal hazard area under Schedule 3C: Coastal Hazard Areas:

⁵ WCRC GIS Mapping System (<https://gis.westcoast.govt.nz/WestMaps/>) viewed on 1 December 2021.

Area	Type of Coastal Hazard and Risk Priority Ranking
CHA 21 Hokitika, from south bank of Arahura River to level with end of Golf Links Road, Takutai	<p>Parts of Hokitika, industrial land, houses, beach access, recreational areas, local roads, farmland at risk or affected by erosion. Erosion fluctuates over long time, with rapid retreat of coastline during erosion phase. Wave washover flooding and dune blowouts can occur during storms. Migration of Houhou Creek mouth can cause erosion.</p> <p>High: Many assets of value at risk, current management practices reasonably effective at managing erosion risk. Township now being protected with engineered seawall.</p>

- A coastal recreational area under Schedule 3F: Coastal Recreation Areas:

Area	Main Recreational Uses
CRA13 Beach on north and south sides of Hokitika River	Swimming, walking, fishing, beach golfing event

There are no New Zealand Archaeological Authority sites identified on the site.

2.4 Topography

The site elevation ranges from 3 - 6 m above sea level (asl).

2.5 Surrounding Land Use

The site is bounded by various land uses. To the south, is the existing Hokitika seawall and town centre consisting of commercial premises. To the east along Revell Street, is residential housing and to the north is a mix of some residential housing and rural land. Several existing buildings and gardens and other informal development associated with properties along Revell Street also occupy the legal road.

St Mary's Catholic School is approximately 130 m south-east of the site boundary.

The Hokitika Beach and Tasman Sea lie to the west of the site.

2.6 Surface Waters

The site is along an open beach within the dune environment and there are no immediately adjacent estuarine environments or stands of water. In addition, there do not appear to be any wetlands within the vegetation on top of the dunes.

The Hokitika township lies within the flood plain of the Hokitika River that lies approximately 550 m to the south of the site boundary and discharges in a western direction into the Tasman Sea. Modelling for the WCRC⁶ for the 1:100 year rainfall event including provision for climate change in 2100 (see **Figure 2-2**) shows peak water depth of between 0.5m and 2.0m over the western and southern parts of the township including a significant portion of the CBD from Park Street south to the river. The figure presents the effects of flooding following 1m of sea level rise which is much greater than has been considered for this proposed

⁶ LandRiverSea Consulting (2020) Peak depth map for 1 in 100year rainfall event including climate change (2100)

15 year consent application, but illustrates the low lying nature of the Hokitika township which is equally exposed to coastal inundation and flooding.

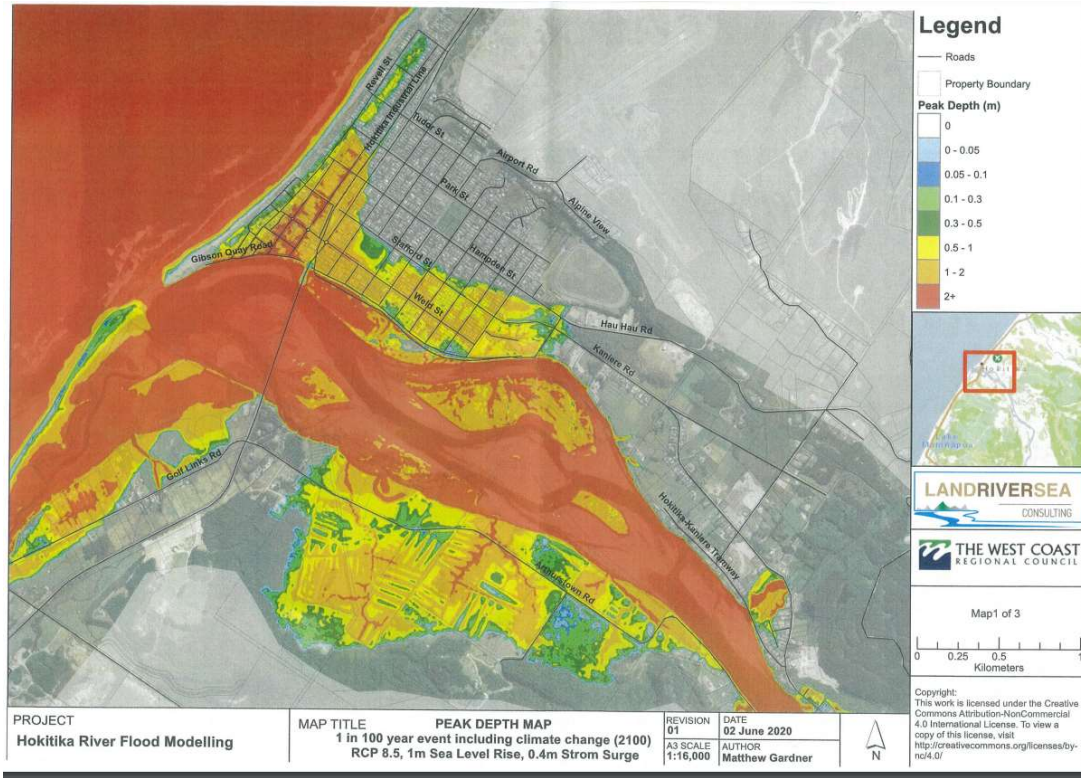


Figure 2-2 Modelled peak water depth in Hokitika for 1:100year river flood event, including 1m Sea Level Rise and 0.4m storm surge

A small unnamed stream passes from east to west just outside the site, approximately 100m to the north of Richards Drive, before discharging into the beach (see **Figure 2-3**). This is not identified on WCRC maps and does not appear to be significant. The creek is fed by runoff from part of the terrace behind the township and some stormwater runoff within the township.

From Figure, 2-3 it can be seen that the creek is often blocked by sand and driftwood and discharge across the beach would likely only occur during heavy rainfall.



Figure 2-3 Photos of the surface waterway just north of Richards Drive

2.7 Soils and Groundwater

2.7.1 Overview

Published information⁷ indicates the site is underlain by Late Quaternary beach and terrace cover deposits, described as *'beach sand, gravel, shell and boulder banks of the modern coastal plain; marine gravel, sand and mud beneath low coastal terraces.'*

The WCRC GIS Mapping System indicates there are no groundwater bores within 200 m of the site. A review of the NZ Geotechnical Database⁸ indicates that several geotechnical investigations have been conducted within 200 m of the southern site boundary that recorded groundwater levels between 0.52 m and 2.69 m below ground level (bgl). Due to the proximity to the Tasman Sea, groundwater levels at the site are likely to be tidally influenced. The MfE GIS mapping tool indicates the site is not located above an aquifer⁹.

2.7.2 Contaminated land

A Preliminary Site Investigation (PSI) (see **Appendix A**) was carried along the site of the proposed seawall extension¹⁰.

The PSI concluded that:

- No known HAIL¹¹ areas were identified within 100m of the site boundary (see **Figure 2-4**).

⁷ GNS Science – New Zealand Geology Web Map (<https://data.gns.cri.nz/geology/>), viewed 1 December 2021.

⁸ NZ Geotechnical Database (<https://www.nzgd.org.nz/ARCGISMapViewer/mapviewer.aspx>), viewed 1 December 2021.

⁹ Ministry for the Environment (<https://data.mfe.govt.nz/layer/52675-location-and-extent-of-nzs-aquifers-2015/>), viewed on 1 December 2021.

¹⁰ Beca Ltd (2022) *Preliminary Site Extension (Contamination) – Hokitika Seawall Extension*; prepared for WCRC

¹¹ HAIL - Hazardous Activities and Industries List- identified from Selected Landuse Sites statements provided by WCRC

- Based on historical aerial imagery, the site was mainly undeveloped and vegetated, and has remained so until present day. Over time, ancillary buildings have extended past their respective residential boundaries along Revell Street (parallel to the site), into the site boundary. Two of these buildings were present from 1963-1988, while the third was built in 1984 and is still present. Based on the age of construction, asbestos, lead paint and / or treated timber may have been used during construction or maintenance activities. The deterioration of these materials overtime (based on wind/ rain action) or poor demolition practices may have resulted in localised shallow soil contamination.
- During the site walkover broken brick fragments were observed in the surface ground cover throughout the site with no observable source, and impromptu conversations with residents mentioned the use of historical offal pits and illegal dumping in the sand dunes on site, however evidence of this within the site was not noted on historical aerial photographs.
- Soils on site are considered to meet the 'more likely than not' threshold related to the potential deterioration of ACM and / or lead paint and /or treated timber from historical building structures (HAIL I *'Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment'*).
- Based on the information review, the potential presence of buried waste/ fill is not considered to meet the 'more likely than not' threshold for soil contamination under HAIL G3 - Landfill Sites or HAIL G5 – Waste Disposal to land. However, it remains possible that contamination from historical filling may be present along the length of the site.
- Identified potentially complete exposure pathways include:
 - Exposure of construction workers to contaminants in soils during site redevelopment – dermal contact, ingestion or inhalation of dust/vapours.

A Detailed Site Investigation (DSI) has not been undertaken.



Figure 2-4 HAIL areas in vicinity of site identified by WCRC (source: GoogleEarth Pro)

2.8 Tide Levels

The tide levels have been taken from LINZ (2021) Standard Port tidal levels for Westport due to the relative proximity to the site, and as these values are more conservative than the levels given at the Hokitika River Bar (where tide levels are potentially affected by the bar). **Table 2-1** provides the tide levels in Chart Datum (CD) and New Zealand Vertical Datum 2016 (NZVD16):

Table 2-1 Tide levels for Westport (LINZ, 2021- accessed 11/11/2021)

Tide level	Level (m CD)	Level (m NZVD16)
Highest Astronomic Tide (HAT)	3.88	1.75
Mean High Water Springs (MHWS)	3.50	1.37
Mean High Water Neaps (MHWN)	2.82	0.69
Mean Sea Level (MSL)	2.04	-0.09
Mean Low Water Neaps (MLWN)	1.26	-0.87
Mean Low Water Springs (MLWS)	0.56	-1.57
Lowest Astronomic Tide (LAT)	0.18	-1.95

2.9 Wave Climate

The beach adjacent to Hokitika township is exposed to a constant open ocean high energy wave climate with predominant south westerly wave approach (see **Figure 2-5**) which results in a general northerly direction of nearshore currents and sediment transport (refer following section).

A wide and high energy surf zone is an almost constant feature of this coastline, with regular exposure to long period swells from remote storms which generate high energy conditions at the coast. These conditions, when combined with high tides and storm surge, have the potential to affect bar movement and beach and foreshore erosion.

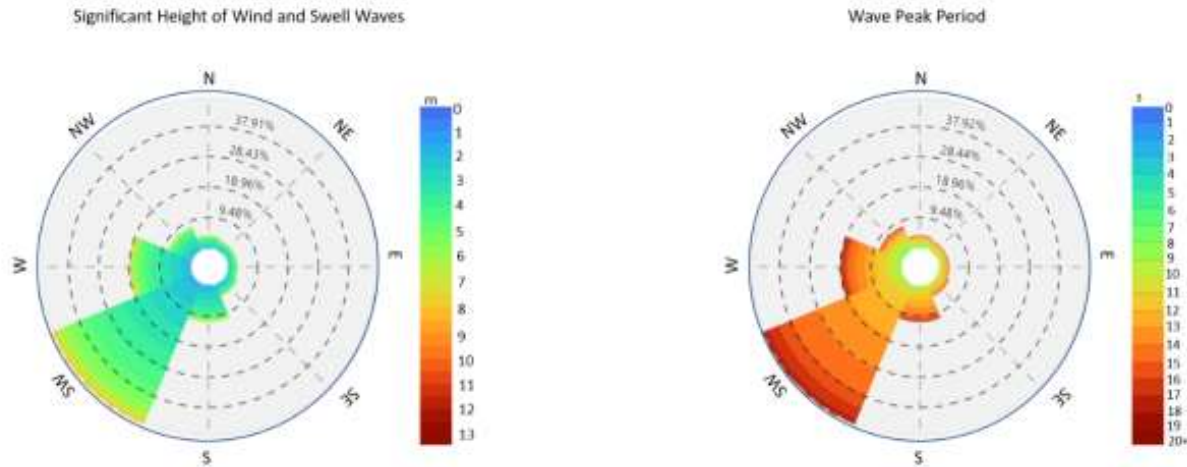


Figure 2-5 Offshore wave rose at MetOcean wave station (at virtual point 42.5S, 171.0E)

2.10 Beach Morphology and Sediment Process

2.10.1 Beach characteristics

The coastline to the north of the Hokitika River comprises a wide and active mixed sand and gravel beach with variable proportions of these components. Sand is dominant over the extent of the proposed seawall extension with distributed patches of surface gravels.

Historic erosion inshore is evident in the southern section of the proposed seawall extension where exposed erosion scarps comprise silt and soil, with components of brick and other materials, suggesting that the foreshore has been modified in this area. Further to the north, the eroded areas comprise marram grass vegetated natural sand dunes. Within the intertidal area of the beach, large vertical changes in beach profile have been recorded by regular surveys carried out since 2000 with profile envelopes showing up to 4m vertical change in parts of the beach. The beach is thus shown to experience significant changes of both erosion and recovery.

2.10.2 Sediment transport processes

Sediment transport is driven by the high energy wave climate. Generally, the northward littoral drift is partly offset by the intermittent north-westerly storms which push sediment southwards (Neale and Nelson, 1998)¹²

¹² Neale DM and Nelson W 1998 *Marine algae of the East Coast South Island NZ* Tuhinga 10:87-118

The beach has a well-documented history of erosion and accretion events which have been recorded from as far back as the 1860s (refer to following section).

A review of the effectiveness and status of the groyne fields between Weld Street and Richards Drive (Beca 2020)¹³ concluded that the section of coastline north of the Hokitika River did not follow the expected consistent northerly transport process on the intertidal beach until as far north as the Richards Drive groyne. This conclusion was based on the observation of the performance of the southern groynes and the processes of erosion and accretion of the beach. The erosion process subsequent to the construction of the groyne field remained the same as described by Gibb in 1987, with the northward migration of erosion troughs, despite the presence of the southern groynes. This conclusion was reached based on the observation of the groynes showing no regular entrapment of sediment on the updrift side suggesting that the sediment transport process in the inter tidal zone has an onshore-offshore component, as opposed to consistent longshore littoral transport where the groynes would be expected to provide progressive improvement to beach volumes, and thus a more robust natural protection buffer. Continuity of the predominant northerly littoral drift in this area is maintained further seaward of the extent of the groynes and within the subtidal bar system and surf zone.

The Hokitika River discharges immediately south of the township and river discharge affects the supply of sediment to the beach through delivery of material from the river and interruption of the general northerly drift from further south. The river mouth configuration is variable and affects how sediment is delivered into the beach processes north of the river, which in turn affects beach processes along the beachfront.

The effects of the Hokitika River mouth were recognised in previous reports as having significant influence on the adjacent foreshore erosion and accretion events with variable river mouth configuration, with Gibb relating the channel discharge direction to erosion and accretion of the adjacent beaches both to the north and south of the entrance. The effect of the Hokitika River mouth configuration was also addressed by Hicks (2016)¹⁴, concluding that a restricted low flow entrance was unlikely to affect estuary flood levels as the entrance would quickly enlarge the channel outlet and intervention to modify the mouth would be unlikely to be effective.

The Hokitika River, with a catchment area of 1100km², has been estimated to discharge in the order of 6.2 million tonnes of suspended sediment (Hicks et al, 2011)¹⁵ per annum on average to the coast, which is subject to a strong northerly drift, with an additional 3 to 20% comprising bed load material. This is a significant quantity, ranking the Hokitika River second in the South Island in terms of total annual suspended sediment yield. The process of the deposition and distribution of the beach-sized fraction of this material and that transported north from the southern coastline, but deflected around the river mouth by the river, and its remobilisation and transport under a range of wave conditions to re-join the uniform northerly drift of beach material is considered to be part of the complex process that results in the episodic cycles of erosion and accretion along the Hokitika foreshore.

¹³ Beca Ltd (2020) *Hokitika groyne field status review*; prepared for West Coast Regional Council 14 February 2020

¹⁴ Hicks D M (2016) *River mouth-related shore erosion at Hokitika and Neils Beach, Westland*; prepared for West Coast Regional Council; NIWA report No CHC2016-002; February 2016

¹⁵ Hicks D M et al (2011) *Suspended sediment yields from New Zealand rivers*; Journal of Hydrology (NZ) 50 (1) 81-142 2011

2.10.3 Shoreline erosion history and recent emergency works

The 1987 Gibb report presents a comprehensive history and interpretation of coastal and flooding issues and is referred to as the main background for this review. In summary, Gibb identified a long-term history of cyclic short-term erosion and accretion with regular intervals of 10, 20 and 30 years since the 1860s. Gibb's review of historical records showed extremely rapid short-term rates of both erosion (up to 54m/yr) and accretion (up to 130m/yr). His review of early newspaper reports referred to erosion troughs migrating the full length of the Hokitika foreshore before dissipating north of Richards Drive.

These events are ongoing, and concerns with the retreating erosion scarp and forecast coincidence of high tides and storm event conditions during 2020 and 2021 led to WCRC's decision to install emergency protection along the unprotected foreshore north of the existing seawall at Stafford Street. This emergency protection extends from Stafford Street to Richards Drive. It has been installed to a basic standard, with the present proposal to improve and formalise the protection over this extent.

2.11 Nearshore Water Quality

Water quality in the nearshore marine environment is influenced by river freshwater inputs and the high energy coastline. Due to continuous wave action and larger swells, dissolved oxygen (DO) concentration is often near or in excess of 100 per cent saturation¹⁶.

Frequent storm events and continual resuspension of sediments due to wave action can result in poor water clarity in nearshore waters.

2.12 Ecology of Beach

The ecology of the beach can be described via the various sections of the coastal environment (e.g. backshore, intertidal beach, subtidal beach). These sections have been modified by human activities such as land clearance, cutting of access tracks and construction of structures (eg groynes) and have also been modified by the natural coastal erosion processes.

2.12.1 Backshore

The backshore is characterised by vegetated dunes, public accessways, grass berms and residential gardens.

The most ecologically significant part of the backshore is the vegetated dunes. Inspection during a site visit carried out in October 2021 found these small dunes are reasonably well vegetated and contain a variety of indigenous and floral exotic species. There does not appear to be any stand of original land cover in the area. The most dominant indigenous species is Harakeke (flax), however other species including tī kouka (cabbage tree) and Coprosma are also found within the site. Of particular note, are scattered clumps of the native Pīngao or golden sand sedge (see **Figure 2-6**) which was found in various areas along the dune and is classified as "At Risk-Declining" under the NZ Threat Classification System Database.

Exotic species including bamboo, marram grass, gorse, blackberry and other grasses are also prevalent along the dune areas.

The fauna of the backshore area has not been surveyed (refer to Section 2.2). However, The Coastal Plan does not note the presence of any specific endangered species (such as lizards).

¹⁶ Cawthron Institute (2011) *Relocation of Westland Milk Products Effluent Discharge: Assessment of Coastal Ecological Effects*; prepared for Westland Milk Products Report No 1962



Figure 2-6 Photo of Pīngao taken during site visit

2.12.2 Intertidal

Results from infaunal investigations carried out by Cawthron (2011)¹⁷, in the beach intertidal zone near the WDC oxidation ponds (approximately 1km to the north of Richards Drive) showed no biota in any of the core samples. Cawthron noted that the beach does not support harvestable shellfish species.

It is expected that a similar absence (or low level of biota) also occurs in the intertidal zone, at the proposed seawall site, due to the similar beach conditions to that experienced near the oxidation ponds.

This depauperate state is not considered surprising given the large volumes of sediment deposition/accretion and rapid changes in beach morphology that occurs along this coastline north from the Hokitika River mouth. Significant fluctuations in beach height can occur over the course of a storm and most shellfish cannot adapt to the constant burial and uncovering that occurs along the beach.

2.12.3 Subtidal

The dynamic nature of the nearshore environment precluded any sampling during the 2011 Cawthron study. Therefore, the ecological characteristics of the nearshore subtidal section can only be inferred, as far as possible, from the nature of the substrate and from very limited studies at other West Coast subtidal sites.

A benchmark survey of benthic infauna at water depths >13m was carried out by McKnight (1969)¹⁸. Main species found included bivalves such as *Scalpomactra scalpellum*, *Tellinella huttoni* and *Nucula nitidula*.

¹⁷ IBID at 8

¹⁸ McKnight DG (1969) *Infaunal benthic communities of the New Zealand continental shelf*; New Zealand Journal of Marine and Freshwater Research 3: 409-44

While it is possible that the nearshore subtidal area along the Hokitika Beach supports some benthic infauna, the dynamic nature of the seabed is likely to limit the development of significant populations.

2.12.4 Surface waterways

As discussed in Section 2.6, a small unnamed stream discharges to the beach outside the site, about 100m to the north of Richards Drive. The stream appears to be fed by runoff from part of the terrace behind the township and some stormwater runoff within the township.

The ecological values of the stream are not expected to be high given its short length and the modified urban nature of the catchment. The creek is regularly blocked at the seaward end by sand and driftwood.

2.12.5 Blue Penguin/Kororā

The foreshore and backshore area of Hokitika Beach is a known Blue Penguin/Kororā habitat for refuge as well as a breeding site. The Blue Penguin/Kororā is classified as “At Risk-Declining” under the NZ Threat Classification System Database.

The West Coast Penguin Trust (WCPT) was commissioned by WCRC to prepare a report and complete a survey of the project area¹⁹. A survey of the signs of the presence of penguins, including access points, was carried out by the WCPT on 3 May 2021. Key points from the survey/report include:

- Along the length of the project site, there is evidence that Blue Penguin/Kororā continue to access the foreshore habitat.
- Along most of the road reserve (and in many abutting residential gardens), there is suitable vegetation to provide refuge and breeding habitat for Blue Penguin/Kororā.
- Blue Penguin/Kororā on the West Coast breed from June to January.
- The post breeding moult can occur through to March. During this entire period, Blue Penguin/Kororā are often ashore, and are travelling between nests and the sea regularly
- Between April – May, the penguins are ashore much less, but still come ashore to rest between foraging trips
- In recent years coastal erosion has steepened the dune bank and has reduced Blue Penguin/Kororā accessibility to the foreshore habitat.

The WCPT noted that the current wall along Beach Street does not provide an appropriate refuge for Blue Penguin/Kororā or allow for safe travel of penguins due to the size and nature of the rocks that form this seawall. The wave action along this wall is also considered unsuitable for internal refuge for the Blue Penguin/Kororā. The Blue Penguin/Kororā is not known to currently breed within the wall but, at the existing wall's northern end, where the erosion slope is shallower, they are known to go around the wall into backshore habitat.

During the Beca site visit in October 2021, thick stands of scrub and larger vegetation along the backshore were noted that could be used by Blue Penguin/Kororā for nesting and breeding.

The WCPT provided a series of recommendations to be applied where rock protection is being considered to help manage any effects on penguins from the construction and operation of the seawall. Where practicable, these recommendations will be incorporated into design and construction considerations.

¹⁹West Coast Penguin Trust (2021) *Hokitika Beach Blue Penguin survey and commentary on proposed seawall*

2.12.6 Other seabirds

The Hokitika River mouth and nearby beaches provide roosting and feeding areas for large numbers of gulls and terns. Other species including petrels, shags, shearwaters and gannets occur largely in the adjacent open sea environment.

2.12.7 New Zealand fur seal/Kekeno

The New Zealand fur seal/Kekeno (*Arctocephalus forsteri*) breeds around New Zealand and one of the largest populations occurs along the South Island west coast. Neale (2007)²⁰ noted an estimated population of 12,500 mature animals.

Seals prefer to haul out on rocky shores but are occasionally seen along the Hokitika beach. The nearest rookery to the site is at Elizabeth Point (Greymouth).

Measures will be taken to minimize disturbance to fur seals/Kekeno during seawall construction, including surveillance and distance separation when possible.

2.13 Amenity and Recreational Use

Hokitika beach has high amenity and recreational value. The location of the site in close proximity to the Hokitika town centre and along the residential frontage of the town, means it is a popular spot for locals to visit and access. Activities undertaken along the beach include walking, swimming, fishing, horse-riding, 4-wheeler motorbiking, surfing and fossicking.

The beach is also scheduled as a swimming area and is managed for contact recreation water quality under the West Coast Regional Land and Water Plan. The majority of the properties along Revell Street also have access directly onto the foreshore area with some having outdoor entertaining areas that encroach beyond their boundaries onto the foreshore area.

In particular, the site is identified as a regionally important Coastal Recreation Area under Schedule 3F of the Proposed West Coast Regional Coastal Plan for swimming, walking, and fishing, and under Schedule 3 of the operative WCRCP for swimming and walking.

The residents along Revell Street also have some views over the beach to the Tasman Sea. Along with a number of informal accessways from beachside properties onto the beach, there are several public accessways to the beach that cross the site (red star) as shown on Error! Reference source not found.-7.

²⁰ Neale DM (2007) *The West Coast Marine and Coastal Environment: An Initial Report for the West Coast Marine Protection Forum*; 204p



Figure 2-7 Public accessways to Hokitika Beach within the site

2.14 Cultural Values

The Hokitika Beach is within the rohe of Te Rūnanga o Ngāti Waewae. The takiwā is centred on Arahura and reaches from the Poerua River to near the top of the South Island at Kahurangi Point and as far east as the main divide. Te Rūnanga o Ngāti Waewae have a shared interest with Te Rūnanga o Makaawhio in the area situated between the north bank of the Poerua River and the south bank of the Hokitika River.

Under Schedule 7C of the West Coast Regional Land and Water Plan, the following cultural values are associated with the Hokitika River- Waahi Tapu, Waahi Taonga, Mahinga Kai, Kohoanga, Navigation Routes, Cultural Materials, Waipuna, Traditional Campsites. While the proposal is associated with the Hokitika Beach and not the river, it is likely that many of the same values are held with the beach.

The Hokitika Beach is not a statutory acknowledgement area.

Ngāti Waewae has provided a formal written response on the proposal (see **Appendix B**) and this is discussed in Sections 5.3.14 and 6.2.6.

A Cultural Impact Assessment (CIA) is currently being undertaken by Ngāti Waewae and will be provided to WCRC and WDC on completion.

3 Description of Proposed Activities

3.1 Overview

The WCRC is proposing to construct an approximately 1100m long extension between Stafford Street and Richards Drive of the existing Hokitika seawall. This project is part of a wider package of works called the “Hokitika and Kaniere Resilience Project” that have received funding from Central Government’s “shovel ready” fund. The seawall extension is part of this project which also includes construction of a river flood protection scheme to provide for greater resilience and protection between Kaniere and Sunset Point.

To protect a portion of the township between Hokitika River mouth and Beach Street, the existing 1000m long seawall was constructed in 2013.

Areas of the Hokitika township are under threat from sea level rise and erosion events and the construction of a seawall along the entire beach frontage will provide interim protection to low lying properties presently between 25 and 40m from the upper beach erosion scarp.

Rock was placed along the Revell Street foreshore in 2019-21 as emergency works to provide interim protection. This rock material will be incorporated into the proposed seawall extension where practicable.

3.2 Seawall Extension Design

3.2.1 Overview

The principal design standards, guidelines and references are set out in Beca (2021)²¹, a copy of which is attached as **Appendix C**. As agreed with the WCRC, the design life for the wall is 10-15 years. Sea level rise allowances for the design life have been assessed using the MfE national guidance²².

A 50-year design life and a 1% AEP^[2] design event is usually adopted for rock walls (BS 6349 – Maritime Works; 2000; CIRIA, 2007).^[3] The 1% AEP design event has a 39% probability of occurrence in a 50-year design life. For a 15-year design life, the comparable event is the 3.25% AEP (30-year ARI). A more conservative approach would be to adopt a 2% AEP event (50-year ARI and 26% probability of occurrence during the period). The corresponding design conditions are discussed in the Basis of Design.

The seawall extension is to be located on the open coast and while initially constructed to be set within and covered by the dunes, it is likely to become exposed in the future with beach changes and rising sea level, but would only be partially submerged during the upper tidal cycle. Wave runup extends to the current seawall under present beach profile conditions (see photo in **Figure 3-1**).

Currents are not considered to be a dominant load for the wall as it is located on the upper beach/backshore. Consistent with existing practice on the West Coast and given the limited design life and more modest tsunami risk exposure, the revetment will not be designed for tsunami conditions. If such an event of significant magnitude occurred, it is expected the structure would need to be repaired. Similarly, and consistent with normal practice for similar structures (e.g. existing Hokitika seawall), the extension will not be

²¹ Beca Ltd (2021) *Hokitika Seawall Extension – Basis of Design Report*

²² MfE (2017) *Coastal hazards and climate change*

^[2] Average Exceedance Probability is the probability of an event of a given magnitude being reached or exceeded in any one year

^[3] CIRIA (2007) *The Rock Manual The use of rock in hydraulic engineering (2nd Ed)* C683 CIRIA, London

designed to resist seismic loads. If an earthquake occurred, it is expected the structure would experience a level of damage and may need to be repaired.



Figure 3-1 Wave runup (illustrated by driftwood) up to existing seawall

3.2.2 Seawall section design

The design incorporates two cross-sections with differing fixed toe depths.

- The shallower section extends from Stafford Street (CH 0) to approximately CH 850
- The deeper section extends from CH 850 to Richards Drive.

Between these sections there will be a short transition zone to accommodate the change in foundation level. The two sections are designed to embed the upper surface of the toe to at least 0.5m below the existing beach profile. The crest width and height, slope angle and toe lengths are all constant. The only changes between the sections are toe level and the length of slope from the crest position.

The backshore consists of loose to a medium dense sand material which is considered vulnerable to scour. The toe foundation level of the structure will be at least 3.0m (equal to the thickness of structure 2.5m and 0.5m embedment depth) below the existing beach level at the toe position. The underlayer and geotextile will extend under the primary armour, as advised in CIRIA (2007).

The two design sections are illustrated in **Figures 3-2** and **3-3**. Further wall cross sections, as well as a longitudinal plan, are provided in the appended Basis of Design Report.

The seawall extension will consist of two layers – an outer rock armour ($D_{n50}=0.83\text{m}$) and an underlayer ($D_{n50}=0.42\text{m}$). A heavy duty, non-woven fabric such as Terratex 750K geotextile, or an approved equivalent, will be laid below the underlayer. The sea facing wall will be constructed at a slope of 1V:2H to provide stability, with a smooth transition to the existing seawall which is a flatter slope. The crest back slope will be

1V:1.5H and the toe slope will be 1V:1H. The crest level and width were determined by calculations of the height of wave run-up and the predicted amount of overtopping expected under design wave and projected sea level rise conditions.

The wall extension will be integrated at the southern end with the existing seawall by overlapping for a short length. The integrity of the existing wall will not be compromised by the new work. The wall will also be tied into the existing groyne at the northern (Richards Drive) end.

3.2.3 Wall rock material and installation

The seawall extension has been designed to use the same density of rock as that from WCRC’s Camelback Quarry which was used for the construction of the existing seawall in 2013. While current rock tests are not available, a survey in 2000²³ describes the rocks as “excellent quality armourstone”. WCRC²⁴ estimates that approximately 16,000 tonnes of rock has been used for the temporary protection work between Stafford Street and Richards Drive. It is anticipated that at least 10,000 tonnes from this insitu material could be incorporated in the proposed design, and the balance used for temporary protection of the works and groyne connections.

It is estimated that the total volume of rock required for the construction of the seawall extension, including the underlayer will be around 48,000m³. This includes the seawall rock across the access ways.

Excavation and disturbance volumes will be greater than this amount due to the requirement to maintain cut batters to construct and backfill the seawall and keep toe depths constant.

The excavated beach material will be replaced on completion of construction work with no natural material removed from the beach. While sand replaced to the current beach profiles will bury the wall in most places, some sections will remain exposed as indicated on the drawings.

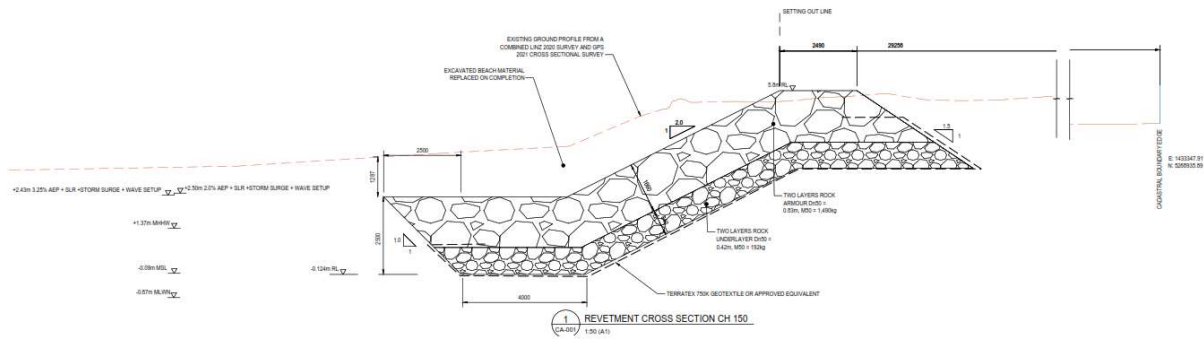


Figure 3-2 Cross section of seawall- higher toe height

²³ Temple (2000) *Rock and Aggregate Export Potential Survey*

²⁴ Pers comm Brendon Russ, WCRC

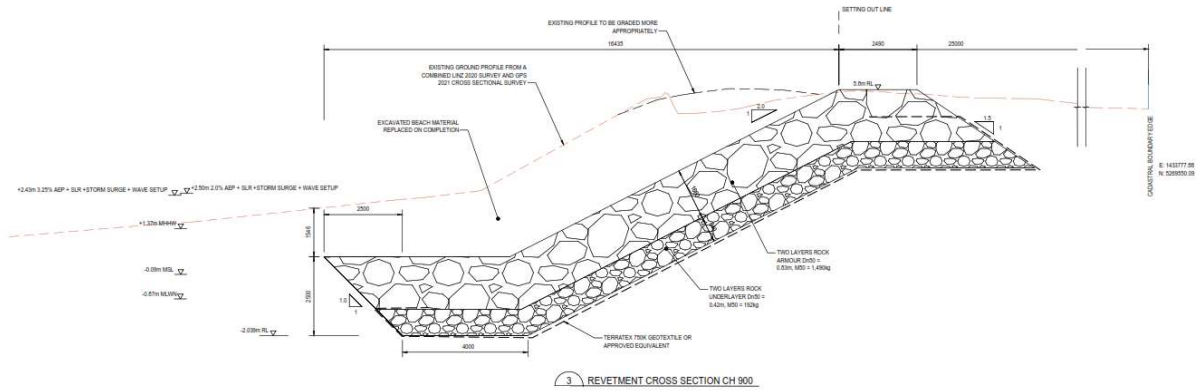


Figure 3-3 Cross section of seawall – lower toe height

The existing seawall to the south was constructed to similar levels as the proposed extension with the toe installed below groundwater level. The temporary excavation was protected by constructing a temporary bund of sand as well as the stockpile of rock supplied to the beach from the beachside (see **Figure 3-4**).

Placement of the toe and filter fabric was achieved using this method without the need for dewatering. Dewatering is not expected to be necessary for the installation of the seawall extension which should be able to be achieved relatively quickly and in short lengths.



Figure 3-4 Installation of existing seawall showing temporary sand bund and rock stockpile

3.3 Location of Seawall

As far as practicable, the seawall alignment has been designed to be placed within the existing dune area landward of the present dune scarp. This location shown reduces encroachment on to the upper beach and limits the earthworks associated with construction. The wall crest will be set inshore of and generally follow the current erosion scarp alignment that lies immediately landward of the beach between Stafford Street and Richards Drive. The intention is to allow retention of sand cover to the seaward face of the seawall with the potential for the establishment of dune vegetation. This sand may be lost over time with coastal exposure and sea level rise with gradual exposure of the rock protection structure.

The seaward crest of the seawall will be located generally between 23 m and 25 m from the seaward cadastral boundaries (west) of the Revell Street properties, although this distance is greater (up to 40 m) at the southern end of the wall where it needs to commence at the end of the existing southern seawall. There are several existing buildings and gardens and other informal development on the legal road which may be directly affected by the construction and location of the wall. The applicant will consult with affected property owners to manage this situation.

The line of Mean High Water Springs (MHWS) provides the delineation of the Coastal Marine Area (CMA) for the purposes of assessment of activities under regional plans. Activities occurring seaward of MHWS will require assessment under the Operative and Proposed West Coast Regional Coastal Plans.

The seawall will be generally located landward of MHWS. However, a small portion of the wall footprint may encroach on the line of MHWS at the southern and northern ends where transition is required to tie into existing structures (as shown on **Figure 3-5**)²⁵. The difference between the lines shown on the plan emphasises the dynamic nature of the beach environment along this coastline where beach contours (and thus the MHWS level position) can change significantly with storm events.

On this basis, the rules of both the Operative and Proposed West Coast Regional Coastal Plans will apply.

²⁵ The MHWS lines have been derived from LINZ (11/2021) Standard Port tide levels for Westport. The 2020 MHWS line was derived from a 2020 LIDAR DEM provided by WCRC. The 2021 MHWS line was derived from Civil 3D (TIN surface of the October 2021 profile survey every 50m).



Figure 3-5 Proposed seawall extension footprint relative to MHWS

3.4 Construction

3.4.1 Construction Environmental Management Plan (CEMP)

A Contractors Construction Environmental Management Plan (CEMP) will be submitted to WDC and WCRC for approval prior to the works commencing. This is proposed as a condition of consent and is a standard and practical way of managing construction activities and impacts. The CEMP will include matters such as a construction methodology, timing of the works, erosion and sediment control, health and safety, public access, traffic management and restoration/planting. The programming of work on a day-to-day basis will largely be controlled by the tides and possible adverse weather. The intention is to make the site safe at the end of each working session, with sediment and erosion measures in place to protect the workforce from coastal conditions.

3.4.2 Indicative construction sequence

The indicative overall seawall construction sequence which will be applied over short length sections to minimise the potential for exposure to storm events follows:

- Remove existing vegetation and store for re-planting
- Remove existing rocks and set aside for sorting for re-use
- Excavate embankment material and store onsite
- Place geotextile, underlayer and rock armour
- At access points, fill voids in the rock armour crest with smaller size rocks
- Place excavated material over the revetment reinstating the existing dune profile, excess material to be disposed of.

- Seeding/planting of the bank and disturbed dune, reusing removed vegetation where practicable.

The work will be carried out using heavy machinery including excavators and bulldozers.

3.5 Maintenance

The proposed design life of the seawall extension is 10 -15 years. The materials from the nominated source will be selected to be durable for the design life with normal routine maintenance. This will involve monitoring and potentially repairs to the rock wall. The outer wall face is expected to be impacted by storm surge and waves during severe storms. Driftwood debris will be deposited against the face of the wall and may require removal of the build-up from access areas. Wave reflection from the toe of the wall is expected to reduce beach levels adjacent to the wall but this is likely to be evenly distributed and to recover naturally following storm events.

The wall will be designed for the wave actions that are expected to occur, without damage to the rock wall under the design storm event. Under very severe storms, damage could occur to the rock wall which may require repair. Normal maintenance activities can be carried out as a permitted activity under the Regional Coastal Plan. Note that sand cover is expected to be lost from the wall under these conditions and can be left to rebuild through wave and wind action or assisted by pushing up sand from the beach under suitable beach profile conditions.

It is recommended that visual inspections be carried it as follows:

- Annually (after the winter season).
- After a significant storm event.

Photographs with reference to locations should be taken to allow for comparison of the rock shape, displacement of rocks, condition of the bank face and any other noticeable changes.

Replacement of sand and gravel at the public access ramps may be required after a significant storm event.

Regular maintenance of the seeding/planting will be required of the exposed bank slope/ground surface until grass/plants have established. As noted above these components will remain vulnerable to further erosion events.

3.6 Amenity Improvements

The crest of the seawall and the potential to establish a walkway/path immediately inland of it will provide a level area for public access and amenity viewing of the beach. This will result in improved public access along this part of the foreshore compared to the existing situation.

A Vegetation Planting Plan will be developed during detailed design that will provide the basis for relocation/planting of indigenous plants (such as Pīngao).

4 Reason for Application

4.1 Overview

The status of the proposed activities under the Westland District Plan, the West Coast Regional Coastal Plans 2000 and 2016 (proposed) and the West Coast Regional Land and Water Plan are outlined below:

4.2 Westland District Plan

Figure 4-1, which is part of Planning Map 3 of the WDP, shows the zoning of the site, in which the site is zoned Coastal Erosion Zone. The general extent and alignment of the seawall extension is shown by the purple line

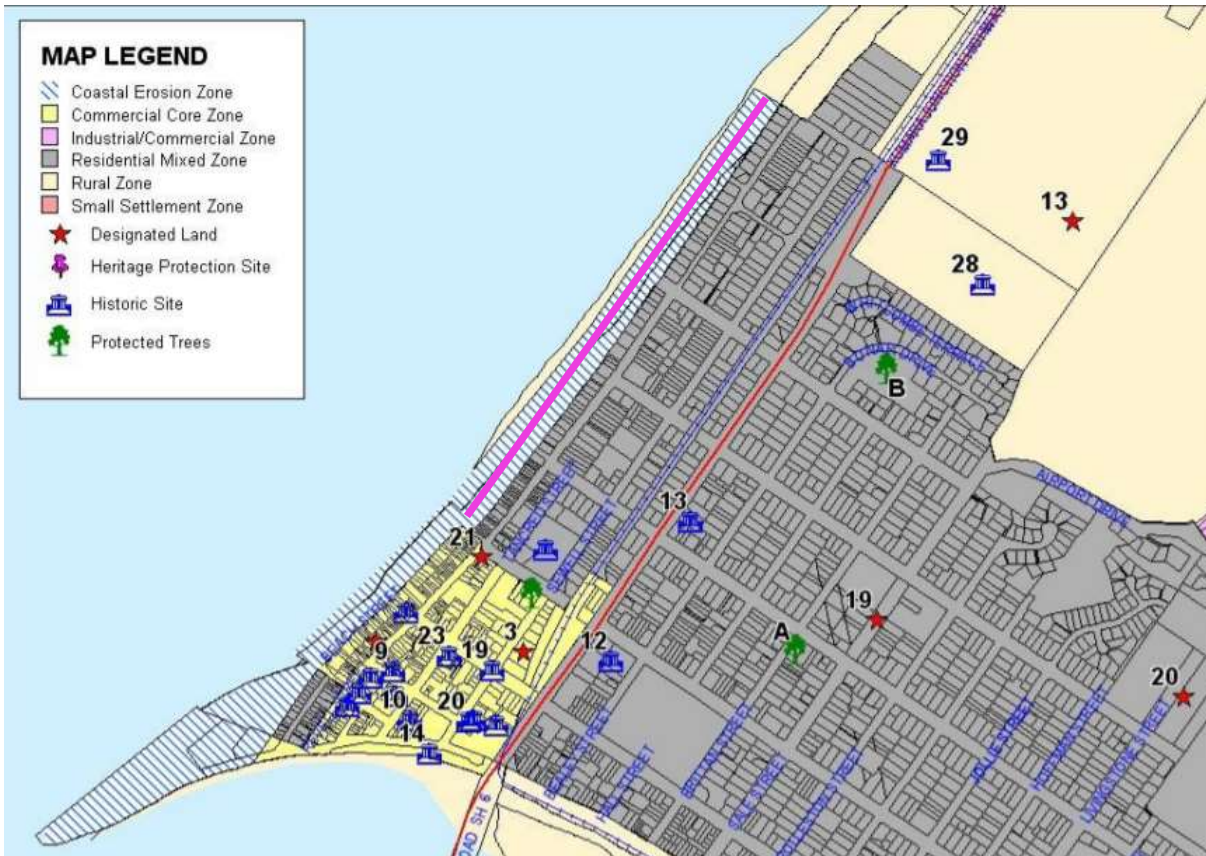


Figure 4-1 WDP Zoning

Section 5.2.4 of the WDP discusses the additional control of natural coastal processes in the “Coastal Protection Zone.”²⁶ The WDP states that the entire foreshore of Hokitika is subject to cyclical threat from natural coastal processes that can cause beach erosion and inundation of coastal lands. Further development within the area shown on the planning maps is restricted to avoid or reduce the potential danger, damage or nuisance which could be caused by the processes.

²⁶ Section 5.2.4 refers to the Coastal *Protection* Zone rather than the Coastal *Erosion* Zone. However, it appears that the planning map and section 5.2.4 are referring to the same zone. This AEE uses “Coastal Protection Zone” when referring to the zone.

The following activities are permitted within the Coastal Protection Zone:

- Protective planting for sand drift control
- Passive recreation
- Buildings or structures accessory to the above uses provided they are capable of relocation and subject to compliance with performance standards for permitted activities.

The proposed activity is not one of the specified permitted activities.

Section 5.2.4 goes onto state that coastal protection works are a restricted discretionary activity and therefore the construction of the seawall is a **restricted discretionary activity**.

Coastal Protection Works are defined in the WDP to mean *the structure and/or programmes (excluding protective planting) designed to protect and rebuild the coastline and/or enhance coastal amenity and use.*

It is considered the proposed seawall meets this definition.

The Council's discretion is limited to the consideration of:

- *the effects of the work on the adjacent shoreline and neighbouring properties.*

Any application is subject to the submission to Council of a report, prepared by a qualified coastal engineer that includes the following:

- *an assessment of the general stability of the site*
- *a detailed engineering design (including drawings)*
- *a recommendation of an appropriate protective measure, including abandonment or relocation*
- *the effects of the recommended protective measure on the adjacent shoreline and neighbouring properties.*

4.3 West Coast Regional Coastal Plan 2000

4.3.1 Overview

The operative WCRCP 2000 considers the use, development and protection of the coastal marine area (CMA) of the West Coast and issues associated with that use, development and protection. It provides objectives, policies, rules and other methods of implementation in order to address those issues. The rules of the Plan determine the status of any particular activity and determine whether a consent is required before that activity can be carried out.

Based on the best available information, it is likely that parts of the wall will encroach into the CMA. Therefore, to cover any uncertainties, it is considered that the WCRCP is relevant for this application as works are proposed to be undertaken in the CMA.

Below are the relevant rules along with an assessment of the compliance of the proposal with each rule to determine the relevant resource consent that are required.

4.3.2 7.5.1 Occupation of the coastal marine area:

Rule 7.5.1.1 Any activity or event which restricts or excludes public access from land of the Crown within the foreshore is a permitted activity provided:

7.5.1.1		Comment
a.	The restriction or exclusion is for a period not exceeding three days in any 6-month period; and	Does not comply: Construction will likely be undertaken in short lengths but may take longer than 3 days in specific areas.
b.	The restriction or exclusion is for a public activity or event; and	Does not comply: The activity is to construct a seawall.
c.	In the case of exclusion of access, the exclusion is limited to an area of 2 hectares or less; and	Complies
d.	The disturbance of the foreshore is confined within the perimeter of the area of occupation and when completed the foreshore or seabed is smoothed flat with no visible depressions greater than 50cm in depth; and the area is left in a tidy state; and	Complies
e.	The activity or event does not occur in a coastal protection area; and	Complies: The site is not in a coastal protection area
f.	There is no disturbance to salt marsh vegetation; and	Complies: There is no salt marsh vegetation present
g.	The activity or event does not include the use of vehicles other than for:	Does not comply: Vehicles will be required within the CMA for the construction of the seawall
i.	The purposes of search and rescue operations; or	
ii.	The launching of vessels; or	
iii.	Other emergency situations	
h.	Public notice of the activity or event stating the time and area of restriction or occupation is first given in a local newspaper at least seven days beforehand.	Complies: This will be carried out as a consent condition

7.5.1.5 Except as provided for by 7.5.1.1 - 7.5.1.4 any activity involving occupation of land of the Crown within the coastal marine area is a discretionary activity.

Given, that the seawall extension is not provided for by Rule 7.5.1.1 consent is required for occupation of the coastal marine area as a **discretionary activity**.

4.3.3 8.5.1 Erection or placement of a structure

Rule 8.5.1.7: Any activity involving the erection or placement of a structure or structures in the coastal marine area is a discretionary activity if:

8.5.1.7		Comment
a.	It would impound or effectively contain 4 hectares or more of the coastal marine area, excluding submarine or sub-aqueous cable, or floating or open piled structures which can be demonstrated to not impede water flows; or	Complies Seawall will not impound more than 4ha of the CMA
b.	It is solid (or presents a significant barrier to water or sediment movement) and when established on the foreshore or seabed would extend 300 metres or more in length more or less parallel to the line of mean high water springs (including separate	Complies Most of the seawall extension will be located outside of the CMA and will not occur for

8.5.1.7	Comment
structures which total 300 metres or more contiguous), excluding submarine or sub-aqueous cable, or floating or open piled structures which can be demonstrated not to have adverse effects; or	more than 300m more or less parallel to MHWS.
c. It is solid (or presents a significant barrier to water or sediment movement), and it is sited obliquely or perpendicular in horizontal projection to the line of mean high water springs, and is in horizontal projection 100 metres or more in length), excluding submarine or sub-aqueous cable; or	Complies The seawall will not extend obliquely or perpendicular to MHWS
d. It is for the storage or containment of any petroleum, petroleum products, or contaminants, in quantities greater than 50,000 litres.	Not applicable

Given, that the seawall extension is consistent with the standards in Rule 8.5.1.7, the seawall is a **discretionary activity**.

4.4 Proposed West Coast Regional Coastal Plan 2016

4.4.1 Overview

The PWCRCP has not yet been made operative. It was notified in 2016 and provides a framework to promote the integrated and sustainable management of the West Coast's coastal marine area. This plan is relevant as some works are proposed to be undertaken in the CMA.

Based on the best available information, it appears part of the wall may encroach into the CMA. Therefore, to cover any uncertainties, it is considered that the PWCRCP is relevant for this application as works are proposed to be undertaken in the CMA.

As per section 86A-86G of the RMA, the objectives, policies, and rules in PWCRP are now legally effective as the relevant rules relate to water which takes immediate legal effect under s86B (3).

Below are the relevant rules along with an assessment of the compliance of the proposal with each rule to determine if resource consent is required.

4.4.2 12.1. Occupation of Space in the CMA

Rule 1 Temporary occupation of the coastal marine area

Any event which restricts or excludes public access within the foreshore, including military exercises, is a permitted activity provided that all of the following conditions are met:

12.1.1 Rule 1	
a. The restriction or exclusion is for a period not exceeding three days in any 6-month period	Does not comply: While construction will likely be sequenced to minimise restriction of public access to the beach, restrictions at any one access point may extend longer than 3 days.
b. The disturbance of the foreshore is confined within the perimeter of the area of occupation, and when completed the foreshore or seabed is smoothed flat with no visible depressions greater than 0.5 metres in depth; and the area is left in a tidy state;	Complies: The temporary disturbance of the foreshore will be minimised as far as practicable to construct a seawall. However, it may temporarily extend further

12.1.1 Rule 1		
		into the beach. The area will be reinstated by contractor and tidal action and waves will return beach to original profile after construction.
c.	Where practical, existing access shall be used;	Complies
d.	Public notice of the activity or event stating the time and area of restriction or occupation is given in a local newspaper at least seven days beforehand;	Complies- a consent condition to this effect is proposed
e.	The activity must not obstruct other persons operating in accordance with an occupation consent.	Complies

As the temporary occupation of the CMA during construction does not meet Condition a of Rule 1 resource consent as a **discretionary activity** is required under Rule 3 (see below).

Rule 2 Occupation by other permitted activities

The occupation of the coastal marine area by any structure which is a permitted activity under Rules 4-10, or by any disturbance activity permitted under Rules 14-21, is a permitted activity.

Rule 3 Other occupation activities

Unless permitted by Rules 1 or 2, any activity occupying space within the coastal marine area is a discretionary activity.

The proposed seawall extension is not a permitted structure under Rules 4-10 and accordingly the occupation of the CMA by the finished seawall is a **discretionary activity** under Rule 3.

4.4.3 12.2 Structures

Rule 13 Discretionary Structures

Unless permitted by Rules 4-10, or controlled by Rules 11 and 12, or prohibited by Rule 14, any erection, placement, maintenance, alteration, replacement, or reconstruction of a structure in the coastal marine area is a **discretionary activity**.

The erection of the proposed seawall extension is not a permitted structure under Rules 4-10, or controlled by Rules 11 and 12, or prohibited by Rule 14 and accordingly the seawall is a **discretionary activity** under Rule 13.

4.4.4 12.3 Disturbance Activities

Rule 25 Other disturbance activities

Unless permitted by Rules 15-22, or controlled by Rule 23, or the activity is a restricted discretionary activity under Rule 24, any disturbance, extraction, removal of natural material, reclamation, or deposition in the coastal marine area is a discretionary activity.

The disturbance of the coastal marine area for the construction of the proposed seawall extension is not a permitted activity under Rules 15-22, or controlled by Rule 23, or the activity is a restricted discretionary activity under Rule 24 and accordingly the disturbance is a **discretionary activity** under Rule 25.

4.5 West Coastal Regional Land and Water Plan

The WCRLWP provides a framework for the integrated and sustainable management of the West Coast's natural and physical resources as they apply in the context of land and water. These resources include the region's lakes, rivers, groundwater, coastal environment, wetlands, geothermal water, and land including river and lake beds.

The WCRLWP does not cover the CMA. Unless otherwise stated, all objectives, policies and rules in the WCRLWP apply to the 'Coastal Environment' landward of the line of Mean High Water Springs.

4.5.1 Rule 3 Earthworks in non-erosion prone areas and outside riparian margins

Earthworks is permitted on areas with less than 12° slope subject to

- (a) Do not exceed an annual volume of 5000m³ per land holding or per hectare, whichever is the smaller.
- (f) Is not within 50m of the coastal marine area on an open coast

The annual volume of earthworks is estimated to exceed 5000m³ within the site and will be located within 50m of the open coast.

4.5.2 Rule 16. Discretionary activities outside of a wetland identified in Schedule 1 or 2

Outside of a wetland identified in Schedule 1 or 2, any: (i) Vegetation disturbance that contravenes Rules 8 or 9; (ii) Earthworks that contravenes Rules 2, 3, 4, 5, 6 or 12; or (iii) Grazing within, and livestock access to, riparian margins that contravenes Rule 11; is a discretionary activity.

The earthworks required for the extension of the seawall contravenes Rule 3 and accordingly resource consent is required under Rule 16 as a **discretionary activity**.

4.6 National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health 2011

The Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011 (NESCS) applies to land as per clause 5(7):

"Land covered:

(7) *The piece of land is a piece of land that is described by 1 of the following:*

- a) an activity or industry described in the HAIL is being undertaken on it;*
- b) an activity or industry described in the HAIL has been undertaken on it;*
- c) it is more likely than not that an activity or industry described in the HAIL is being or has been undertaken on it."*

The NESCS applies to certain activities taking place on a piece of land including sampling soil, soil disturbance, land use change, subdivision, all of which have the potential to be triggering activities should redevelopment of the site occur.

HAIL 'Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment' is considered to meet the 'more likely than not' threshold related to the potential deterioration of ACM and / or lead paint and / or treated timber from historical building structures.

The PSI notes that the proposed works are likely to intercept and include soil disturbance within the HAIL areas. As the HAIL areas are small (footprint of a shed/ garage) it is likely that the permitted activity criteria

cannot be met as the entire HAIL area will be disturbed. Given it appears that the permitted criteria may not be able to be met a resource consent under Regulation 11 of the NESCS as a **discretionary activity** is required given a Detailed Site Investigation (DSI) has not been undertaken.

4.7 Overall Consent Status

The application for consent under the Westland District Plan is a restricted discretionary activity under Sections 104 and 104B of the RMA.

The application for consents under the West Coast Regional Coastal Plan Coastal Plan, the Proposed West Coast Regional Coastal Plan Coastal Plan, the West Coast Land and Water Plan and the NESCS are considered as a discretionary activity under Sections 104 and 104C of the RMA.

Section 104(1) states that, in considering applications, the consent authority, subject to Part 2 must have regard to:

- Any actual and potential effects on the environment of allowing the activity; and
- Any relevant provisions of:
 - A national environmental standard:
 - Other regulations:
 - A national policy statement:
 - A New Zealand coastal policy statement:
 - A regional policy statement or proposed regional policy statement:
 - A plan or proposed plan; and
- Any other matter the consent authority considers relevant and reasonably necessary to determine the application.

5 Assessment of Environment Effects

5.1 Overview

In accordance with section 104(1)(a) of the RMA the Consent Authority must, have regard to any actual and potential effects on the environment of allowing the activity.

In the RMA, unless the context otherwise requires, the term “effect” includes—

- (a) any positive or adverse effect; and*
- (b) any temporary or permanent effect; and*
- (c) any past, present, or future effect; and*
- (d) any cumulative effect which arises over time or in combination with other effects—
regardless of the scale, intensity, duration, or frequency of the effect, and also includes—*
- (e) any potential effect of high probability; and*
- (f) any potential effect of low probability which has a high potential impact.*

The following assessment of effects associated with the construction and operation of the seawall extension has been prepared on the basis of the matters set out in the Fourth Schedule to the RMA. The assessment is based on the anticipated environmental effects of the seawall over the proposed 15-year term of the consent.

5.2 Positive Effects

The proposed seawall will result in positive effects to the surrounding landward environment and for residents, in the short to medium term (up to 15 years). The seawall will primarily provide protection for residents within Hokitika from erosion along Hokitika beach. If the seawall is not built it is likely that the beach and particularly residents along Revell Street will experience further erosion and inundation from the sea, particularly with rising sea levels due to climate change, during this period. Protection of these areas will reduce costs associated with remediation following inundation events, as well as reducing the need for emergency seawall works which are currently being undertaken.

This project is also part of the “Hokitika and Kaniere Resilience Project” that has received funding from Central Government’s “shovel ready” fund. This indicates the positive aspect of the project and the benefits it will bring to the community.

Importantly, the proposed seawall design life and term of consent will provide an impetus for the development of a longer-term climate change adaptation strategy for Hokitika. The proposed 15-year consent term for the operation of the seawall extension will allow protection of property in the shorter term, while facilitating the planning and implementation of an adaptive management strategy. As sea levels are expected to continue to rise, hard structures such as seawalls can provide reliable protection in the short term but are unlikely to continue to be effective in the long term.

In addition, legislation is anticipated in the near future from Central Government to help guide climate change adaptation and managed retreat in New Zealand. A 15-year term for the seawall operation will allow sufficient time for the adaption strategy to be developed within this guidance framework. The strategy will need to consider the range of potential adaptation options including Do Nothing, Hold the Line, Managed Retreat, etc over short, medium and long-term time scales and including consideration of how the seawalls would be addressed for each option.

5.3 Construction Effects

5.3.1 Beach sand and gravel ecology

During construction of the wall, there will be some disturbance of the gravel/sand beach due to excavations and the general passage of heavy machinery. The beach is of low ecological diversity and any biota that is present in the sand/gravel is likely to be tolerant of disturbance. While none are specifically identified, any species present in the affected area of the beach are likely to be well represented in the adjacent gravel/sand habitat, which will facilitate the re-establishment of any communities, postconstruction.

The occupation of land by the proposed wall within the CMA is unlikely to result in a significant loss of coastal biodiversity. While pebble/gravel field habitat in subtidal or intertidal areas can be important for growth of flora and fauna that require more permanent sediment structures (e.g macroalgae, chitons, mussels and barnacles), these species do not survive in the upper mid-littoral zone, where the wall will be located, and where tidal immersion may only occur for short periods of the day. Typically, coastal structures can provide alternative habitat for marine flora and fauna and can act as replacement habitats to be colonised. New habitat is not expected to be created by the new wall due to the lack of intertidal hard rock habitats in the adjacent area that may act as source populations.

There are no known mahinga kai sites within the vicinity of the site.

Therefore, the effects on beach ecology during construction of the seawall extension will be relatively localised, intermittent and temporary and will impact on non-sensitive habitat (e.g the gravel/sand beach). These adverse effects will be minor or less.

5.3.2 Blue Penguin/Kororā

According to the West Coast Penguin Trust (WCPT), the foreshore and backshore area of Hokitika Beach is a Blue Penguin/Kororā habitat for refuge as well as a breeding site. The Blue Penguin/Kororā (*Eudyptula minor*) is classified as “At Risk-Declining” under the NZ Threat Classification System Database.

From the results of a survey of the site on 3 May 2012 (see summary in Section 2.11.5), the WCPT noted that penguins access the beach and adjacent road reserve and gardens for refuge and breeding for much of the year (June to January). However, they are ashore much less frequently between March and May. In recent years coastal erosion has reduced accessibility to habitat.

The WCPT noted that the current wall along Beach Street does not provide an appropriate refuge for Blue Penguin/Kororā or allow for safe travel of penguins due to the size and nature of the rocks that form this seawall. The wave action along this wall is also considered unsuitable for internal refuge for the Blue Penguin/Kororā. The Blue Penguin/Kororā is not known to currently breed within the wall but, at the existing wall's northern end, where the erosion slope is shallower, they are known to go around the wall into backshore habitat.

In respect of the proposed seawall, the excavated beach material will be replaced to the existing ground profile on completion of construction work. The sand will bury the greater extent of the wall, although some sections will remain partially exposed. The general profiles of the seawall (see **Figures 3-1** and **3-2**) and regular buried sections along the wall will promote penguin access to the backshore habitat. However, over time storm activity will remove sand build-up from the front of the wall. Post storm recovery will allow sand on the upper beach to rebuild against the exposed face of the wall with favourable wave and wind conditions before the next significant event. This could be assisted mechanically by pushing sand from the beach up the wall face. Ongoing monitoring of the degree and location of exposed sections of rock seawall will allow identification of areas and extents that may require the installation of accessways for penguins to traverse the seawall.

The proposed public access ramps will require monitoring and maintenance but will also facilitate penguin access over the seawall. Similar access ramps can be considered for penguin traffic when it becomes clear where the rock structure will remain exposed with sand cover loss, and where penguin access is required.

Some voids within the rocks placed on the wall (where exposed) may provide additional habitat and refuge for penguins once constructed.

The WCPT has made some recommendations regarding the management of penguins during construction to minimise adverse effects. Measures will be taken to minimize disturbance to Blue Penguin/Kororā during seawall construction and these will be formalised in consent conditions and in the CEMP. Based on the protocol prepared by the WCPT, the following mitigation is proposed:

- While construction could take up to 6 months, the sequencing of construction near known roosting areas will be taken into account by the contractor to avoid, where practicable, the main penguin breeding period. The WPCT recommends that the work be carried out between mid-March and mid-June if possible and that a daily pre- construction inspection will be carried out of the proposed work area to confirm the absence/presence of penguins. If penguins are detected, the WPCT, or a DoC ranger will be notified to assess the risk to penguins.
- If it is necessary for seawall construction to occur outside mid-March to mid-June, a fortnightly survey using a trained conservation dog will be carried out. In addition, a daily pre- construction inspection will be carried out of the proposed work area to confirm the absence/presence of penguins. If penguins are detected, the WPCT or a DoC ranger will be notified to assess the risk to penguins.
- Access to any active nests found will be maintained overnight. WPCT will be consulted in regard to the provision of any temporary access requirements.
- Ramps included in the seawall design to provide for public access may also facilitate access for penguins to the backshore.
- Where existing refuge sites are compromised, nest boxes will be located within foreshore habitat associated with the access paths. WPCT will be consulted in respect of box location and any shade plantings.
- No dogs will be allowed on the construction site.

As a result, the effects of the seawall extension during construction on Blue Penguin/Kororā is expected to be minor or less.

5.3.3 New Zealand fur seal/Kekeno

The New Zealand fur seal/Kekeno (*Arctocephalus forsteri*) prefer to haul out on rocky shores but are occasionally seen basking along the Hokitika beach.

Measures will be taken to minimize disturbance to fur seals/Kekeno during seawall construction, including pre-work surveillance and distance separation. As a result, the effects of the proposal during construction on fur seals are expected to be less than minor.

5.3.4 Nearshore water quality

The construction of the new wall has the potential to release contaminants (such as oil from working machinery) onto the beach and into the nearshore waters. Accordingly, the following measures will be implemented to avoid any significant adverse effects on nearshore water quality from contaminants, during construction and maintenance of the wall:

- The construction and maintenance works will be restricted to periods when machinery can work above water level, when tidal conditions allow. No exposed areas will be worked in water.

- All plant working on the foreshore will have an oil spill kit and the operators will be trained to use it. All plant refuelling and washing of equipment and containers will take place away from the foreshore and any water courses.
- During excavation of the foreshore to form the wall foundations, excavated sand will generally be placed on the foreshore for protection of the construction excavations. Some of this material will be lost to tidal exposure and subject to natural redistribution for beach nourishment. Any potential effects of this on water quality within the CMA will be localised and temporary in what is already a highly turbid environment.
- Geotextile fabric will be placed beneath a rock filter layer, under the rock armour, to retain beach sediment under the rock wall and prevent it from being washed out by wave action.
- At the completion of the construction works, any newly established surfaces landward of MHWS and the observed runup zone and any areas cleared will be revegetated to prevent sediment from entering water.

Therefore, the adverse effects on nearshore water quality during construction are expected to be less than minor.

5.3.5 Erosion and sediment control

A small unnamed creek discharges just outside the site, to the north of Richards Drive (see **Figure 2-2**). This stream is not identified on WCRC maps and does not appear to be significant. The sources of water appear to be restricted to runoff from part of the terrace behind the township and some stormwater runoff within the township. The proposed work will occur on land to the south of the Richards Drive groyne and there will be no potential for discharges to the small creek.

Landside works will involve earthworks and temporary stockpiling of soil. If not properly managed, there is some potential for sediment runoff during heavy rainfall into stormwater. While the effects of this in the context of the site are expected to be low with little formal stormwater collection or conveyance within the construction area, the Contractor will be required to implement erosion and sediment control measures in accordance with best practice. This is likely to include:

- Excluding stormwater runoff from outside the site from entering the works area wherever possible by the use of diversions such as bunds.
- Minimising disturbance and exposed areas to a minimum and stabilising/sealing these areas as soon as practicable.
- Minimising stockpiles as far as practicable.

The construction work will be relatively short term and the risk of any sediment runoff can be managed such that the effects are less than minor.

5.3.6 Vegetation disturbance

The small backshore dunes are reasonably well vegetated and contain a variety of indigenous and exotic species. There does not appear to be any stand of original land cover in the area. The most dominant indigenous species is harakeke (flax) however other species including tī kouka (cabbage tree), are also within the site. Of particular note, are scattered clumps of the native Pīngao or golden sand sedge which was found in various areas along the dune and is classified as “At Risk-Declining” under the NZ Threat Classification System Database.

Exotic species including bamboo, marram grass, gorse, blackberry, other grasses and vegetation are also prevalent along the dune areas.

Some vegetation will be disturbed during construction of the wall. However, this will be minimised as far as practicable (particularly in regard to indigenous species).

A Vegetation Planting Plan will be developed during detailed design that will provide the basis for removal and replanting of indigenous plants (such as Pīngao) where practicable, restoration of vegetation that was disturbed or removed during construction. This Plan will be provided to Te Rūnanga o Ngāti Waewae and WDC for comment prior to finalisation.

Disturbance of indigenous vegetation will be minimised as far as practicable during construction, and reinstatement will occur according to an agreed Planting Plan. On this basis, the effects will be minor or less.

5.3.7 Public access and amenity

Hokitika Beach has high amenity and recreational value. The location of the site in close proximity to the Hokitika town centre and along the residential frontage of the town with the coast, means it is a popular spot for locals.

There are a number of public access points to the beach that pass through the site. For practical and public safety reasons, public access will be temporarily restricted in the working area and in the vicinity of operating machinery. Prior notice will be given to adjacent landowners and residents, and temporary signage will be provided advising of alternative public access points.

Access along the beach will be maintained where practicable, noting that any beach side works will be generally confined to periods of low to mid tide and when sea conditions allow.

The estimated construction period is up to 6 months if the work is carried out continuously from the southern end. However, the work may also be staged to suit budget and weather conditions.

Regardless, any adverse effects on public access and amenity on any point along the site will be relatively short-term during construction (as works moves sequentially along the beach front) and can be managed such that the effects are minor or less.

5.3.8 Landscape and visual

The site is modified by current human landuse and existing erosion control measures. The works will involve the operation of machinery (which will be retained on site during construction), temporary stockpiling of materials and soil. These items may be temporarily placed in front of existing houses which will obstruct the view over the beach. These items will be moved as construction progresses along the site.

Some removal of vegetation, which may alter the visual nature of the site, will be required but this will be replaced where practicable.

Any adverse effects on the visual character of the site during construction will be generally temporary and can be managed such that the effects are less than minor.

5.3.9 Traffic

Vehicle and machinery (truck, excavator, etc) movements will be required for the construction of the seawall, including the cartage of rock from the Camelback Quarry. Such vehicle access will likely be needed at several access points (e.g Stafford St, Hampden St, Tudor St, Spencer St, Richards Drive) over a period of several weeks or months at each location.

The works will require the transport to the site workforce of rock for wall construction.

Heavy earthmoving machinery will be moved onto site (excavators) at the commencement of the work. This machinery will be moved as the work proceeds. In addition, there will be minor light traffic movements (workforce and supply vehicles) to and from the site each morning and evening from the nearest access road.

While a small increase in heavy traffic movements will occur in and around the site during construction, this will be temporary and minimised where practicable such that the effects on local roads and traffic are less than minor.

5.3.10 Noise

The wall construction may cause intermittent, localised noise and vibration due to the use of heavy machinery.

The potential effects of noise on neighbours will be mitigated by:

- Appropriate muffling of site machinery
- Compliance with the relevant provisions of NZS 6803:1999 Acoustic – Construction Noise in respect of hours/days of work and acceptable noise levels²⁷
- Maintaining an appropriate complaints procedure.

While construction will occur relatively close to residential dwellings, any adverse effects from noise will be relatively short term (as works moves along the beach front) and can be managed such that the effects are less than minor.

5.3.11 Dust

Dust generation from earth disturbance can adversely affect neighbours. While Hokitika has relatively high, well distributed rainfall, there may be times during extended dry conditions when high winds from the west (typically >5m/s) could transport dust towards adjacent residential dwellings.

The potential effects of dust on neighbours will be mitigated by:

- Timing earthworks to avoid the windiest conditions as far as possible
- Suppressing dust by surface watering
- Covering of any stockpiles of soil if they are generating dust.

While construction will occur relatively close to residential dwellings, adverse effects from dust will be relatively short term (as works moves along the beach front) and can be managed such that the effects are less than minor.

5.3.12 Contaminated soils

As indicated in Section 2.7.2 of the AEE a Preliminary Site Investigation (PSI) was carried out by Beca along the entire footprint of the seawall.

The PSI concluded that:

- Soils on site are considered to meet the 'more likely than not' threshold related to the potential deterioration of ACM and / or lead paint and /or treated timber from historical building structures (HAIL I *'Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment'*).
- The potential presence of buried waste/ fill is not considered to meet the 'more likely than not' threshold for soil contamination under HAIL G3 - Landfill Sites or HAIL G5 – Waste Disposal to land. However, it remains possible that contamination from historical filling may be present along the length of the site.
- Identified potentially complete exposure pathways include:

²⁷ Works will be undertaken between the hours of 7.00am to 7.00pm Monday to Friday. No works will be carried out on weekends or public holidays, nor during the main summer holiday period and Easter, in order to avoid disturbance during high use periods

- Exposure of construction workers to contaminants in soils during site redevelopment – dermal contact, ingestion or inhalation of dust/vapours.

To address these potential adverse effects, the following will be undertaken:

- A detailed site investigation (DSI) report prepared by a suitably qualified and experienced contaminated land practitioner (SQEP) and in accordance with the Ministry for the Environment (MfE) *Contaminated Land Management Guidelines No. 1 – Reporting on Contaminated Sites in New Zealand (2011)* and the MfE *Contaminated Land Management Guidelines No.5 – Site Investigation and Analysis (2011)*.
- The DSI report will include a Contaminated Land Management Plan, including handling requirements and disposal options of materials and any other matter required to be addressed to ensure contaminated material is managed in a way to avoid, remedy or mitigate adverse effects on the environment.

Overall, the above measures should result in any effects being less than minor.

5.3.13 Hazardous substances and spill response

Spills of fuel, oil and other hazardous substances have the potential to contaminate nearshore waters.

No significant quantities of hazardous substances (petrol, diesel, oils etc) will be stored on site. Mini tankers will be brought to site when refuelling of machinery is required. The storage of any hazardous substances within the site will comply with the requirements of the Health and Safety at Work (Hazardous Substances) Regulations (2017) and any other relevant legislation.

The Contractor will be required to obtain the relevant licenses and hold Material Safety Data Sheets on site for all hazardous substances. All hazardous substances will be securely locked in an appropriate container at the end of each working day.

Best practice measures to be used by the contractor will include:

- Preparation of spill management and emergency response procedures in the event of a hydrocarbon or chemicals spill to land or water
- Maintenance of a general spill containment kit to be used when machinery is operating or parked.
- Provision of sealed waste bins for the collection of oil rags etc.

The risks of spillage of hazardous materials during construction can be managed such that they will be less than minor.

5.3.14 Cultural Impacts

A Cultural Impact Assessment (CIA) is currently being undertaken by Ngāti Waewae and will be provided to WCRC and WDC on completion.

In the interim the following comments are made in regard to potential cultural effects:

The Hokitika Beach is within the rohe of Te Rūnanga o Ngāti Waewae.

Under Schedule 7C of the West Coast Regional Land and Water Plan, the following cultural values are noted as associated with the Hokitika River- Waahi Tapu, Waahi Taonga, Mahinga Kai, Kohoanga, Navigation Routes, Cultural Materials, Waipuna, Traditional Campsites. While the proposal is associated with the Hokitika Beach and not the river, it is likely that many of the same values are held with the beach.

The Hokitika Beach is not a statutory acknowledgement area.

Although the site of the seawall extension does not have any known cultural values and has been highly modified by previous landuses, there remains some potential for the discovery of cultural artefacts during construction. As such an Accidental Discovery Protocol will be developed by the applicant and contractor in consultation with Te Rūnanga o Ngāti Waewae.

that sets out the responsibilities and actions in the event of a discovery. As a result, it is anticipated that the effects on cultural artefacts during construction can be managed such that they are less than minor.

The conditions proposed by Ngāti Waewae (in Appendix 1 of the attached letter) align generally with the applicant's proposed conditions.

5.3.15 Public safety and security

The site lies within a highly accessible area that is frequented by the public. The contractor will be required to manage the safety and security of the site in accordance with the Health and Safety at Work Act 2015.

Mitigation measures to be employed by the contractor to protect public safety will include:

- Regular hazard identification and reporting
- Formal control of entry to the work site with standard check in/safety briefing for workers and visitors
- Restrictions on public access to the working site with warning/directional signs posted.

The risks to public safety and security during construction can be managed such that they will be less than minor.

5.3.16 Reinstatement

The contractor will be required to reinstate the site. Completed landside sections will be backfilled and resurfaced as soon as possible according to WDC specifications. Any stockpiled soils, spare materials and machinery will be removed.

Vegetation disturbed or removed during construction will be reinstated according to a Vegetation Planting Plan that has been agreed in consultation with Te Rūnanga o Ngāti Waewae, WDC and affected landowners.

A consent condition has been proposed in respect of the preparation of the Vegetation Planting Plan.

5.3.17 Construction Environmental Management Plan

The contractor will be required to prepare a Construction Environmental Management Plan (CEMP) prior to the commencement of any work at the site. The CEMP will outline the proposed construction activities, the effects of these activities (as set out above) and the measures to be undertaken to mitigate any adverse effects on the environment.

Consent conditions have been proposed in respect of the content, timing and approvals of the CEMP.

5.4 Operation and Maintenance Effects

5.4.1 Effects on coastal processes

The proposed coastal protection works will consist of an approximately 1100m long engineered rock seawall from Stafford Street to Richards Drive, while maintaining, where practicable, the existing public access tracks to the beach. This area is at risk of erosion and its coastline is subject to episodes of retreat and recovery. It is noted that the section of foreshore to be protected by the proposed seawall has less substantial but continuous temporary rock protection. The effects of the proposed works on the physical coastal processes are discussed below.

- a. Effect on water level and overtopping

The proposed seawall will be in an open coast area and parallel to the shore, in alignment with the natural plan shape of the embankment. The proposed seawall will be constructed generally landward of the MHWS line, and the toe of the seawall will be buried below the beach. Therefore, the effects on sea water level will be negligible. The crest level of the seawall has been designed to allow limited overtopping under design conditions of high tide, storm surge, sea-level rise and wave runup as explained in the Basis of Design Report. The distance retained between the seawall and private properties is considered adequate to allow for accumulation and percolation of the overtopping flows above the design crest level for a 1 in 30 year event for the up to 15 year lifetime of the structure.

b. Effect on beach performance

The location and substantial burial of the rock wall is proposed to provide a backstop to the natural beach function that will minimise effects on the beach processes until an erosion event that results in the retreat of the dune face and/or lowering of the upper beach to a degree that exposes the rock protection. Once this situation has arisen, the proposed seawall, as with any “hard” seawall or revetment structure, may exacerbate wave reflection from the seawall during events that reach the seawall. Wave reflection from seawalls can result in localised scouring at the seawall toe and subsequently lower the sand levels of the fronting beach. The lower sand levels result in deeper water in front of the rock wall, which in turn allows larger waves to reach the seawall structure. This arises because wave height is limited by depth in shallow water so increases in depth resulting from lowering of the bed through scour and sea level rise impose greater wave loadings on the seawall. This condition has been allowed for in the design of the seawall armour with the consideration of observed beach profile variations, establishing and applying empirically calculated allowances for scour depth, and allowance for sea level rise values as required by the MfE Guidelines in the establishment of design wave exposure.

Beach levels are thus expected to vary in front of the seawall with cycles of erosion and accretion, during and after storm events, and with ongoing but gradual sea level rise the amount of wave energy reaching the shoreline is likely to become greater than at present. Therefore, the seawall will be more prone to exposure with subsequent toe scour and overtopping over time. These effects have been considered in establishing the Basis of Design and are reflected in the proposed seawall geometry, armour specifications and toe depth. The design characteristics have been based on the range of beach levels recorded as regular cross sections since 2000 with empirically calculated beach lowering assessment, and the effects of further toe scour mitigated by incorporating and extended seawall toe.

c. Effect on sediment transport

The construction of the seawall will require the existing embankment/scarp to be excavated, and the toe of the seawall to be dug into the top of the beach. This will cause a temporary disturbance to the foreshore area until the beach material is restored to its original profile following construction of the seawall. Once this is completed the area in front of the seawall will quickly revert back to the natural beach through tidal actions.

Wave reflection from the seawall can create turbulence, capable of suspending sediments, hence making them more susceptible to erosion. While beach material at the toe and face of the seawall may be subject to local scour, the scale of such localised effects in the context of the observed natural beach changes at Hokitika suggests that the construction of the seawall would not change the general pattern of the sediment transport within the Hokitika coastal area.

d. Integration of the seawall into the coastal environment

Adequate toe embedment will be included in the design to reduce the risk of sliding failures, scour and undermining at the base of the seawall. The founding of the seawall toe below the lowest historical beach level should mitigate any risk of scour. However, regular monitoring and inspection of seawall scour will be carried out and reinstatement of any displaced rock will be carried out. A consent condition requiring regular ongoing inspections and mitigation, if required, has been proposed.

The seawall extension will be tied into the existing seawall at the end of Stafford Street/Beach Street, and the existing groyne at the end of Richards Road. While there may be a need to increase the height of the Richards Road groyne at the landward end to facilitate this tie in, the 2020 investigation by Beca shows that the groyne is performing well and exhibits consistent sediment trapping on the southern updrift side in retaining beach sediment in the area, with a stable downdrift end effect shoreline alignment. The presence of the Richards Drive groyne, which has been in place for nearly 40 years, provides a practical termination point for the seawall extension which will help to minimise energy translation and seawall end effect from the rock protection. There are unlikely to be additional effects on coastal processes north of the groyne as a result of the seawall extension.

Overall, the effects of the seawall extension on coastal processes during operation are expected to be less than minor for the up to 15 year life of the scheme.

5.4.2 Effects on ecology

The most potentially affected species will be the blue penguin. Upon completion the penguins will be able to access potential habitat sites on the land behind the wall as it will be covered in sand along significant portions. In addition, ramps included in the seawall design to provide for public access may also facilitate access for penguins to the backshore.

It is also noted that the seawall will occupy a relatively small part of the overall potential penguin along this portion of the West Coast.

Other protected wildlife known in the area will be minimally affected. Measures will be taken to minimize disturbance to fur seals during seawall repair and maintenance including surveillance and distance separation when possible.

Overall, the effects of the seawall extension on ecology during operation are expected to be less than minor.

5.4.3 Effects on landscape and visual amenity

The seawall is proposed to be located within an unformed legal road that runs parallel and adjacent to the beach. Therefore, there are no significant changes expected to the foreshore character of the beach.

The greatest visual changes are anticipated to be at the interface of the backshore and the unformed legal road where the seawall is to be built. There are currently emergency work rocks along the beach which will be replaced by the wall. However, as the finished crest level of the seawall will be close to existing ground levels there will be no significant impact on the current views to the west (ie towards the sea) from existing dwellings along Revell Street.

The wall (see cross sections in **Figures 3-2** and **3-3**) will, in a few places alter the visual outlook for users of the beach and residents in Revell Street.

However:

- Excavated beach material will be replaced after construction and the top of the wall will be at an essentially similar profile to that which currently exists
- The area will be replanted as much as practical without comprising the integrity of the wall to an agreed Vegetation Planting Plan and this is proposed as a condition of consent. The planting plan will show how the site will be rehabilitated and restored including specific plantings and the re use of existing native plantings where possible.

In addition, any changes to the amenity value and visual landscape need to be balanced against the future protection the wall will afford residents along Revell Street.

Overall, the effects of the seawall extension on landscape and visual amenity during operation are expected to be minor or less.

5.4.4 Effects on access and recreation

As discussed in Section 2 of this report, the Hokitika Beach has high recreation value and therefore maintaining access for residents to the beach, is particularly important.

Some Revell Street residents currently have direct informal access from their properties onto the beach, and there are outdoor dining areas, lawns and sheds that, in some cases, extend into the foreshore area which legally is unformed legal road. While there will be no construction or disturbance of private property, the construction of the seawall may affect some of the informal development that has occurred on the legal road.

While the seawall does create a solid structure along the beach, several public accessways have been incorporated into the design of the wall to allow local residents, and general members of the public to access the beach. This will provide for access from the end of Hampden and Tudor Streets as well as Richards Drive. Walking access along the seawall crest and over buried parts of the wall to the beach will also be able available.

As the seawall is being built along the unformed legal road and not along the beach, no reduction in the size of the beach is anticipated and therefore any recreational activities that take place on the beach are not expected to be impacted.

Due to the above, the effects of the seawall extension on public access and recreation during operation are expected to be less than minor.

5.4.5 Effects on existing development on road reserve

As discussed above some historic development associated with the adjoining private properties has occurred on the legal road, although the legal status of this development is unclear. Some of this development may be directly affected by the proposed seawall extension. The applicant proposes to discuss this matter with affected property owners.

5.4.6 Cumulative effects

The seawall extension will have an overall positive effect by reducing the risk of further erosion and flooding of adjacent private properties, and potentially of adjacent low-lying areas of the commercial district. The proposed wall will be tied into the existing seawall at Stafford Street and also to the Richards Drive groyne, to provide continuous protection along the Hokitika township beach frontage for a period of up to 15 years.

In the longer term, the effect of the existing and proposed structure within the context of expected climate change will be eventual drawdown of the beach resulting in the loss of the high tide beach. The seawall will interrupt natural coastal processes that supply and store backshore sediment to augment the beach (in addition to longshore beach sediment supply).

5.5 Conclusions

Overall, the effects of constructing and operating the proposed seawall within the 15 year timeframe are anticipated to be minor or less. Beyond this timeframe, effects may become more significant. The proposal is likely to result in a variety of shorter term positive effects and allow the community to develop a longer-term plan to manage coastal hazards in Hokitika.

6 Consultation Undertaken

6.1 Overview

The Fourth Schedule of the RMA indicates that an AEE should identify “*those persons interested in or affected by the proposal, the consultation undertaken and any response to the views of those consulted*”.

Within the RMA context, consultation with iwi arises under the principles of the Treaty of Waitangi. The Environment Court has noted that active protection of Māori interests requires positive action, which will at times, oblige the applicant as well as the consenting authority to consult and also initiate, facilitate and monitor the consultation process. This is viewed as part of the inherent duty under the Treaty to take into account the principles of active protection and partnership.

Consultation with iwi must be conducted in the spirit of goodwill to a degree sufficient for the applicant to be informed on the matters of issue.

6.2 Summary of Consultation Undertaken

6.2.1 Key Stakeholders

A number of stakeholders have been identified as also having an interest in the proposal. These include WDC, WCPT, the Hokitika and Kaniere communities, directly affected residents and Te Rūnanga o Ngāti Waewae,

6.2.2 West Coast District Council

WCRC has engaged with WDC regarding the future protection of Hokitika from coastal erosion. WDC has indicated that it supports the proposed seawall extension.

6.2.3 West Coast Penguin Trust

The WCPT has completed a survey and provided a report to assess the effects of the proposal on Blue Penguins/Kororā. In terms of penguin conservation, the WCPT see no reason why construction of the seawall should not occur if their proposed recommendations are included in design and construction considerations. Where practicable, the proposal will incorporate the WCPT proposed recommendations to mitigate any adverse effects on penguins and habitat.

6.2.4 Hokitika and Kaniere communities

In September 2020, the WCRC undertook consultation with the Hokitika and Kaniere communities regarding the “Hokitika and Kaniere Resilience Project” which includes the extension of the sea wall as well as the construction of river flood protection. Feedback was primarily sought from the communities regarding whether they agreed with co-funding the project to secure “shovel ready” money from Central Government and to allow the project to proceed, and to be maintained.

Feedback was also sought in regard to alterations to the rating district to provide the required co-funding as well as on the proposed governance structure of this rating district. A public survey was conducted with submissions being received in October of 2020. Two drop-in sessions were also carried out on the 29th and 30th of September at the Wests Rugby clubrooms in Hokitika. Councillors and staff from both the WDC and WCRC attended these sessions for discussions with residents. 339 submissions were received in total. There were a variety of views towards the proposed developments, with 66% of respondents in support of the co-funding of the resilience projects, which includes the sea wall. 62% of respondents also supported the proposed governance structure of the rating district.

A range of core themes were also raised, such as concerns over the affordability of the projects and the governance structure associated with them. Of note for the sea wall is that the environmental impacts of the protection works were mentioned as a concern, particularly the consequent effects of hard infrastructure on coastal processes and surrounding coastal environment. In addition to this, submitters also highlighted the need for ongoing consideration of alternative resilience measures including managed retreat. Lastly, a lack of clarity and information was also expressed by the public in regard to the overall proposal.

6.2.5 Directly affected residents

WCRC will engage with directly affected residents regarding the proposal. Survey pegs will be installed to show the proposed alignment and height of the seawall.

6.2.6 Te Runanga o Ngāti Waewae

Te Rūnanga o Ngāti Waewae has provided comments on the proposal (see letter from Francois Tumahai dated 29 March 2022 in **Appendix B**). Ngāti Waewae has indicated preliminary support for the proposal subject to mitigation measures outlined within the application and summarised in Appendix 1 of the attached letter. Ngāti Waewae has indicated that it is comfortable for the WCRC to lodge the consent applications with both WDC and WCRC.

Additional information has been sought by Ngāti Waewae (see appended letter) and the adoption of additional mitigation measures before their written approval can be considered.

The following is noted in regard to these matters:

The preparation of a Cultural Impact Assessment report which assesses the effects of the proposal on Ngāti Waewae values and provides recommendations on ways to avoid, remedy or mitigate these effects.

Comment: The applicant has commissioned Ngāti Waewae to prepare a Cultural Impact Assessment.

A report prepared by an expert on blue penguins to consider the effects of the proposed structure on the species and their habitat. It would be beneficial to know how effective the currently proposed accessways will be in facilitating access to penguins to the backshore for breeding etc.

Comment: The applicant has had ongoing discussions with the West Coast Penguin Trust in regard to the management of penguins during and after construction. The Trust has carried out a survey and prepared a report which includes recommendations for minimising any effects on penguins. These recommendations will be considered where practicable during the design and construction phases. The Trust will be retained by the applicant during construction to provide advice to the contractor.

A peer review of the coastal wall design by an independent coastal engineer and an assessment of the potential effects of the seawall extension on coastal processes and flooding events associated with the Hokitika River. Will the seawall extension create more pressure on the Hokitika River stopbanks when the river is in flood?

Comment: The concept design and effects assessment has undergone internal Beca review. It is anticipated that the consent authority will also review the proposal during consent processing.

Information on the legality of the current rock protection works installed as part of emergency works back in 2019/20. Has this rock protection work been subsequently consented?

Comment: It is understood that the protection work has not been subsequently consented. The granting of consents for the current proposal will result in the removal and relocation of the existing rock protection works.

The inclusion of the consideration of alternative resilience measures which could the consideration of managed retreat. Is the Council proposing any measures to discourage further development on the properties behind the seawall if this is deemed appropriate?

Comment: The proposed 15-year consent term will allow for the applicant to plan and implement a longer term adaptive coastal management strategy for Hokitika. This may include measures such as managed retreat and other controls on future development in coastal areas.

The inclusion of a consent condition which requires the WCRC to plan for and implement an adaptive management strategy for the longer-term management of the coastal hazards at Hokitika within a specified timeframe to enable these measures to be implemented before consents requested expire.

Comment: The applicant supports the inclusion of a consent condition that addresses the issues raised by Ngāti Waewae in regard to the preparation of an adaptive management strategy for coastal hazards at Hokitika.

Ngāti Waewae has also indicated that it would appreciate the opportunity to comment on the proposed consent conditions before consents are granted.

6.2.7 Requirements of Marine and Coastal (Takutai Moana) Act 2011

The Marine and Coastal Area (Takutai Moana) Act (MACAA) requires WCRC to notify iwi, hapu and whanau groups that have made application in regard to customary rights under the Act.

Ngāi Tahu (Application Number MAC-01-13-002) and Ngāti Toa Rangatira (Application Number MAC- 01-12-021), have applied for customary rights in the area where the seawall extension is to be located.

Letters have been sent to both groups advising of the proposal in accordance with Section 62(3) of the MACAA. Copies of this correspondence are attached (see **Appendix D**). Therefore, if there is any need for mana whenua input into the project it will be triggered when appropriate.

7 Alternatives Assessment

7.1 Overview

The Fourth Schedule of the RMA requires an assessment of alternative locations and/or methods where it is likely an activity will result in any significant effect on the environment.

A short/medium term engineered sloped rock revetment seawall is WCRC's favoured coastal protection option for the site (Stafford Street to Richards Drive section of coastline), as an interim measure to allow time for a longer-term adaptive management strategy to be developed. It provides a level of erosion protection with reasonable maintenance and is relatively durable, subject to the quality of rock available for the option. The equipment, skills and rock material required to construct the seawall are readily locally available.

WCRC has monitored coastal erosion at the site for many years. A 2019 assessment of the performance of the existing protection structures (groynes) by Beca has showed that there is no consistent entrapment of sediment on the updrift side until the Richards Drive groyne. This suggests that the sediment transport process has a significant onshore-offshore component, as opposed to consistent longshore littoral transport where groynes would be expected to provide progressive improvement to beach volumes, and thus provide a more robust natural protection buffer. Therefore, improvements to the existing groyne field to the south of Richards Drive are unlikely to be a viable coastal protection option.

A very high level consideration of alternative coastal management options for the site is set out below for the purposes of this consent application. WCRC is continuing to undertake further work on coastal hazards etc, which can inform a more detailed evaluation of coastal management strategy options and future decision-making.

Also set out below are alternatives in terms of the seawall form and materials, and alignment and project timing.

7.2 Coastal Management Strategies

7.2.1 Do Nothing (No Active Intervention)

The "Do nothing" coastal strategy option would allow the continued erosion of the beachfront. The ongoing nature of sea level rise means that the continued erosion of the shoreline will eventually result in encroachment onto private properties which will place structures at risk. The rate of erosion is expected to accelerate with the increase of sea level and storm events over time. The risk of coastal inundation (flooding) is also expected to increase over time as the higher land along the coastal frontage is lost to erosion.

Do nothing is not favoured by WCRC, WDC or local landowners as it provides no certainty for the protection of property in the short to mid-term.

7.2.2 Managed Retreat

"Managed retreat" refers to a planned move of communities and infrastructure away from a hazard area, as a means of reducing the risk to property and life. In a coastal setting, it allows space for the coastal processes that result in erosion and inundation, while reducing the impact of these hazards on a community. It also provides a means of reducing the increasing exposure to these hazards associated with climate change.

Managed retreat has implications for property in the hazard zones. In New Zealand, attempts at managed retreat have typically been lengthy processes with varying outcomes. The planned reform of resource management legislation includes a new Climate Change Adaptation Act. The new Act will address the

complex legal and technical issues associated with managed retreat, and funding and financing of adaptation.

At this point in time, managed retreat of the Stafford Street to Richards Drive coastline is not favoured by WCRC because “there is no blueprint for managed retreat. It is also an issue that is being discussed at a national level as each region attempts to address similar issues in other parts of the country. Some guidance has been produced by the Ministry for the Environment. However, the major problem of funding remains a live issue” (WCRC, 2018)²⁸ pending the provisions of the new Act.

7.2.3 Hold the Line (Protect)

“Hold the Line” refers to maintaining the present shoreline position through sea defence measures in order to protect property and infrastructure. The measures may include “soft” or “hard” protection (refer to Section 7.3). A Hold the Line strategy may be put in place for the near term to provide a window for investigation and consideration of long-term options; or it may be a long-term option.

A short to medium term “Hold the Line” strategy has been discussed and agreed with WCDC to allow a window of time for planning and implementation of a long-term coastal management strategy. This interim strategy does not preclude any future options and is also consistent with WCRC’s coastal management approach immediately to the south of the Stafford Street to Richards Drive coastline.

7.2.4 Advance the Line (Move Seaward)

“Advance the Line” involves building new sea defences seaward of the existing defence line. This policy is only intended to be used on those stretches of coastline where significant land reclamation is considered for reasons of regional or national importance.

This strategy is therefore not relevant to the project site.

7.2.5 Limited Intervention and Accommodation

Some policy and scientific commentary recognises further management options. “Accommodation” refers to a coastal strategy where the community and infrastructure manage the risk of coastal erosion and inundation hazards through measures such as warning systems and evacuation plans, raising building floor levels above coastal flooding, strengthening structures to resist increased wave loading²⁹. Limited intervention is a similar concept, providing some risk reduction while allowing natural coastal change. It includes measures such as e.g. beach nourishments, warning systems, dune and forest maintenance and reconstruction, land use planning defining building restrictions in coastal strip³⁰.

While these measures may help a community to manage the risks in the short term, they may not provide a long-term solution for coastal erosion. In addition, the measures can involve significant costs to individuals (dwellings) and local authorities (infrastructure). It is understood that WCRC therefore does not favour a limited intervention or accommodation strategy for the Stafford Street to Richards Drive coastline.

²⁸ West Coast Regional Council (2018) Long Term Plan July 1 2018 to June 20 2028

²⁹ Hanna, C., White, I., Glavovic, B. (2017). *Managed retreat in New Zealand: revealing the terminology, approaches and direction of local planning instruments*. Report for the National Science Challenge: Resilience to Natures Challenges, University of Waikato, New Zealand.

³⁰ European Commission and the European Environment Agency (201%) Climate Adapt <https://climate-adapt.eea.europa.eu/metadata/adaptation-options/adaptation-of-integrated-coastal-management-plans>

7.3 Sea Defence Measures

7.3.1 Soft Protection

Soft protection options, such as beach and dune nourishment and dune planting, in a high energy area would remain likely to experience erosion during storm events. Section 2.9 provides a description of the beach characteristics noting the exceptionally fast rates of accretion and erosion in terms of advance and retreat of the beach crest observed over time, and the resulting significant variation in volumes, and distribution of beach materials both along and across the beach. Gibb (1987) in reviewing the state of the Hokitika foreshore refers to the loss of 200,000 m³ of beach material from 1000 m (the approximate length of the proposed seawall) of the Hokitika foreshore in one year, and up to 45,000 m³ per month.

To provide renourishment for the scale of these changes would present significant challenges in terms of delivery cost and sourcing of suitable material, with no assurance that a renourishment campaign could be expected to provide protection for a set length of time and would potentially require regular replacement of material and replanting following significant storm events.

This option is unlikely to provide the level of protection required in this high energy environment, with large, uncertain ongoing costs.

7.3.2 Hard Protection Measures

Vertical/Near Vertical Structures

Two variants of hard protection structures which could be used include vertical concrete seawalls and near-vertical grouted rock seawalls. These structures are favoured in areas where horizontal space is limited, or a vertical face is preferred for functional reasons. Vertical concrete seawalls are constructed as either an in situ poured structure, or as a wall formed from stacked interlocking precast concrete blocks and is considered an option in areas where rock is not available.

The vertical, or near-vertical face of these walls do not absorb wave energy and create wave reflection resulting in scour at the toe of the wall, as well as contributing to wave overtopping as waves are deflected upward, requiring the height of the structure to be increased beyond the requirement of revetment type seawall. The absence of any wave dissipation characteristics and significant wave reflection has an adverse effect on the adjacent coastline by lowering the beach level at the toe of the seawall.

Vertical seawall options are not considered appropriate at this location due to the negative effect on the beach system and the additional height required.

Sloping Rock Seawall

Sloping rock seawalls, or revetments, can be employed to maintain the position of the coastline. UngROUTED rock structures provide greater energy dissipation and reduced wave reflection compared with grouted structures, and also reduce wave run-up. The slope of the structure also assists with reducing wave reflection. Scour at the toe of the structure is therefore typically less than for a vertical seawall.

The existing seawall to the south of the site is a sloping rock revetment and has performed adequately since it was constructed in 2013 other than requiring raising of the seawall crest (WCRC, 2021)³¹.

A sloping rock seawall is the preferred option for the Stafford Street to Richards Drive coastline for the reasons described above. The seawall form is generally consistent with the existing seawall which has performed adequately for a similar period to the design life of the proposed seawall.

³¹ West Coast Regional Council (2021) personal communication

Groynes

Groynes can be used on suitable coastlines to reduce coastal erosion within their area of influence. Groynes work by trapping sediment moving along the coastline, creating a wider section of beach adjacent to each groyne. Typically, however, this also reduces the feed of sediment to the adjoining section of beach, which then starts to lower and erode.

WCRC has monitored coastal erosion at the Hokitika site for many years. The existing groyne structures on this section of foreshore have not been successful in maintaining a protective beach, and substantial variations in beach level and dune toe position have been observed over this time. Extension of the groynes seaward to encourage greater trapping of sediment would involve significant capital and maintenance costs, given the exposed, high-energy environment. Groynes are therefore not considered the preferred option for this location based on existing experience, potential effects on adjacent beach sections and capital and maintenance requirements.

7.4 Seawall Alignments

7.4.1 “Backshore” Alignment

As far as practicable, the wall alignment has been designed to allow the construction of the seawall crest inshore of the existing erosion scarp and temporary protection, where it will be installed initially as a buried backstop protection. At the design position, the crest is generally 23 to 40 m from the cadastral boundaries of the sections west of Revell Street except near the southern end where a transition is required to tie into the end of the existing southern seawall at Stafford Street. This position provides an opportunity to establish the seawall to be buried within the dune where beach material can be restored in front of and on top of it. The distance remaining inshore of the wall provides a buffer between it and the private properties to allow placement of a walking/cycling track, to maintain an area of coastal and potentially restored vegetation, and to ensure that any overtopping of the crest will be accommodated within this area. The design alignment shown limits the encroachment of the seawall footprint on the beach and minimises the earthworks and disturbance associated with construction. The Richards Drive groyne provides a practical end point for the northern end of the seawall, with the substantial groyne structure providing a cut-off for wave and energy translation along the seawall. This groyne has been in place for many years with established downstream conditions which are not expected to worsen. Monitoring of this area should continue following construction.

The design crest alignment is thus more consistent with the present beach alignment than the existing seawall to the south and does not result in any building out of the seawall on to the present beach position. At the southern end of the proposed seawall, the alignment is required to tie into the end of the existing southern section of the seawall at Stafford Street. The existing southern seawall was built forward of the beach scarp and thus a transition is required to bring the alignment of the new seawall gradually landward to meet this objective. The transition to the proposed alignment is achieved over the first section between Stafford Street and Hampden Street.

7.4.2 “Landward” Alignment

A more landward alignment along the public / private property boundary is a further alternative. Such an alignment would provide a last line of defence against the property boundaries. It would not retain any public access or amenity inshore of the seawall once the beach scarp retreated to the seawall position. A seawall on this alignment could be constructed as a buried structure in the near future, or constructed as an exposed structure as the foreshore eroded and the erosion scarp reached the alignment position.

WCRC does not see this option as a preferred approach because the seawall alignment protects private, rather than public, property and access along the coastline would ultimately be lost, with continued sea level rise and beach drawdown.

7.5 Implementation Timings

7.5.1 Continuous implementation

The seawall could be constructed in one continuous operation. This approach could be applied for any of the alignments described in Section 7.4.

7.5.2 Staged implementation

A staged option would commence from the southern end, which is the most exposed, and continue northwards in increments. Consideration would need to be given to identifying practical stage end locations based on exposure and erosion scarp condition. This approach could be applied for any of the alignments described in Section 7.4.

7.5.3 “Triggered” implementation

“Triggered” implementation could be used with the “backshore” and “landward” alignments described in Section 7.4. This approach involves establishing “trigger points” for the initiation of seawall construction at eroding locations. It has merit in minimising expenditure and construction disturbance but has the potential to result in the construction of discrete sections of protection which could result in “end effects” exacerbation of erosion adjacent to the completed sections, initiating the need for extensions to be constructed. Construction on this basis would also be difficult with access to exposed sites potentially requiring special consideration as opposed to setting up for a continuous or sequentially staged operation. There is also the potential for significant erosion events to require construction of substantial sections to be commenced when a trigger point is activated, making both trigger point and the location of the seawall alignment critical to maintaining effective protection.

7.5.4 Summary

The above considerations, and the availability of initial funding, suggests that the more practical and effective approach to construction is to commence construction from the southern end tie in position and advance northward as funding allows (refer to Section 7.5.3).

8 Notification Requirements

Section 5 of the AEE generally concludes that there will be a number of positive effects and any adverse effects will be minor or less.

In terms of affected persons under section 95A-95G of the RMA, the residents along Revell Street may be potentially affected and it is suggested that the application is limited notified to these parties in terms of section 95E.

In addition, Te Rūnanga o Ngāti Waewae, the Department of Conservation and the West Coast Penguin Trust may also be considered to be affected parties.

9 Statutory and Planning Assessment

9.1 Resource Management Act 1991

9.1.1 Overview - Part 2

The proposed activity is subject to an assessment under Part 2 of the RMA.

9.1.2 Section 5

The purpose of the RMA, as set out in Section 5, is to “*promote the sustainable management of natural and physical resources*”. Sustainable management means “*managing the use, development and protection of these resources in a way, or at a rate, which enables people and communities to provide for their social, economic, and cultural wellbeing and for their health and safety while –*

- a) *Sustaining the potential of natural and physical resources to meet the reasonably foreseeable needs of future generations; and*
- b) *Safeguarding the life-supporting capacity of air, water, soil and ecosystems; and*
- c) *Avoiding, remedying, or mitigating any adverse effects of activities on the environment”*

Comment

The purpose of the proposal is to prevent erosion of the Hokitika Beach and to provide protection for adjacent residents and the township in the short term. The construction of the seawall extension is anticipated to result in effects that are less than minor while protecting adjacent land and local residents from inundation. This is a short-medium term solution (10-15 years) to a problem that is likely to be exacerbated by sea level rise in the future. The longer-term solution (beyond 15 years) will require the development and implementation of an adaptive management strategy for Hokitika. Therefore, the proposal will benefit the community by providing for their social and cultural well-being and for their health and safety, in the most appropriate way while minimising the effects on the environment. The proposal is therefore considered consistent with section 5 of the RMA.

9.1.3 Section 6

Section 6 sets out the matters of national importance which must be recognised and provided for. Those of relevance are assessed below.

- 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:*
- c) *the protection of areas of significant indigenous vegetation and significant habitats of indigenous fauna:*
- d) *the maintenance and enhancement of public access to and along the coastal marine area, lakes, and rivers:*
- e) *the relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga:*
- f) *the protection of protected customary rights:*
- h) *the management of significant risks from natural hazard*

Section 6 requires recognition of and provision for, certain matters of national importance. Of particular relevance to this project, is the preservation of natural character of the coastal environment from inappropriate development and use.

Firstly, the proposed seawall extension is considered to be appropriate development and use of the coastal environment because a seawall requires a coastal location. In addition, the coastal environment in the vicinity of the extension contains a number of man-made coastal protection features including seawalls, groynes and other structures.

The existing character of the coastal environment would therefore be maintained, and the proposed seawall is considered to be appropriate development of the CMA.

Public access along the CMA would not be restricted during the construction phase of the outfall and would be maintained once the outfall is operational. Temporary access restrictions to the CMA will be required during construction to maintain public safety.

Consultation has been undertaken with a number of stakeholders including iwi (Te Rūnanga o Ngāti Waewae) to recognize and provide for the requirements of section 6(e) of the RMA (see also Section 6).

9.1.4 Section 7

Section 7 lists the matters, to which particular regard must be given when making resource management decisions. The following matters are considered relevant to this application:

- a) *kaitiakitanga:*
 - aa) *the ethic of stewardship*
 - b) *the efficient use and development of natural and physical resources*
 - c) *the maintenance and enhancement of amenity values*
 - d) *intrinsic values of ecosystems*
 - f) *maintenance and enhancement of the quality of the environment*
 - g) *any finite characteristics of natural and physical resources*
 - i) *the effects of climate change.*

Comment

The amenity values in the vicinity of the proposed outfall would be maintained as there are already existing protection structures in this location. The quality of the coastal environment would be maintained and enhanced because the seawall extension will help stabilise beach erosion.

The effects of possible climate change on the proposal have been assessed and incorporated into design elements. The primary purpose of the seawall extension is to protect landward property from coastal erosion in the short to medium term (an element of which is related to sea level rise as a result of climate change).

9.1.5 Section 8

Section 8 places an obligation on all persons exercising functions and powers under the RMA to take into account the principles of the Treaty of Waitangi. The Court of Appeal has identified four principles, which form the basis of developing a relationship of partnership and communication. These are the principles of Essential Bargain, Tribal Self-Regulation, Treaty Relationship and Active Protection. The third principle, the Treaty Relationship, accords Māori with special status as a Treaty Partner, distinct and separate from status as an 'affected party'.

Comment

Consultation has been carried out with Te Rūnanga o Ngāti Waewae and a formal response has been received (see Section 6.2.6). They will also be consulted with during the implementation of this proposal. By also addressing the relevant objectives and policies in the statutory documents described above, and assessing effects on cultural values, the principles of the Treaty of Waitangi have been taken into account by this proposal. The potential adverse effects from this application have been considered and are likely to be less than minor and therefore do not contravene section 8 of the RMA.

A Cultural Impact Assessment is currently being prepared by Ngāti Waewae which is expected to highlight areas where mitigation measures can be adopted by the applicant.

9.1.6 Section 9: Restrictions on the use of land

Section 9 states that:

- (1) *No person may use land in a manner that contravenes a national environmental standard unless the use—*
- (a) is expressly allowed by a resource consent; or*
 - (b) is allowed by section 10; or*
 - (c) is an activity allowed by section 10A; or*
 - (d) is an activity allowed by section 20A.*
- (2) *“No person may use land in a manner that contravenes a regional rule unless the use –*
- (a) is expressly allowed by a resource consent; or*
 - (b) is an activity allowed by section 20A.*
- (3) *No person may use land in a manner that contravenes a district rule unless the use -*
- (a) is expressly allowed by a resource consent; or*
 - (b) is allowed by section 10; or*
 - (c) is an activity allowed by section 10A.”*

Comment

The proposal would involve the use of land to construct and build a seawall, and therefore any land use is permitted and does not require resource consent unless it contravenes a national environmental standard or a regional or district rule.

The construction and installation of the seawall requires earthworks that are located within 50 m of the CMA. A land use consent as a discretionary activity under Rule 15 of the WCRC Proposed Regional Land and Water Plan is therefore required.

9.1.7 Section 12: Restriction on the use of the Coastal Marine Area

Section 12 places restrictions on the use of the coastal marine area. Sections 12(1) and (2) state:

- “(1) No person may, in the coastal marine area, -*
- (a) reclaim or drain any foreshore or seabed; or*
 - (b) erect, reconstruct, place, alter, extend, remove, or demolish any structure or any part of a structure that is fixed in, on, under, or over any foreshore or seabed; or*

(c) disturb any foreshore or seabed (including by excavating, drilling, or tunnelling) in a manner that has or is likely to have an adverse effect on the foreshore or seabed (other than for the purpose of lawfully harvesting any plant or animal); or

(d) deposit in, on, or under any foreshore or seabed any substance in a manner that has or is likely to have an adverse effect on the foreshore or seabed; or

(e) destroy, damage, or disturb any foreshore or seabed (other than for the purpose of lawfully harvesting any plant or animal) in a manner that has or is likely to have an adverse effect on plants or animals or their habitat; or

(f)...

unless expressly allowed by a national environmental standard, a rule in a regional coastal plan as well as a rule in a proposed regional coastal plan for the same region (if there is one), or a resource consent.

(2) No person may, unless expressly allowed by a national environmental standard, a rule in a regional coastal plan or in any proposed regional coastal plan for the same region, or a resource consent, -

(a) occupy any part of the common marine and coastal area; or

(b) remove any sand, shingle, shell, or other natural mineral from that area.

(3) Without limiting subsection (1), no person may carry out any activity-

(a) in, on, under, or over any coastal marine area; or

(b) in relation to any natural and physical resources contained within any coastal marine area

in a manner that contravenes a national environmental standard, a rule in a regional coastal plan, or a rule in a proposed regional coastal plan for the same region (if there is one) unless the activity is expressly allowed by a resource consent or allowed by section 20A (certain existing lawful activities allowed).

Comment

The proposal may involve the use of the CMA to erect portions of the seawall and includes the following activities: occupying the CMA and disturbing the foreshore and seabed. The activities related to the CMA therefore must be allowed by a national environmental standard or a rule in a regional coastal plan (proposed and operative), or resource consent will be required for the activity. Resource consents (coastal permits) are required for the above activities.

7.1.4 Section 13 River and Lake Beds

Section 13 places restrictions on the use of the beds of rivers and lakes. Section 13(1) and (2) state:

(1) No person may in relation to the bed of any lake or river-

(a) Use, reconstruct, place, alter, extend, remove or demolish any structure or part of any structure in, on, under or over the bed; or

(b) excavate, drill, tunnel, or otherwise disturb the bed; or

(c) introduce or plant any plant or any part of any plant (whether exotic or indigenous) in, on, or under the bed; or

(d) deposit any substance in, on, or under the bed; or

(e) reclaim or drain the bed—

unless expressly allowed by a national environmental standard, a rule in a regional plan as well as a rule in a proposed regional plan for the same region (if there is one), or a resource consent.

(2) No person may do an activity described in subsection (2A) in a manner that contravenes a national environmental standard or a regional rule unless the activity—

- (a) is expressly allowed by a resource consent; or*
- (b) is an activity allowed by section 20A.*

(2A) The activities are—

- (a) to enter onto or pass across the bed of a lake or river:*
- (b) to damage, destroy, disturb, or remove a plant or a part of a plant, whether exotic or indigenous, in, on, or under the bed of a lake or river:*
- (c) to damage, destroy, disturb, or remove the habitats of plants or parts of plants, whether exotic or indigenous, in, on, or under the bed of a lake or river:*
- (d) to damage, destroy, disturb, or remove the habitats of animals in, on, or under the bed of a lake or river.*

Comment

The construction of the seawall will not impact the unnamed waterway north of Richards Drive.

9.1.8 Section 14 Water

Section 14 places restrictions relating to water. Section 14(1) states that:

- (1) No person may take, use, dam or divert any –*
 - a) Water (other than open coastal water)*

Unless the taking, use, damming or diversion is allowed by Subsection 3.

Subsection 3(a) notes that a person is not prohibited from taking, use, damming or diversion of water if allowed by a rule in a regional plan or a resource consent. No dewatering during excavation of the site is anticipated.

9.1.9 Section 15 Discharge of contaminants

Section 15 places restrictions on discharges of contaminants to water, land or air where it may enter water.

Section 15(1) states that:

- 1. No person may discharge any—*
 - a) contaminant or water into water; or*
 - b) contaminant onto or into land in circumstances which may result in that contaminant (or any other contaminant emanating as a result of natural processes from that contaminant)*
 - c) contaminant from any industrial or trade premises into air*

unless the discharge is expressly allowed by a national environmental standard or other regulations, a rule in a regional plan as well as a rule in a proposed regional plan for the same region (if there is one), or a resource consent.

Comment

No dewatering is proposed and no discharge of contaminants to land or water is anticipated from the construction or operation of the seawall extension.

9.2 New Zealand Coastal Policy Statement 2010

7.2.1 Overview

In accordance with section 104(1)(iii) of the RMA, regard must be given to the relevant provisions of a national policy statement.

In this respect, the New Zealand Coastal Policy Statement (NZCPS) was officially gazetted on 4 November 2010 and became operational on 3 December 2010, replacing the previous NZCPS (1994). In accordance with section 104(1) of the RMA, regard must be had to the relevant provisions of the NZCPS.

An assessment of the WCRC proposal and its consistency with the relevant objectives and policies of the NZCPS is considered in more detail below.

7.2.2 Objectives

Objective 1

To safeguard the integrity, form, functioning and resilience of the coastal environment and sustain its ecosystems, including marine and intertidal areas, estuaries, dunes and land, by:

- *Maintaining or enhancing natural biological and physical processes in the coastal environment and recognising their dynamic, complex and interdependent nature;*
- *protecting representative or significant natural ecosystems and sites of biological importance and maintaining the diversity of New Zealand's indigenous coastal flora and fauna; and*
- *maintaining coastal water quality and enhancing it where it has deteriorated from what would otherwise be its natural condition, with significant adverse effects on ecology and habitat, because of discharges associated with human activity.*

Comment

The natural biological and physical processes in the CMA will be maintained in the vicinity of the proposed seawall during construction and operation. There are no significant natural ecosystems, or sites of biological importance within the seawall. Some minor removal of indigenous coastal flora may be required during construction, but this will be replanted/restored where practicable in consultation with iwi and landowners.

Objective 4

To maintain and enhance the public open space qualities and recreation opportunities of the coastal environment by:

- maintaining and enhancing public walking access to and along the coastal marine area without charge, and where there are exceptional reasons that mean this is not practicable providing alternative linking access close to the coastal marine area; and

Comment: There may be some minor, temporary disruption to public access to the beach during construction for public safety purposes. The construction will be sequenced to minimize disruption and alternative access points will be maintained.

There will be no significant disruption of public access along the beach with excavation works occurring during low tidal conditions in the backshore area.

Access post construction will be maintained at key points along the wall (as described in Section 5.4.4.

Objective 6

To enable people and communities to provide for their social, economic, and cultural wellbeing and their health and safety, through subdivision, use, and development, recognising that:

- functionally some uses and developments can only be located on the coast or in the coastal marine area;

Comment: A seawall clearly requires a coastal location and the proposed site is considered appropriate given the existence of other similar coastal protection infrastructure in the vicinity. Therefore, the proposed seawall is consistent with Objective 6 of the NZCPS.

7.2.3 Policies

Policy 2 The Treaty of Waitangi, tangata whenua and Māori heritage

In taking account of the principles of the Treaty of Waitangi (Te Tiriti o Waitangi), and kaitiakitanga, in relation to the coastal environment:

(a) recognise that tangata whenua have traditional and continuing cultural relationships with areas of the coastal environment, including places where they have lived and fished for generations;

Comment: Consultation has been carried out with Te Rūnanga o Ngāti Waewae and a formal response has been received (see Section 6.2.6). Ongoing engagement with iwi will continue through the construction phase including the development of a Planting Plan.

A Cultural Impact Assessment is currently being prepared by Ngāti Waewae which is expected to highlight areas where mitigation measures can be adopted by the applicant.

Policy 13 Preservation of natural character

(1) To preserve the natural character of the coastal environment and to protect it from inappropriate subdivision, use, and development:

(a) avoid adverse effects of activities on natural character in areas of the coastal environment with outstanding natural character; and

(b) avoid significant adverse effects and avoid, remedy or mitigate other adverse effects of activities on natural character in all other areas of the coastal environment.

Comment: The adverse effects of the proposed seawall on natural character will not be significant, given the proposed design and the presence of other similar structures in the area. The proposal is consistent with Policy 13 because the natural character of the coastal environment will be maintained, and the seawall is an appropriate use and development of the CMA.

Policy 19 Walking Access

(1) Recognise the public expectation of and need for walking access to and along the coast that is practical, free of charge and safe for pedestrian use.

(3) Only impose a restriction on public walking access to, along or adjacent to the coastal marine area where such a restriction is necessary:

(e) to protect public health or safety; or

(g) for temporary activities or special events.

Comment: Walking access along the coast will not be affected by the construction of the seawall.

However, the public will be temporarily restricted from specific construction areas to ensure their safety. The proposal is therefore consistent with Policy 19.

Access post construction will be maintained at key points along the wall (as described in Section 5.4.4).

Policy 23 Discharge of contaminants

(1) In managing discharges to water in the coastal environment, have particular regard to:

(a) the sensitivity of the receiving environment;

(b) the nature of the contaminants to be discharged, the particular concentration of contaminants needed to achieve the required water quality in the receiving environment, and the risks if that concentration of contaminants is exceeded; and the capacity of the receiving environment to assimilate the contaminants; and:

(d) avoid significant adverse effects on ecosystems and habitats after reasonable mixing;

(e) use the smallest mixing zone necessary to achieve the required water quality in the receiving environment; and

(f) minimise adverse effects on the life-supporting capacity of water within a mixing zone.

Comment: Construction of the seawall will not require dewatering to facilitate the works and no works will be carried out close to water in the coastal environment. Excavation work using machinery will be carried out under lower tidal conditions and will be subject to management under appropriate spill management and emergency response procedures.

Overall, the WCRC proposal is considered to be consistent with Policy 23 of the NZCPS, because no discharge to the coastal environment is anticipated during construction or operation

Policy 25 Subdivision, use and development in areas of coastal hazard

In areas potentially affected by coastal hazards over at least the next 100 years:

(a) avoid increasing the risk of social, environmental and economic harm from coastal hazards;

(b) avoid redevelopment, or change in land use, that would increase the risk of adverse effects from coastal hazards;

(c) encourage redevelopment, or change in land use, where that would reduce the risk of adverse effects from coastal hazards, including managed retreat by relocation or removal of existing structures or their abandonment in extreme circumstances, and designing for relocatability or recoverability from hazard events;

(d) encourage the location of infrastructure away from areas of hazard risk where practicable;

(e) discourage hard protection structures and promote the use of alternatives to them, including natural defences; and

(f) consider the potential effects of tsunamis and how to avoid or mitigate them.

Comment:

The proposal forms part of the “Hokitika and Kaniere Resilience Project” which also includes construction of a river flood protection scheme to provide far greater resilience and protection between Kaniere and Sunset Point. The extension of the existing seawall from Stafford Street to Richards Drive will provide a short to medium term solution on the basis of projected sea level rise. The proposed 15-year consent term will allow time for WCRC, in conjunction with WDC and other stakeholders, to plan and implement an adaptive management strategy for the longer-term management of coastal hazards in Hokitika

The proposal is considered to be the best solution for protection of private property from further erosion and flooding in the short to medium term. On this basis, the seawall extension is considered to be consistent with the requirements of (a) (c) (e) and (f).

Policy 26 Natural defences against coastal hazards

(1) Provide where appropriate for the protection, restoration or enhancement of natural defences that protect coastal land uses, or sites of significant biodiversity, cultural or historic heritage or geological value, from coastal hazards.

(2) Recognise that such natural defences include beaches, estuaries, wetlands, intertidal areas, coastal vegetation, dunes and barrier islands.

Comment:

The proposal will provide for the installation of a seawall extension for a period of up to 15 years which is considered to be appropriate in respect of the existing protection structures already established. Natural defences such as regular beach enhancement are not considered practicable in this high energy environment.

Policy 27 Strategies for protecting significant existing development from coastal hazard risk

(1) In areas of significant existing development likely to be affected by coastal hazards, the range of options for reducing coastal hazard risk that should be assessed includes:

- (a) promoting and identifying long-term sustainable risk reduction approaches including the relocation or removal of existing development or structures at risk;*
- (b) identifying the consequences of potential strategic options relative to the option of 'do-nothing';*
- (c) recognising that hard protection structures may be the only practical means to protect existing infrastructure of national or regional importance, to sustain the potential of built physical resources to meet the reasonably foreseeable needs of future generations;*
- (d) recognising and considering the environmental and social costs of permitting hard protection structures to protect private property; and*
- (e) identifying and planning for transition mechanisms and timeframes for moving to more sustainable approaches.*

(2) In evaluating options under (1):

- (a) focus on approaches to risk management that reduce the need for hard protection structures and similar engineering interventions;*
- (b) take into account the nature of the coastal hazard risk and how it might change over at least a 100-year timeframe, including the expected effects of climate change; and*
- (c) evaluate the likely costs and benefits of any proposed coastal hazard risk reduction options.*

(3) Where hard protection structures are considered to be necessary, ensure that the form and location of any structures are designed to minimise adverse effects on the coastal environment.

(4) Hard protection structures, where considered necessary to protect private assets, should not be located on public land if there is no significant public or environmental benefit in doing so

Comment:

The proposal to extend the existing seawall from Stafford Street to Richards Drive has been assessed as the best solution for protection of private property from further erosion and flooding in the short to medium term. It is consistent with other protection structures that have been installed along this portion of coastline.

The proposed seawall extension will provide a short to medium term protection for low lying properties presently between 25 and 40m from the upper beach erosion scarp but that there will be a need for WCRC to develop an adaptive management strategy, in collaboration with WDC, iwi and other key stakeholders, for the expected impacts of sea level rise on Hokitika. It is proposed that the requirement for WCRC to plan for and implement such a strategy be incorporated into a consent condition. Longer term options including planning tools will need to be considered.

While the structure is hard protection, which is considered the only realistic option in a high energy environment, it will be covered in sand for significant periods which will reduce the effects on the coastal environment. While the structure will be located on “public land” in the form of legal road, there is no realistic alternative, and the structure will not inhibit public access and may enhance it.

9.3 West Coast Regional Policy Statements (2000 and 2018)

7.3.1 Overview

In accordance with section 104(1) (v) of the RMA, regard must be given to the relevant provisions of the West Coast Regional Policy Statement (WCRPS) and also the Proposed West Coast Regional Policy Statement (PWCRPS). The PWCRPS was publicly notified on 16 March 2015. Hearings on the document were held on 14, 15, and 21 May 2018 and following the release of decisions there were a number of appeals. The Environment Court has since directed that all outstanding matters can be resolved by mediation. Once these are resolved, the new Policy Statement will become operative.

Given the advanced stage of the PCRPS, reasonable weight can be placed on its provisions - along with those of the WCRPS.

7.3.2 West Coast Regional Policy Statement 2000

The West Coast Regional Policy Statement (WCRPS) contains objectives and policies set out in Chapters 5, 8 and 10 that are considered relevant to this application.

Chapter 5: Matters of Significance to Poutini Ngai Tahu

Chapter 5 of the WCRPS contains the issues, objectives and policies relating to tangata whenua and their relationship with their ancestral lands, water, sites, waahi tapu and other taonga. The relevant objectives and policies are considered below.

Objective 5.1: *To take into account the principles of the Treaty of Waitangi in the exercise of functions and powers under the Resource Management Act.*

Policy 5.1.1: *The principles of the Treaty of Waitangi will be taken into account in the sustainable management of natural and physical resources in the West Coast Region.*

Objective 5.2:

(a) *Recognise and provide for the relationship of Poutini Ngai Tahu and their culture and traditions with their ancestral lands, water, sites, waahi tapu and other taonga within the West Coast Region.*

(b) *To have particular regard to kaitiakitanga in the management of the use, development and protection of natural and physical resources in the West Coast Region.*

Policy 5.2.3: *Recognise the role of kaitiakitanga in the management of natural and physical resources on the West Coast.*

Comment: As outlined in Section 4 of this report, consultation has been carried out with Te Rūnanga o Ngāti Waewae.

The construction work is not expected to affect any protected sites of significance to tangata whenua. The area of coast where the seawall will be located is not considered a source of mahinga kai for local iwi. An appropriate Accidental Discovery Protocol will be required to be implemented by the Contractor during construction of the seawall.

A Cultural Impact Assessment is currently being prepared by Ngāti Waewae which is expected to highlight areas where mitigation measures can be adopted by the applicant.

Overall, the applicant has recognised the values important to tangata whenua in selecting the seawall site.

Chapter 8: Water

Chapter 8 of the WCRPS addresses the issues in relation to water. The relevant objectives and policies are addressed below.

Objective 8.2.1: *To maintain, and where water quality is degraded, enhance the quality of the region's surface, ground and coastal water resources by:*

a) Recognising and providing for the relationship of Poutini Ngai Tahu and their culture and tradition with their ancestral water;

b) Ensuring that land and water resources are used and managed so that their life supporting capacity, intrinsic, amenity, recreational and cultural values are maintained or enhanced by:

i. Sufficient flow or levels in natural water bodies to achieve desired water quality; and

ii. Avoid, remedy or mitigate the adverse effects of soil loss, erosion and the contamination of water bodies with chemicals, sediment, bacteria or nutrients.

Policy 8.2.1: *Avoid, remedy or mitigate the adverse effects of discharges into surface, coastal and ground water particularly where these cause, or are likely to cause:*

a. Risks to human health;

b. The production of any conspicuous oil or grease films, scums or foams, or floatable or suspended materials;

c. Any conspicuous change in the colour or visual clarity;

d. Any emission of objectionable odours;

e. The rendering of fresh water unsuitable for consumption by farm animals;

f. Any significant adverse effects on aquatic life;

g. Loss of ecological, cultural, aesthetic, fishery, amenity and recreational values; and

h. The relationship of Poutini Ngai Tahu and their culture and traditions with ancestral water and other taonga to be compromised.

Comment: As described in the AEE, the construction of the seawall will not have significant effects on public health, or the receiving coastal environment or cause the relationship between Poutini Ngai Tahu and their culture and traditions with ancestral water and other taonga to be compromised.

Overall, it is considered that the proposal would be consistent with Objective 8.2.1 and Policy 8.2.1.

Chapter 10: The Coastal Environment

The protection of the CMA is addressed in Chapter 10 of the WCRPS and includes the following relevant objectives and policies.

Objective 10.1: *Allow appropriate subdivision, use and development in the coastal environment which avoids, remedies or mitigates adverse effects on the natural character of the coastal environment and on any outstanding natural features and landscapes.*

Policy 10.1.1: *Preserve the natural character of the West Coast's coastal environment and protect it, and outstanding natural features and landscapes, from inappropriate subdivision, use and development.*

Comment: The seawall is considered an appropriate use and development of the coastal environment given its modified nature.

Objective 10.5: *To safeguard the life supporting capacity of the region's coastal water resources by:*

- a) *Avoiding, remedying or mitigating adverse effects of the discharge of contaminants and the deposition of substances in the coastal environment;*
- b) *Preventing contamination of the marine environment by discharges from ships as far as is practicable, having regard for the needs of shipping to take, use and discharge coastal water; and*
- c) *Recognising and providing for the relationship of Maori and their culture and tradition with their ancestral lands, water, sites, waahi tapu and other taonga.*

Policy 10.5.1: *To maintain, enhance or restore water quality in the coastal environment, taking into account:*

- a. *The public use of water resources.*
- b. *The sensitivity of the receiving environment to adverse effects.*
- c. *The current state of technical knowledge of treatment and disposal options for discharges.*
- d. *Existing lawful discharges.*
- e. *The relationship of Poutini Ngai Tahu and their culture and traditions with water.*
- f. *The setting of progressively higher water quality standards in water bodies that are unacceptably degraded*
- g. *The need for ships to discharge water, whilst avoiding risks associated with contamination.*

Comment: As described in this AEE, the proposal will not result in any significant adverse environmental or cultural effects during construction or operation.

Overall, the proposed outfall is considered to be consistent with Objective 10.5 and Policy 10.5.1 of Chapter 10 of the WCRPS.

7.3.3 Proposed West Coast Regional Policy Statement (2018)

The PWCRPS contains objectives and policies that are considered relevant to this application.

Chapter 3 Matters of Significance to Poutini Ngai Tahu

Chapter 3 contains the issues, objectives and policies relating to tangata whenua and their relationship with their ancestral lands, water, sites, waahi tapu and other taonga. The relevant objectives and policies are considered below.

Objective 1: *To take into account the principles of the Treaty of Waitangi in the exercise of functions and powers under the RMA.*

Objective 2: *Recognise and provide for the relationship of Poutini Ngai Tahu and their culture and traditions with their ancestral lands, water, sites, wāhi tapu, and other taonga within the West Coast Region.*

Policy 2: *In consultation with Poutini Ngai Tahu, provide for the protection of ancestral land, wāhi tapu, water, sites, and other taonga from the adverse effects of activities, in a manner which is consistent with the purpose of the RMA.*

Comment:

Consultation has been carried out with Te Rūnanga o Ngāti Waewae and a formal response has been received. The construction work is not expected to affect any protected sites of significance to tangata whenua. The area of coast where the seawall will be located is not considered a source of mahinga kai for local iwi. An appropriate Accidental Discovery Protocol will be required to be implemented by the Contractor during construction of the seawall.

Overall, it is considered that WCRC has recognised the values important to tangata whenua in selecting the seawall extension option.

A Cultural Impact Assessment is currently being prepared by Ngāti Waewae which is expected to highlight areas where mitigation measures can be adopted by the applicant.

Chapter 8 Land and Water

Chapter 8 contains the issues, objectives and policies relating to land and water.

Objective 3: *Provide for a range of land and water uses to enable the economic, social and cultural wellbeing of West Coast communities while maintaining or improving water quality and aquatic ecosystems.*

LW.01 *The life supporting capacity of freshwater is maintained and improved for future generations.*

LW.02 *Coastal water quality does not deteriorate due to land use, development or activities in the CMA.*

Policy LW.P1: *Safeguard the life supporting capacity of freshwater:*

- a) *through the sequencing and coordination of urban growth, land use and development;*
- b) *when making any provisions for infrastructure; and*
- c) *having particular regard to effects of use and development on land and freshwater that may affect coastal water.*

Policy LW.P2 *Manage land use activities and activities within the CMA to avoid any significant sediment increase in coastal water and to manage discharges of contaminants to maintain the life supporting capacity of water in the coastal environment.*

Comment

The construction of the seawall will not have significant effects on the quality of freshwater systems, or the coastal environment. Overall, the seawall would be consistent with the above objectives.

Chapter 9 Coastal Environment

Chapter 9 contains the issues, objectives and policies relating to the coastal environment.

Objective 1: *The natural character of the region's coastal environment is protected and enhanced.*

Objective 3: *Ensure that any new subdivision, use or development in the coastal environment has appropriate regard to the level of coastal hazard risks.*

Policy 1: *provide for the protection of natural character, natural features and landscapes from inappropriate subdivision, use and development by:*

- c. *Avoiding significant adverse effects and by avoiding, remedying adverse effects on natural character, natural features and natural landscapes.*

Comment

As described in this AEE, the proposal is consistent with other coastal protection structures in the area and will not result in any significant adverse environmental effects on the natural character of the coastal environment.

9.4 West Coast Regional Coastal Plans (2000 and 2016)

9.4.1 Overview

In accordance with section 104(1)(vi) of the RMA, regard must be had to the relevant provisions of an operative or proposed regional plan. The West Coast Regional Coastal Plan (WCRCP) was made operative on 13 June 2000 and describes the issues, objectives and policies relating to protection of the CMA.

The Proposed West Coast Regional Coastal Plan (PWCRCP) was publicly notified in 2016. As per section 86A-86G of the RMA, the objectives, policies, and rules in PWCRP are now legally effective as the relevant rules relate to water which takes immediate legal effect under s86B (3).

9.4.2 West Coast Regional Coastal Plan (2000)

The following objectives and policies are considered relevant to the proposed seawall.

Chapter 7 Public Access and Occupation of Space

Objective 7.3.1: *To maintain and as far as practical enhance public access to and along the coastal marine area.*

Policy 7.4.2: *Public access to and along the margins of the coastal marine area will only be restricted where necessary:*

d To protect public health or safety; or..

Comment

Walking access along the beach will not be affected by the construction of the seawall. However, the public will be temporarily restricted from specific construction areas to ensure their safety. The proposal is therefore consistent with Policy 7.4.2.

Public access post construction will be maintained at several key points along the wall (as described in Section 5.4.4).

Chapter 8 Structures

Objective 8.3.2: *To preserve the natural character of the West Coast's coastal environment as far as practicable from the adverse effects associated with structures.*

Policy 8.4.1: *New and existing structures will be required to be maintained in a structurally sound and tidy state and should blend as far as is practicable with the adjoining landscape to minimise the visual impact of that structure on the natural character of the area.*

Policy 8.4.2: *When undertaking coastal management functions (including the processing of resource consent applications) with regard to structures within the coastal marine area, consideration will be given to the discharge of contaminants, disposal of wastes, the reticulation of water and other required services associated with the structure.*

Comment

The seawall extension will be consistent and blend with other existing coastal protection structures in the area. The seawall will be tied into the existing wall at the southern end and the existing groyne at the northern end. The wall will be regularly inspected and maintained and there will be no discharge of contaminants or wastes associated with the work.

Chapter 9: Alteration of the Foreshore and Seabed

Objective 9.3.4: *To provide for activities which disturb the foreshore or seabed, where the adverse effects of such disturbances are minor.*

Policy 9.4.1: *The area to be disturbed during any operation altering the foreshore or seabed will be limited as far as practicable to the area necessary to carry out that operation.*

Policy 9.4.5: *For the following activities, consideration will be given to the reasons for undertaking the activity in the coastal marine area, and to any other available alternatives to what the applicant seeks to do:*

a. Any reclamation; or

b. The removal of sand, shingle, stones, driftwood or other natural materials for commercial purposes; or

c. Any deposition of material.

Comment: The area of disturbance of the foreshore will be temporary and minimised as far as practicable to construct the wall. Sand will be replaced on the wall after construction. The temporary disturbance is necessary to construct the wall, which is an appropriate use and development of the CMA. The disturbance would have no more than minor effects on the coastal environment.

9.4.3 Proposed West Coast Regional Coastal Plan (2016)

The following objectives and policies are considered relevant to the proposed seawall.

Chapter 3 Natural and Human Use Values

Objective 3.2.1 *To enable the sustainable use and development of resources in the coastal marine area.*

Objective 3.2.3 *To protect the natural and amenity values within and adjacent to the coastal marine area from inappropriate use and development in the coastal marine area, including natural character, the life supporting capacity of marine ecosystems, and the integrity, functioning and resilience of natural coastal processes.*

Objective 3.2.4 *To maintain, or where appropriate enhance, the spiritual and cultural values and uses of significance to Poutini Ngāi Tahu.*

Objective 3.2.5 *To avoid or mitigate the exacerbation of any natural hazard or the creation of a hazard in the coastal marine area.*

Policy 3.3.7 *In the management of any activity in the coastal marine area:*

1) *Avoid, remedy, or mitigate adverse effects on:*

(a) *Water quality;*

(b) *Indigenous biodiversity, cultural and amenity values, natural character, landscapes, and historic heritage values not described in Policies 3.3.5 or 3.3.6;*

(c) *Intrinsic values of ecosystems;*

(d) *Recreational values in any Coastal Recreation Area identified in Schedule 3F;*

(e) *Human health;*

(f) *Infrastructure;*

Policy 3.3.10 *Have regard to cumulative effects of activities in the coastal marine area.*

Comment

Any adverse effects of the work on public amenity natural character and recreation along the beach will be temporary, with the impacts managed by the contractor through a Construction Environmental Management Plan. Following construction, the work area will be restored and the effects on amenity, natural character and recreation will be less than minor. Provision will be made in the seawall design for ongoing public access at key points.

A Cultural Impact Assessment is currently being prepared by Ngāti Waewae which is expected to highlight areas where mitigation measures can be adopted by the applicant.

Chapter 4 Public Access and Occupation of Space

Objective 4.2.1 *To maintain, and as far as practical enhance, public access to and along the coastal marine area, while recognising that some activities require the occupation of space.*

Policy 4.3.1 *Public access along the coastal marine area will only be restricted where necessary: (a) For health and safety reasons in relation to a consented activity; (b) To ensure a level of security consistent with the purpose of a resource consent; (c) In other exceptional circumstances sufficient to justify the restriction.*

Policy 4.3.3 *Alternative forms of access or compensation may be required to offset the loss of public access resulting from an activity in the coastal marine area.*

Policy 4.3.5 *Motorised vehicle access to, and use in, the coastal marine area associated with a consented activity may be restricted to manage adverse effects on habitats, water quality, flora, fauna, kaimoana beds on the foreshore shown in Schedule 10, or coastal processes.*

Comment

Public access will be temporarily restricted during construction to protect public safety. However, this will impact only a portion of the beach access at any time as the work will be sequenced to progress along the beach in small sections. The design of the wall will provide for public access at several key points along the beach after the wall has been constructed. Motorised machinery will be required to use the CMA at times for excavation of material and delivery and placement of rocks. This will be restricted to the minimum required for the work and no machinery will be parked on the beach except during work hours.

Chapter 5 Structures:

Objective 5.2.1 *To provide for structures to be located within the coastal marine area, while avoiding, remedying, or mitigating adverse effects.*

Policy 5.3.1 *In addition to the policies in Chapter 3, avoid, remedy, or mitigate adverse effects of the construction, operation, repair, maintenance, reconstruction, or alteration of structures, including effects on:*

- (a) Sediment movement;*
- (b) Coastal hydrological and geomorphic processes;*
- (c) Navigation safety;*
- (d) Existing hazard protection works;*
- (e) The coastal environment adjoining the coastal marine area;*
- (f) Existing lawful uses and users of the coastal marine area;*
- (g) Poutini Ngāi Tahu values not identified in Schedule 3A.*

Policy 5.3.2 *New and existing structures will be required to be maintained in a structurally sound and tidy state and should blend as far as is practicable with the adjoining landscape to minimise the visual impact of that structure on the natural character of the area.*

Policy 5.3.5 *When considering resource consent applications for coastal protection structures, have regard to whether the structure is the best practicable option, taking into account:*

- (a) any environmental, social, cultural, and economic effects and costs;*
- (b) the safety of people and communities;*
- (c) whether the structure is proposed in a Coastal Hazard Area in Schedule 3C, and the priority ranking;*
- (d) whether the works are likely to be properly maintained over the long term;*

(e) the design of the proposed structure and likely effects at either end.

Policy 5.3.6 *Where a coastal protection structure is considered necessary in a Coastal Hazard Area listed in Schedule 3C to protect adjoining regionally significant infrastructure, and the structure may adversely affect:*

(a) Significant indigenous biodiversity values meeting the Policy 11 criteria in the New Zealand Coastal Policy Statement 2010; or

(b) Values in an Outstanding Natural Landscape or Outstanding Natural Character Area listed in Schedule 3D or 3E,

the need to protect regionally significant infrastructure from coastal hazards may take priority over the requirement in Policy 3.3.5 to avoid adverse effects on the values listed in Policy 3.3.5. Remediation or mitigation of adverse effects on these values will be required as far as is practicable.

Policy 5.3.7 *Sea-level rise shall be taken into account when designing and building new, permanent structures in the coastal marine area. Calculations for sea-level rise should be based on up-to-date, nationally recognised guidelines.*

Comment

The proposed seawall extension will be tied into the existing seawall to the south of Stafford Street and to the existing groyne at the end of Richards Drive and have less than minor effects on coastal processes, including sediment movement, after construction. The wall is consistent with existing coastal protection structures in the area and will be installed to provide, as far as practicable, to meet the needs of existing public beach users and penguins that may use the beach or backshore habitat.

Sea level rise using up to date guidelines has been taken into account in the design of the seawall extension. The seawall will be regularly inspected and maintained for the duration of the consent term in a structurally sound and tidy manner.

Chapter 6 Disturbance, extraction/removal, deposition, reclamation

Objective 6.2.1 *To provide for disturbance, extraction, removal of natural material, deposition, and reclamation in the coastal marine area, in appropriate places and forms, and within appropriate limits to manage adverse effects.*

Policy 6.3.1 *Provide, where appropriate, for the protection, restoration or enhancement of natural or man-made defences that protect coastal land uses, or sites of significant biodiversity, cultural or historic heritage or geological value, from coastal hazards.*

Policy 6.3.2 *Any major disturbance to the foreshore should blend, as far as practicable, with the adjoining landscape to minimise the visual impact on the natural character of the area*

Policy 6.3.3 *When processing resource consent applications for disturbance, removal of natural material, or deposition, consider whether the following may be effective to avoid, remedy, or mitigate adverse effects:*

(a) Buffers or setbacks to protect adjacent values;

(b) Limits on the activity, including the location, rate, volume, size of material, area, timing, duration, methods, or equipment used;

(c) Industry best practice guidelines and codes;

(d) For deposition in riverbeds, measures to maintain flood flow capacity, bed levels, channel location, and riverbed and bank stability;

(e) Measures to ensure that any natural material removed is replenished, either by natural processes or by an operator, unless the removal is to reduce a hazard risk;

(f) Contingency measures if a resource becomes depleted.

Policy 6.3.5 *When processing resource consent applications for disturbance activities in or near a Coastal Hazard Area identified in Schedule 3C, or in an area which may potentially be subject to coastal hazards, a hazard risk assessment may be required to further assess the effects of the proposed disturbance on the hazard risk.*

Comment

The seawall will be consistent with other existing coastal protection structures in the area. The seawall will be tied into the existing wall at the southern end and the existing groyne at the northern end.

Chapter 10 Noise

Objective 10.2.1 *To manage noise levels generated within the coastal marine area in order to avoid, remedy, or mitigate any adverse effect.*

Policy 10.3.1 *When determining whether noise levels from an activity requiring resource consent within the coastal marine area are reasonable or unreasonable, particular regard will be had to:*

(a) *The scale of adverse effects on:*

i) *amenity values,*

ii) *other uses of the coastal marine area,*

iii) *adjacent land uses;*

(b) *The duration and nature of noise produced;*

(c) *The duration and nature of background noise;*

(d) *The New Zealand Standards NZS 6801 (2008) “Acoustics - Measurement of Environmental Sound”, NZS 6802 (2008) “Acoustics – Environmental Noise”, NZS 6803 (1999) Acoustics – Construction Noise”, and NZS 6807 (1994) “Noise Management and Land Use Planning for Helicopter Landing Areas”*

Comment

Mechanical equipment used during construction will increase noise levels in the CMA immediately adjacent to the work. However, this will be temporary as work is moved sequentially along the beach. The construction work will Comply with the relevant provisions of NZS 6803:1999 *Acoustic – Construction Noise* in respect of hours/days of work and acceptable noise levels.

9.5 West Coast Regional Land and Water Plan

9.5.1 Overview

The Regional Land and Water Plan (RLWP) came operative on 27th May 2014 and promotes the sustainable management of the West Coast’s land and water resources.

Chapter 4 Land Management

Chapter 4 contains issues, objectives and policies to control the appropriate management and effects from land disturbance activities.

Objective 4.2.1: *To avoid or reduce adverse effects from land disturbance so that the region’s water and soil resources are sustainably managed.*

Policy 4.3.1: To manage the disturbance of land and vegetation in order to avoid, remedy or mitigate any adverse effects on:

- (a) The stability of land (e.g slumping, subsidence or erosion), river banks and riverbeds and coastal margins;
- (b) Water quality, including clarity, turbidity and temperature changes and instream values
- (c) Changes in water level including water table
- (d) Public access to rivers, lakes and their margins and the coast;
- (e) Natural character and aquatic ecosystems;
- (f) Soil depth and soil fertility;
- (g) The integrity of property and structures;
- (h) Cultural and recreational values
- (i) Significant indigenous vegetation and significant habitats of indigenous fauna.

Comment

The proposed land disturbance associated with the construction of the seawall extension will have no than minor effects on the surrounding environment. The site has been modified to provide for informal beach access and coastal protection. Some existing indigenous plants will require disturbance, with restoration and replanting managed under Site Landscaping and Planting Plan agreed with iwi and adjacent landowners.

No waterways traverse the site. To mitigate any adverse effects associated with construction, the overall work will be associated under a Construction Environmental Management Plan that will be approved by WDC.

Public access will be temporarily restricted during construction for public safety purposes as the work moves along the site. However, the seawall will be designed to maintain public access points after construction at the seaward ends of Hampden and Tudor Streets as well as Richards Drive.

Where practicable, penguin access to potential backshore habitat will be enhanced or maintained.

9.6 Westland District Plan

The Westland District Plan establishes a framework within which natural and physical resources will be managed in Westland. The Plan identifies issues relating to resource use, development and/or protection and sets out objectives and policies which address the issues.

Relevant Objectives and Policies	Assessment
Objective 3.2.1 To establish levels of environmental quality for Westland which enable people and communities to provide for their social, economic and cultural well being, while meeting the principles of sustainable management of natural and physical resources.	Consistent The proposal is consistent with this objective as the extension of the seawall will provide protection for nearby residents and the local community.
Objective 3.9.1 To identify, protect and enhance the distinctive Westland character of the District’s settlements.	Consistent The extension of the seawall will protect the township of Hokitika.
Objectives	Consistent As part of the detailed design, it is proposed that a Vegetation Planting Plan will be

Relevant Objectives and Policies	Assessment
<p>3.10.1 To ensure development does not impinge on the integrity of landscapes in Westland.</p> <p>3.10.2 To maintain and protect the existing scenic and open and diverse character of Westland District, dominated by natural dynamic processes.</p> <p>3.10.3 To ensure that land uses, buildings and development have regard to the natural landscapes in which they are located or seek to be located.</p>	<p>submitted and approved. This will ensure that the planting will be in keeping with the natural landscape.</p>
<p>Objective 3.12.1 To preserve the natural character and unique qualities of the coastal environment by taking into account the effects of subdivision, use or development on these values.</p>	<p>Consistent</p> <p>The seawall extension will ensure that the township of Hokitika is protected from sea level rise and erosion events for a period of up to 15 years.</p>
<p>Part 4 Policies</p> <p>Amenity Policies</p> <p>A. The effects of activities which can have significant adverse effects on amenities and the well being of residents shall generally be avoided, remedied or mitigated.</p> <p>B. Noxious, offensive, and/or dangerous activities shall be segregated where there is potential to generate adverse effects on the environment.</p> <p>E. The effects of activities which can be seen as adversely affecting the overall environmental amenity of the District shall be avoided.</p>	<p>Consistent</p> <p>The proposal is considered to be consistent with these policies as the extension of the seawall will not have any significant adverse effects on amenities and the well being of residents or the District.</p>
<p>Landscape Policies</p> <p>A. The continuity of the mountains to sea landscape in Westland particularly in the south of the District and significant landscape elements shall be protected by ensuring development takes into account the landscape setting.</p> <p>B. The contribution of indigenous vegetation to the landscape character of the district shall be recognised and its clearance controlled.</p>	<p>Consistent</p> <p>The extension to the seawall and future planting will be in keeping with the surrounding environment and therefore consistent with this policy by the construction of a low profile seawall that will be covered for much of its length by sand and appropriately planted.</p>
<p>Natural Habitats and Ecosystems Policies</p> <p>A. Adverse effects on the integrity, functioning and health of natural habitats and ecosystems and indigenous species shall be avoided, or where avoidance is not practical, remedied or mitigated.</p> <p>B. The protection and enhancement of areas of significant indigenous vegetation and habitats of indigenous fauna, and outstanding natural features in the district will be encouraged.</p>	<p>Consistent</p> <p>The proposal is not considered to have adverse effects on the natural habitats and ecosystems. Any effects on indigenous species, namely the blue penguin and fur seals are also considered to be less than minor. The design of the seawall extension and the approval of vegetation planting plan will ensure the protection and enhancement of the indigenous vegetation and fauna.</p>
<p>The Coast Policies</p> <p>A. Development, use or subdivision affecting the natural character of the coastal environment shall have particular regard to the following:</p>	<p>Consistent</p> <p>The matters identified have, where relevant, been had regard to as specified in Section 5 of the AEE.</p>

Relevant Objectives and Policies	Assessment
<p>Coastal processes and natural landforms</p> <p>The area is distinctive for natural coastal processes which may also provide a defence to hazards such as beach erosion, shoreline recession, coastal entrance stability, sand drift, coastal inundation, slope and cliff instability.</p> <p>Ecosystem functioning and health</p> <p>The area is ecologically representative and/or by its connection to one or more significant areas, makes a major contribution to the overall functioning or value of these areas.</p> <p>Indigenous vegetation and habitat</p> <p>The area supports significant indigenous vegetation and/or natural habitat that is important for migratory species or for breeding, feeding or other vulnerable stages of indigenous species.</p> <p>Open space and amenity values</p> <p>The area contains popular areas of open space and/or significant historic, cultural, recreational or scientific values.</p> <p>Protected Status</p> <p>The area has been set aside by NZ statute or covenant for protection and preservation or is a recognised wilderness area.</p> <p>Buffering</p> <p>The area is well protected from other human based modifying influences.</p> <p>B. The adverse effects of subdivision, use or development on the natural character of the coastal environment shall be avoided or mitigated, in particular, in highly sensitive areas such as Wetlands and lagoons.</p> <p>C. The maintenance and enhancement of public access and areas of open space shall be encouraged to and along the coastline where these will contribute to enjoyment of the coastal environment by the public.</p> <p>D. Development, within the coastal area should take place in modified areas such as existing settlements in preference to unmodified areas.</p> <p>E. Development in unmodified areas should only take place where the setting is integral to the development proposal and adverse effects can be avoided, remedied or mitigated.</p>	

Summary: The proposed works are consistent with relevant objectives and policies within the Westland District Plan.

9.7 Marine and Coastal Area (Takutai Moana) Act 2011

The Marine and Coastal Area (Takutai Moana) Act 2011 establishes a legislative framework for the recognition of customary interests in the common marine and coastal area between the line of mean highwater springs and the outer territorial limits in the sea. Under the Act, iwi, hapu and whanau can apply to the Crown to seek agreement to recognise Customary Title (CMT).

Section 62(3) of the Act requires an applicant to notify groups who have applied for recognition of CMT.

Comment: Two groups (Ngai Tahu and Te Runanga o Toa Rangitira) have made application under the Act. The area within these applications includes the location of the proposed WCRC seawall. WCRC has notified both groups by letter (see **Appendix D**) as required by Section 62(3) of the Act.

10 Conclusions

The West Coast Regional Council is applying for resource consents to allow the construction and operation of the Hokitika seawall extension for a term of 15 years.

The overall conclusion of this Assessment of Environmental Effects is that any adverse effects on the environment from the proposal will be minor or less and will be appropriately avoided or mitigated if the construction and maintenance of the seawall extension is undertaken in accordance with the recommended consent conditions set out in **Appendix E** of this report. The proposal will have positive effects by providing short to medium term protection to properties immediately inland from coastal erosion. The proposal is consistent with the purpose and principles of the RMA. It is also generally consistent with, and is not contrary to, the relevant objectives and policies of relevant regional and local planning documents. As such, it is considered that consents can be granted to the proposal under sections 104D, 104 and 104B of the RMA.

Consent conditions that take into account the nature of the proposed activity and the term of the consent have been proposed.

A

Appendix A – Contaminated Land Report



Preliminary Site Investigation (Contamination) - Hokitika Seawall Extension

Prepared for West Coast Regional Council
Prepared by Beca Limited

12 April 2022



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Appendices

Appendix A – Hokitika Seawall Draft Design

Appendix B – Historical Aerial Photographs

Appendix C – Council Provided Information

Revision History

Revision N°	Prepared By	Description	Date
1	Agustina Cortina Melissa Fletcher	Draft Report	28 January 2022
2	Agustina Cortina	Final Report	12 April 2022

Document Acceptance

Action	Name	Signed	Date
Prepared by	Agustina Cortina Melissa Fletcher		12 April 2022
Reviewed by	Vicky Kennaugh Phillip Ware, CEnvP SC		12 April 2022
Approved by	Jennifer Hart		12 April 2022
on behalf of	Beca Limited		

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Executive Summary

Beca Limited (Beca) was commissioned by West Coast Regional Council (WCRC) to undertake a Preliminary Site Investigation (PSI) for the proposed extension of the Hokitika Seawall. The WCRC has advised its intention to extend the existing seawall from its current northern end position to the end of the township at Richards Drive (the site). This is an approximately 1,100 m long extension.

The purpose of this PSI is to identify potential for soil contamination (based on reviewed records) that may be present at the site due to historical or current land uses/activities which may be disturbed by the proposed works and comment on contaminated land consent requirements (note this PSI does not constitute a planning assessment).

The site is currently classified by WCRC as a road reserve along the coastal erosion zone and is used for beach access. Based on historical aerial imagery, the site was mainly undeveloped and vegetated, and has remained so until present day. Over time ancillary buildings have extended past their respective residential boundaries along Revell Street (parallel to the site), into the site. Two of these buildings were present from 1963-1988, while the third was built in 1984 and is still present. Based on the age of construction, asbestos, lead paint and / or treated timber may have been used during construction or maintenance activities. The deterioration of these materials overtime (based on wind/ rain action) or poor demolition practices may have resulted in localised shallow soil contamination around the structures.

During the site walkover broken brick fragments were observed in the surface ground cover throughout the site with no observable source, and impromptu conversations with residents mentioned the use of historical offal pits and illegal dumping in the sand dunes on site. Evidence of this within the site was not observed on historical aerial photographs or within the council information records.

Based on the information reviewed as part of this PSI, potential sources of contamination include:

- Deterioration of asbestos containing materials (ACM) and / or lead paint and / or treated timber from historical building structures. This land use is considered to meet the 'more likely than not' threshold under the Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011 (NESCS) as Hazardous Activities and Industries List (HAIL) Activity I 'Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment'.
- Buried waste/ filling along the length of the site based on the observations of rubble during the site walkover. This activity is not considered to meet the 'more likely that not' threshold under the NESCS however it remains possible that contamination may be present, and investigation is recommended to assess if management is required.

Identified potentially complete exposure pathways include exposure of construction workers to contaminants in soils during site redevelopment and sediment and runoff directly into surface water.

Recommendations

- It is unlikely that Permitted Activity (PA) soil disturbance volume thresholds can be met under the NESCS, therefore Resource Consent will be likely required. Due to the short timeframes for consent submission, consent as a discretionary activity will be required with completion of a Detailed Site Investigation (DSI) and Contaminated Soils Management Plan (CSMP) (if determined to be required based on the DSI findings) included as conditions of consent.
- Consent under the West Coast Regional Land and Water Plan may be required depending on the findings of the DSI.
- A DSI is also recommended to inform material management, re-use and disposal.
- An asbestos demolition survey with appropriate removal of identified ACM is required for all pre-2000 buildings needing demolition within the site area.

1 Introduction

Beca Limited (Beca) was commissioned by the West Coast Regional Council (WCRC) to undertake a Preliminary Site Investigation - Contamination (PSI) for the proposed 1,100 m long extension of the Hokitika Seawall (the site). The WCRC has advised its intention is to extend the existing seawall north from its current position at Stafford Street to the northern end of the Hokitika township at Richards Drive.

1.1 Purpose and Scope

The purpose of PSI is to:

- Summarise information about the current and historical use of a site to inform the potential for soil contamination and the development of a Conceptual Site Model (CSM).
- Determine whether subsequent Detailed Site Investigation (DSI) is needed.
- Advise on contaminated land consent requirements for the proposed works under the:
 - Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011 (NESCS).
 - Contaminated land rules of West Coast Regional Land and Water Plan (L&WP).

The investigation included the following scope of works:

- A review of the following publicly available information on the site and directly adjacent properties:
 - Local geology, hydrogeology and sensitive environmental receptors.
 - Selected historical aerial photographs from Retrolens and Google Earth.
 - Contaminated land enquiries which include Selected Land Use Sites (SLUS) from WCRC.
 - Available property information from WCRC and Westland District Council (WDC).
 - Local consents and bore information.
- A walkover inspection of the proposed works area.
- Other relevant information and reports made available during the timeframe of this investigation.

A planning review of the district and regional plans is being undertaken separately.

This assessment has been undertaken and reported in general accordance with following:

- Ministry for the Environment (MfE) Contaminated Land Management Guidelines No. 1 – Reporting on Contaminated Sites in New Zealand (2021)
- MfE Contaminated Land Management Guidelines No. 5 – Site Investigation and Analysis (2021)
- New Zealand Guidelines for Assessing and Managing Asbestos in Soils (2017), herein referred to as ‘the GAMAS’
- Management and Removal of Asbestos Approved Code of Practice (November 2016), herein referred to as ‘the Asbestos ACOP’

2 Site Description

2.1 Site Location

The site is located along the seaward side of the residential houses along Revell Street, between Stafford Street and Richards Drive in Hokitika (**Figure 1**). An existing seawall, shown in green within is located south of the site.

The site does not contain a legal description on the WCRC GIS mapping system¹ as it has been classified as a road reserve within a coastal erosion zone. The site comprises a gravel road, sand dunes and vegetation. Ancillary buildings such as sheds and garages from the houses along Revell Street have encroached across their respective property boundaries into the reserve, though these buildings are outside of the approximate site boundary. The site has an approximate area of 2.23 hectares.



Figure 1 - Proposed location of the Seawall Extension (Image Source: Hokitika Seawall Extension Design and Consents - Commissioning Letter written by Beca dated 17 June 2021).

¹ WCRC GIS Mapping System (<https://gis.westcoast.govt.nz/WestMaps/>) viewed on 1 December 2021.



Figure 2 - Site Plan (Image source: Google Earth Pro).

2.2 Proposed Works

The design of the seawall has taken into consideration climate change effects for the agreed design life (10-15 years). This will allow the WCRC to prepare and implement a long-term adaptive management strategy, while securing short-term protection.

The current design (23 December 2021) is at Concept Design stage and therefore may change as design progresses. We understand that the proposed works sequence is:

- Remove existing vegetation and store for re-planting
- Remove existing rocks and set aside for sorting for re-use
- Excavate embankment material and store onsite
- Place geotextile, underlayer and rock armour
- Fill voids in the rock armour crest with smaller size rocks
- Place excavated material over the revetment reinstating the existing beach profile, excess material to be disposed.
- Seeding/planting of the bank, reusing removed vegetation where possible.

Based on indicative calculations the soil disturbance volumes and earthworks associated with the construction of the seawall extension are approximately 70,000 m³. Approximately 30,000m³ of the excavated beach material will be replaced upon completion of the seawall.

The current design extends to the edge of the proposed seawall location which can be found in **Appendix A**. This design does not account for construction works required for the installation of the seawall. A batter slope along the eastern site boundary will likely be required for facilitating construction of the seawall, therefore a construction buffer zone of approximately 5 m will be required where plant and machinery may operate and disturb ground freely as shown in **Figure 3** and **Figure 4**.

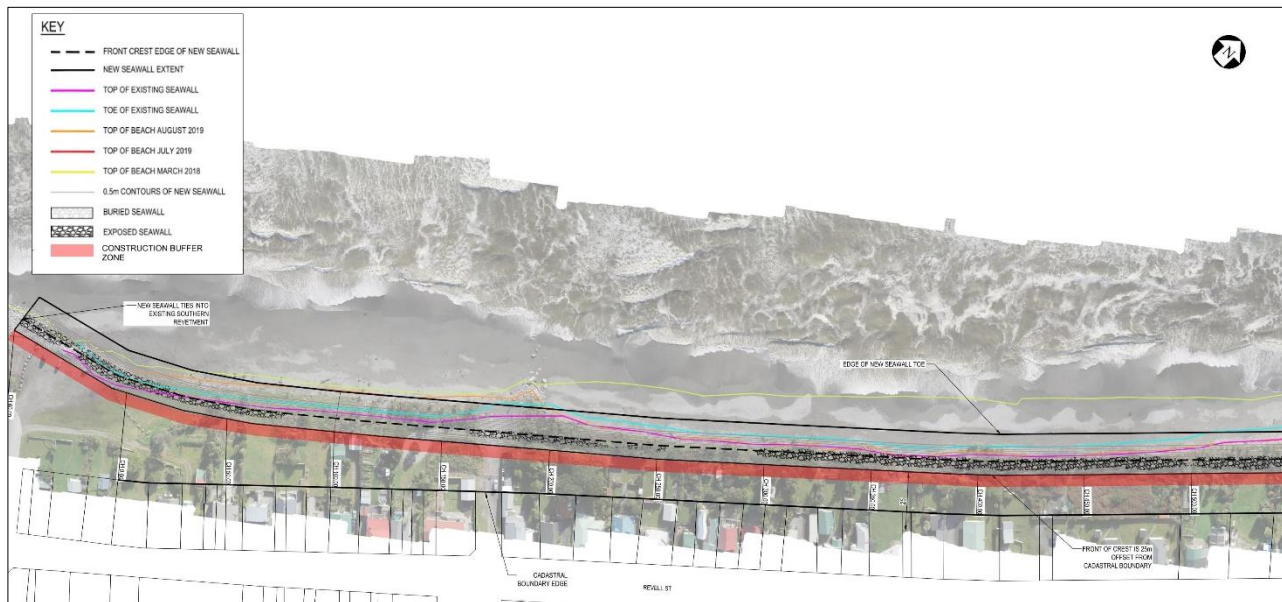


Figure 3 - Draft design for proposed seawall extension (Stafford Street to Tudor Street) with added construction buffer zone (Image Source: Beca Design Documents, 23 December 2021)

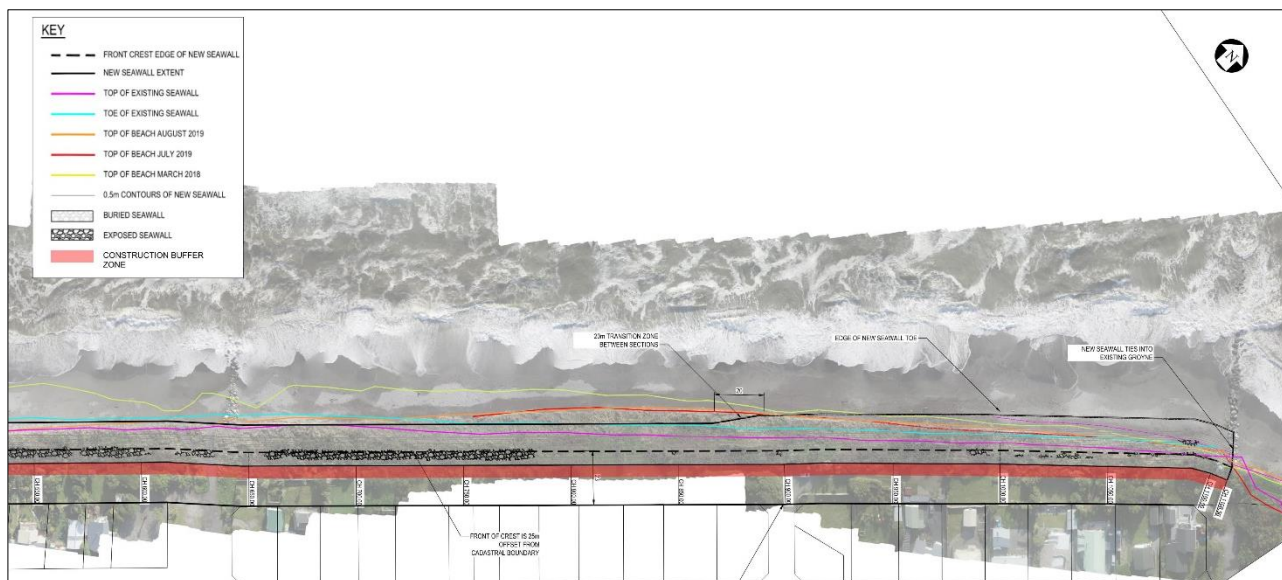


Figure 4 - Draft design for proposed seawall extension (Tudor Street to Richards Drive) with added construction buffer zone (Image Source: Beca Design Documents, 23 December 2021)

3 Environmental Setting

3.1 Current Land Use

The site is currently classified as a road reserve along the coastal erosion zone and is used for beach access. Ancillary buildings such as sheds and garages from the houses along Revell Street have encroached across their respective property boundaries into the reserve, though these buildings are outside of the approximate site boundary.

3.2 Surrounding Land Use

The surrounding land use is predominantly used for residential housing to the east and south-east, commercial buildings to the south and south-west, pastoral farming to the north, and the Tasman Sea to the west.

3.3 Topography

The Tasman Sea is located to the west of the site. The site elevation ranges from 3 - 6 m above sea level (asl). To the east of the site the elevations vary between 5 – 8 m asl, and approximately 360 m to the north-east of the site the Hokitika Cemetery is elevated up to 43 m asl.

3.4 Hydrology

The Tasman Sea is present adjacent to the west.

The WCRC GIS Mapping System does not contain information on the flood plains or overland flow paths on site. The Hokitika township is likely to be within the flood plain for the Hokitika River that is approximately 550 m to the south of the site boundary and discharges in a western direction, ultimately discharging to the Tasman Sea 1.2 km from the site.

3.5 Geology and Hydrogeology

Published information² indicates the site is underlain by Late Quaternary beach and terrace cover deposits, described as *'beach sand, gravel, shell and boulder banks of the modern coastal plain; marine gravel, sand and mud beneath low coastal terraces.'*

A search on the WCRC GIS Mapping System indicates there are no groundwater bores within 200 m of the site. A review of the NZ Geotechnical Database³ indicates that several geotechnical investigations have been conducted within 200 m of the southern site boundary that recorded groundwater levels between 0.52 m and 2.69 m below ground level (bgl). Due to the proximity to the Tasman Sea, groundwater levels at the site are likely to be tidally influenced. The MfE GIS mapping tool indicates the site is not located above an aquifer⁴.

3.6 Sensitive Receptors

Residential properties are present on the eastern boundary. St Mary's Catholic School is approximately 130 m south-east of the site boundary.

² GNS Science – New Zealand Geology Web Map (<https://data.gns.cri.nz/geology/>), viewed 1 December 2021.

³ NZ Geotechnical Database (<https://www.nzgd.org.nz/ARCGISMapViewer/mapviewer.aspx>), viewed 1 December 2021.

⁴ Ministry for the Environment (<https://data.mfe.govt.nz/layer/52675-location-and-extent-of-nzs-aquifers-2015/>), viewed on 1 December 2021.

4 Information Search

4.1 Historical Aerial Photographs

Historical aerial photographs for the site have been sourced from:

- Retrolens⁵ for the years 1951, 1963, 1970, 1984, and 1988; and
- Google Earth Pro⁶ for the years 2006, 2015, and 2019.

The aerial photographs have been reviewed to identify any changes in land use activities on the site and surrounding properties. A summary of pertinent observations is included in **Table 1**. Historical aerial images are provided in **Appendix B**.

Table 1 - Summary of Observations from Historical Aerial Photographs

Year	On Site	Surrounding Area
1951	<ul style="list-style-type: none"> • The site is undeveloped land covered in vegetation and sand dunes. • Many sandy paths are visible that cross the site from the houses along the eastern boundary. 	<ul style="list-style-type: none"> • The southern boundary of the site is intermittently lined with residential properties (higher density in the south-west) while the north-eastern area is predominantly comprised of grass/vegetation. • A building and driveway are present in the centre of the land north of Richards Drive. • In the south-eastern area of the site, six residential properties have extended their property boundaries into the reserve, though still outside of the site. • Hokitika Cemetery is visible in the east of the aerial photograph.
1963	<ul style="list-style-type: none"> • The vegetation within the site is denser in the south-west though there is no vegetation visible in the northern area of the site. • Along the site boundary in the location of present day 179 Revell Street, there are two potential sheds/garages. 	<ul style="list-style-type: none"> • To the north-east of the site, more residential properties have developed. • Along the southern boundary, ancillary buildings of residential properties extend into the reserve.
1970	<ul style="list-style-type: none"> • More established walkways are apparent throughout the site, leading from the properties to the beach. • The vegetation in the northern area of the site remains sparse. 	<ul style="list-style-type: none"> • The present day 252 Beachside Motel has been built near the north-eastern site boundary. • The surrounding land continues to be developed. • Ancillary buildings have developed adjacent the southern site boundary.
1984	<ul style="list-style-type: none"> • A total of three ancillary buildings like sheds and garages are visible within the southern area of the site. Two are located at present day 179 Revell Street, and the third is at 159 Revell street. • The majority of the site is covered in vegetation. 	<ul style="list-style-type: none"> • The surrounding land has been further developed, with predominantly residential dwellings. • The building to the north of Richards Drive is no longer present and the driveway leading into the property north of Richards Drive has widened.
1988	<ul style="list-style-type: none"> • The vegetation throughout the site is sparse. • The sheds/garages at present day 179 Revell Street are no longer present. The shed located at present day 159 Revell Street is still apparent along the site boundary. 	<ul style="list-style-type: none"> • A pool is present on the site boundary at the approximate location of present day 237 Revell Street. • In the approximate location of present day 198 Revell Street, the property and nearby properties have been demolished.
2006	<ul style="list-style-type: none"> • The vegetation within the site is denser. • The shed at 159 Revell Street is still present. 	<ul style="list-style-type: none"> • A residential neighbourhood has been developed to the north of Richards Drive, adjacent the site. • The pool at present day 237 Revell Street is no longer present.

⁵ Retrolens (<https://retrolens.co.nz/>), viewed 29 November 2021.

⁶ Google Earth Professional, viewed 29 November 2021.

Year	On Site	Surrounding Area
		<ul style="list-style-type: none"> Two small buildings have been built north of Richards Drive within the provisional extension.
2015	<ul style="list-style-type: none"> In the location of present day 183 Revell Street, there is a cluster of what appears to be buildings on the southern border of the site. 	<ul style="list-style-type: none"> One building to the north of Richards Drive is no longer present. A shed remains. There are fewer ancillary buildings present along the southern boundary of the site.
2019	<ul style="list-style-type: none"> The land behind 165 Revell Street has been cleared of vegetation and a rounded footprint is apparent. The cluster of buildings at present day 183 Revell Street along the southern border is no longer present. 	<ul style="list-style-type: none"> No key observations were made that differ from the 2015 photograph.
2021	<ul style="list-style-type: none"> At present day 165 Revell Street, the vegetation has grown over the rounded footprint, though it is still apparent. In the northern area of the site, the vegetation is sparse, and the ocean waves are visible within the site boundary. The shed at 159 Revell Street is still present along the site boundary. 	<ul style="list-style-type: none"> No key observations were made that differ from the 2015 photograph.

4.2 West Coast Regional Council Information

4.2.1 Contamination Enquiry

An enquiry was submitted to the WCRC in relation to contaminated land for the site with a response received on 1 December 2021. WCRC provided Selected Land Use Sites (SLUS) statements that indicate whether land uses that appear on the Hazardous Activities and Industries List (HAIL) are known to have currently or historically taken place on or adjacent to the site (see **Appendix C** for the statements).

The council's records indicate that there are no known HAIL areas within the site boundary. HAIL activities that have been identified within 100 m from the site boundary are summarised in **Table 2** with the HAIL map provided in **Figure 5**. During the site walkover (Section 4.3) observations of the HAIL areas were made and are also summarised in **Table 2**. Site walkover observations of private properties were made from public footpaths and therefore not all sources or evidence of contamination may have been noted.

Table 2 - Summary of HAIL Activities

Site Ref.	Site Address	HAIL Activity	HAIL Status	Comments from SLUS Report	Site Walkover Observations
SAHS_311	Private land located adjacent to 20 Richards Drive	G3: Landfill Sites	Not Verified	<ul style="list-style-type: none"> • Septage was dumped daily for years in sand dunes between Richards Drive and the Seaview outfall pipes. Used to be buried daily. • Former Hokitika Borough Council and Westland County Council would probably have been responsible for the discharge. In 2001, Richard Cotton (WDC) advised he hadn't heard of the dump. • This area is subject to chronic coastal erosion and sea flooding. • Seaview outfall discharge is still present today. 	<ul style="list-style-type: none"> • The area was observed from the beach between 16 and 20 Richards Drive. • No evidence of septage discharge or contamination was observed. • Seaview outfall pipes were not located; however, these may be buried.
SAHS_316	125 Revell Street, Hokitika	F7: Service stations including retail or commercial refuelling facilities	Verified; risk not quantified	<ul style="list-style-type: none"> • The lot was used for general motorcycle /machinery sales and service. • 546 L above ground storage tank (AST) was present until at least 2014. 	<ul style="list-style-type: none"> • Currently under development for a retail complex that extends from 127-137 Revell Street. • No above ground structures present except for the temporary site container office.
SAHS_317	139 Revell Street, Hokitika	F7: Service stations including retail or commercial refuelling facilities	Verified; risk not quantified	<ul style="list-style-type: none"> • Based on anecdotal information, the lot was used until 1994 a transport depot that contained 2230 L diesel underground storage tank (UST). The tank was removed 1994. • At the time of the SLUS report dated 27/6/2003, the land was used as a garden centre and vegetable retail outlet 	<ul style="list-style-type: none"> • Land-use is currently a residential property. • No well heads, staining or any evidence of a former service station were observed.

Site Ref.	Site Address	HAIL Activity	HAIL Status	Comments from SLUS Report	Site Walkover Observations
SAHS_322	116 Revell Street, Hokitika	F7: Service stations including retail or commercial refuelling facilities	Not Verified	<ul style="list-style-type: none"> • Until the late 1970s, the lot was used as a service station. • The lot was a rental car outlet from 1970s to 1985. • A 2070 L petrol UST was stored here. It is unknown if the tank was decommissioned or removed. In 2001 the landowner advised there was never a tank on the site. • When the lot was converted into office space, the oil and greasing pit was filled in. 	<ul style="list-style-type: none"> • Land-use is currently for commercial use occupied by New World and a Beauty Salon. • No well heads, staining or any evidence of a former service station were observed.
SAHS_327	243 Revell Street, Hokitika	F7: Service stations including retail or commercial refuelling facilities	Verified; risk not quantified	<ul style="list-style-type: none"> • Until 1975, the lot was used as a service station. • Pipework associated with the UST is present, though anecdotal information states the UST was removed in 1975 • The site has been inundated with sea level flooding. • A 2003 excavation in the area where the UST was located indicated the ground had been backfilled (fragments of concrete noted), no oil sheen or odour was observed. 	<ul style="list-style-type: none"> • Land-use is currently a residential property. • No well heads, staining or any evidence of a former service station were observed.
SAHS_380	252 Revell Street, Hokitika – Blacksands Motor Lodge	F7: Service stations including retail or commercial refuelling facilities	Verified; risk not quantified	<ul style="list-style-type: none"> • 1000L diesel AST (recorded in 2001) as installed to replace two 500 L diesel AST's in 1997. • The site is currently noted as a motel. 	<ul style="list-style-type: none"> • Land-use is currently a holiday park. • No well heads, staining or any evidence of a former service station were observed.

Site Ref.	Site Address	HAIL Activity	HAIL Status	Comments from SLUS Report	Site Walkover Observations
SAHS_446	133 Revell Street, Hokitika	A5: Dry-cleaning premises or bulk storage of dry-cleaning solvents	Verified; risk not quantified	<ul style="list-style-type: none"> • Until 1973, the site was used by a drycleaners. • A carpet and vinyl store were situated in this lot until the 1980s. 	<ul style="list-style-type: none"> • Currently under development for a retail complex that extends from 127-137 Revell Street. • Several stockpiles of vegetation and sandy gravels were observed. • Brick fragments and broken ceramic pipes or pots were noted within the stockpiles (Photo 10).



Figure 5 – Council Identified HAIL Map (source: GoogleEarth Pro)

4.2.2 Resource Consents

Information on consented activities were gathered from WCRC GIS Mapping System on 6 December 2021. In summary, four consents were recorded to have occurred within the site boundary. These consents (RC-2020-0149-01 to RC-2020-0149-04) relate to the black sand gold mining on Hokitika Beach. The WCRC GIS Mapping System does not contain dates for these consents. Activities within these consents include using surface water from Little Hou Hou Creek, disturbing the Coastal Marine Area, removing black sand for the purposes of black sand mining, as well as depositing coastal substances on the beach.

The following consents relevant to the surrounding area were granted within 250 m of site:

- RC13131 – A resource consent was granted for the pre-existing seawall to the south of the site that relates to coastal protection works associated with the installation of the seawall. This seawall begins approximately 30 m to the south-west of the site boundary.
- RC-2016-0120-01 – A resource consent was granted at 65 Fitzherbert Street for the installation of underground petrol storage tanks (UST). The UST is located approximately 250 m to the south-east of the site boundary.
- RC11027/1 - A resource consent was granted to discharge stormwater from the Hokitika reticulated stormwater system to the Hokitika River upstream of the coastal marine area. The discharge location is located approximately 260 m to the south-west of the site boundary, along the existing seawall.

The summarised consented activities within proximity to the site are not considered to present a contaminated land risk to the site or proposed works.

4.2.3 Property Files

As the site is classified as a road reserve along the coastal erosion zone property files were unavailable. As discussed in the review of historical aerial photographs we note that small ancillary buildings (e.g., sheds) have been constructed within the site boundary related to the adjacent residential properties.

The WCRC and WDC were contacted to obtain information on relevant consents, certificate of titles and building consents. The only information provided was a resource consent application form for an Assessment of Environmental Effects (AEE)⁷ for a temporary rock seawall in September 2021. This AEE is in relation to the site where a temporary seawall was erected to prevent further coastal erosion as an interim measure. No further documentation was provided by council relevant to the site.

4.3 Site Walkover

A site walkover was undertaken by a Beca Environmental Scientist on 7th December 2021. Each of the seven HAIL activities identified within 100 m from the site boundary (**Figure 5**) were observed from the street during the site walkover, summarised above in **Table 2**. Access in some areas was restricted by dense vegetation or localised surface water flooding. The following provides a summary and photographs of observations and conversations during the site visit:

- The site is bounded by the beach to the west and residential houses along Revell Street to the east. The majority of the houses have overtime encroached their property boundary on to the site by extending their backyards up to the beach line for gardens, lawns and ancillary buildings (**Photo 1**).
- A temporary seawall in the form of large boulders has been erected between the beach and site (**Photo 2**). Large amounts of sand deposits have washed over the boulders. Beach erosion with escarpment is widespread. Some residents have built their own access way to the beach by making a makeshift 'ramp' out of sand to avoid climbing over the boulders.
- In the areas where properties haven't claimed the site, the land is predominately well vegetated and swampy, with natural depressions throughout from sand build-up throughout the years (**Photo 3**). A faint 4WD track runs through the centre however this cannot be accessed all the way along the reserve due to dead ends or flooding (**Photo 4**).
- Broken brick fragments were observed in the surface ground cover throughout the site with no observable source (**Photo 5 and 6**). No other debris including suspected asbestos-containing materials (ACM) were observed in readily accessible areas.
- A large pile of horse manure has been dumped on site between 245 Revell Street and the beach. Two horses were observed on the property (**Photo 7**).
- A conversation with a local resident who approached along the beach mentioned offal dumping was known to have occurred in the early 1900's in the southern end of the site, as well as illegal 'fly' tipping occurred in the northern end of the site in the 1970s.
- A large stormwater pipe located at the corner of Revell Street and Richards Drive runs under a driveway and follows a stream to the sea (**Photo 8**). The stream is currently blocked to the sea by large amounts of driftwood and is stagnant and brown. The stormwater channels along Richards Drive also have stagnant water.

⁷ Resource Consent: Application Form including Assessment of Environment Effects (AEE) and Supporting Information. Submitted by Hokitika Coastal Protection Alliance (HCPA) - 25 September 2021.

- North of Richards Drive, the site does not currently have a temporary seawall and is bounded with the beach by grasses and flaxes (**Photo 9**). Beach erosion with escarpment is observed but not as severe as further south of the site.



Photo 1: A property encroached right up to the beach line.

Photo 2: Temporary seawall in the form of large boulders (facing south-west). Sand deposits can be seen washed up behind the boulders.



Photo 3: 4WD track through the centre of the site.

Photo 4: 4WD track through the centre of the site showing flooding.



Photo 5: Broken brick fragments observed in the surface ground cover within site near 165 Revell Street.



Photo 6: Soil profile at the northern end of the site near Richards Drive showing brick fragments within.



Photo 7: Horse manure dumped on site between 245 Revell Street and the beach.



Photo 8: Stormwater outfall pipe leading to the sea at the corner of Revell Street and Richards Drive.



Photo 9: Location of proposed seawall extension north of Richards Road.

Photo 10: 133 Revell Street showing stockpiles with debris.

5 Discussion

5.1 Summary of Information Search

The information search was undertaken to identify areas that the proposed works area passes through, and adjacent activities, that may have resulted in contaminated soil within the site.

5.1.1 On-Site

Historical Structures

Based on historical aerial imagery, the site was mainly undeveloped and vegetated, and has remained so until present day. A number of the houses along Revell Street have extended their residential boundaries towards the site, with ancillary buildings (e.g. sheds or garages) extending adjacent to or into the eastern site boundary. Ancillary buildings (e.g., sheds or garages) were observed within the site boundary at:

- 179 Revell Street - two sheds/garages were visible within aerial photographs from 1963 and removed// demolished sometime before 1988.
- 159 Revell Street - shed/garage first apparent in the 1984 historical aerial photograph.
- 183 Revell Street - cluster of buildings noted in the 2015 aerial.

Given the age of these buildings (particularly those constructed prior to 2000), it is considered likely that ACM⁸ and / or lead paint⁹ were used in their construction and / or maintenance. Treated timber may also have been used which may also have resulted in localised arsenic contamination. The deterioration of these materials overtime (based on wind/ rain action) or poor demolition practices may have resulted in localised shallow soil contamination. Based on the information obtained during this search, the HAIL activity I: *Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment* is considered to meet the 'more likely than not' threshold related to the deterioration / improper demolition of building structures constructed using ACM, lead paints or treated timber. Refer to **Figure 6** and **Figure 7** for a HAIL plan.

If buildings located on site need to be demolished for the installation of the proposed seawall extension, an asbestos demolition survey with appropriate removal of identified ACM is required prior to their demolition.

Fill Material

A site visit was undertaken on 7 December 2021. Broken brick fragments were observed in the surface ground cover throughout the site with no observable source. No other debris including ACM were observed. Impromptu conversations with residents mentioned the use of historical offal pits and illegal dumping in the sand dunes on site, however evidence of this within the site was not noted on historical aerial photographs. Historically along the West Coast of New Zealand, there were a large number of small dump sites where waste was disposed of on the outskirts of urban areas and along the coast; with MfE¹⁰ reporting, *'There is a history of illegal dumping of cleanfill on the West Coast largely due to large distances between cleanfills and extent of reserve land and DOC owned land'*. Anecdotal evidence cannot always be relied upon, and as no observations were made during the historical aerial photographs review or advised within the Council information requests the potential presence of buried waste is not considered to meet the 'more likely than not' threshold for soil

⁸ BRANZ. New Zealand Guidelines for Assessing and Managing Asbestos in Soil (2017).

⁹ Ministry of Health (MoH). Guidelines for the Management of Lead Based Paint (2013).

¹⁰ <https://environment.govt.nz/publications/waste-facilities-survey-methodology-and-summary-of-results/4-regional-summaries/> accessed 13/12/21.

contamination under HAIL G3 - *Landfill Sites* or HAIL G5 - *Waste Disposal to land*. However, it remains possible that contamination from historical filling may be present along the length of the site (**Figure 6** and **Figure 7**) and a soil sampling investigation is recommended. The findings of the soil sampling investigation would also inform material management, disposal and re-use for the proposed construction works.

5.1.2 Surrounding Land Uses

The SLUS reports obtained from WCRC states there are no known hazardous activities and industries recorded within the site but seven HAIL activities within a 100 m radius of the site, as shown in **Figure 6** and **Figure 7**. Six of the seven SLUS sites (excluding SAHS_446) have since changed land-use practices, and at the time of this investigation showed no visual evidence of contamination. Although there is potential that contamination from these historical land-uses may have entered groundwater and migrated onto the site, it is unlikely that contamination will be present on site at quantities that are harmful to human health or the environment due to the time since the activity occurred and the dilution within groundwater from daily tidal changes. The risk of contaminants associated with these sites are low.

The SLUS report for 133 Revell Street (SAHS_446) identified the site as having HAIL activity “A5 - *Dry-cleaning premises or bulk storage of dry-cleaning solvents.*” During the site walkover, the Beca environmental scientist observed no visual evidence of contamination relating to a dry-cleaning facility such as remnants of storage drums, ASTs/USTs or areas of stained grass from spills. Brick fragments and broken ceramic pipes or pots which appear to have been unearthed during the current re-development were noted in stockpiles. The SLUS states the dry cleaners was operating prior to 1973, and the property is located approximately 80 m to the south-west of the site. Based on the age since this activity occurred, the likely groundwater flow direction (westerly) and dilution from daily tidal changes, any contamination resulting from localised spills from this activity are unlikely to have resulted in contamination within the site.

5.2 HAIL Areas

On site, HAIL I ‘*Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment*’ is considered to meet there ‘more likely than not’ threshold related to the potential deterioration of ACM and / or lead paint and /or treated timber from historical building structures. This area is identified as a provisional HAIL on **Figure 6**.

Figure 6 and **Figure 7** also presents the area of site where contamination is possible related to historical filling, but which does not meet the ‘more likely than not’ threshold.

Council identified HAIL areas located within 100 m of the site are also presented on **Figure 6** and **Figure 7**.



Figure 6 – HAIL Area and Potential Contamination Plan – Part 1 (Image Source: WCRC GIS Mapping System)



Figure 7 - HAIL Area and Potential Contamination Plan – Part 2 (Image Source: WCRC GIS Mapping System)

5.3 Potential Contaminants of Concern

Review of the site historical information has identified the following land use activities which may have resulted in the contamination of soil and/or groundwater at the site. Contaminants of potential concern associated with these activities have also been identified in **Table 3**. A soil sampling investigation is recommended.

Table 3 - Potential Contaminants of Concern

Activity	HAIL Code	Contaminants of Potential Concern
<ul style="list-style-type: none"> Deterioration or demolition of buildings constructed prior to 2000 	<p>I: Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment.</p>	<ul style="list-style-type: none"> Asbestos Lead Arsenic
<ul style="list-style-type: none"> Potential Filling 	<p>Does not meet the 'more likely than not' threshold but presence of fill material still considered possible and may present a risk to the project.</p>	<p>Depends on composition of fill material, but likely to include:</p> <ul style="list-style-type: none"> Asbestos Heavy metals Hydrocarbons

5.4 Exposure Pathway Assessment

The Conceptual Site Model (CSM) (see **Table 1**) was developed to describe the relationship between sources of contamination on site, the human and environmental receptors that may be exposed to those contaminants in the context of the development of the seawall, and the pathways by which those receptors may be exposed. Overall, recorded soil contaminant concentrations should not prohibit the proposed development of the site. This assessment relates to the proposed seawall development only and has not considered the potential for contamination within the site to be disturbed as a result of sea level change or coastal erosion.

Table 4 - Conceptual Site Model

<ul style="list-style-type: none"> Heavy Metals Asbestos Hydrocarbons 	Construction workers	Exposure of workers to contaminants in soils during site redevelopment – dermal contact, ingestion or inhalation of dust/vapours.	<p>Potentially Complete Pathway</p> <p>Potential contamination sources have been identified. A soil sampling investigation should be undertaken to characterise and advise on material management.</p>
	Future site users	Exposure of future site users to contaminants in soils – dermal contact, ingestion or inhalation of dust/vapours.	<p>Incomplete Pathway</p> <p>Site will remain as a road reserve following works and ground material will be covered by vegetation.</p> <p>Potential contaminants in soil are not likely to be present in sufficient quantities at the surface that pose a risk to human health.</p> <p>The location of any unidentified contaminants that is left in situ should be recorded and investigated.</p>
	General public	Exposure of general public to contaminants in soils – dermal contact, ingestion or inhalation of dust/vapours.	<p>Incomplete Pathway</p> <p>During construction site access to the general public will be restricted, and procedures put in place to prevent exposure (eg dust suppression).</p>

	Groundwater resources for public consumption	Leaching and migration of soil contaminants into groundwater.	<p>Incomplete Pathway</p> <p>Information from WCRC did not identify any active groundwater abstraction wells that was used for public water consumption within 200 m from the site.</p>
	Surface water	Migration of contaminants from the soil into surface water and/or groundwater.	<p>Incomplete Pathway</p> <p>Potential contaminants from the site are unlikely to have migrated off-site. Therefore, the risk to surface water and/or groundwater and other environmental receptors from is low.</p>
		Sediment and runoff directly into surface water.	<p>Potentially Complete Pathway</p> <p>Site is located adjacent to the beach and Tasman Sea. Appropriate erosion sediment control should be put in place by the contractor during earthworks and construction.</p>

6 Development Implications

6.1 Consents

A planning review is being undertaken separately however the following sections provide an indication of contaminated land consenting.

6.1.1 National Environmental Standard

The *Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011* (NЕСS) applies to land as per clause 5(7):

“Land covered:

- (7) *The piece of land is a piece of land that is described by 1 of the following:*
- a) an activity or industry described in the HAIL is being undertaken on it;*
 - b) an activity or industry described in the HAIL has been undertaken on it;*
 - c) it is more likely than not that an activity or industry described in the HAIL is being or has been undertaken on it.”*

The NESCS applies to certain activities taking place on a piece of land including sampling soil, soil disturbance, land use change, subdivision, all of which have the potential to be triggering activities should redevelopment of the site occur.

HAIL I ‘Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment’ is considered to meet there ‘more likely than not’ threshold related to the potential deterioration of ACM and / or lead paint and /or treated timber from historical building structures.

The proposed works are likely to intercept and include soil disturbance within the HAIL areas. As the HAIL areas are small (footprint of a shed/ garage) it is likely that the permitted activity criteria cannot be met as the entire HAIL area will be disturbed. If Permitted Activity criteria cannot be met consent under the NESCS is required for the works; a Detailed Site Investigation (DSI) is required.

6.1.2 West Coast Regional Land and Water Plan (L&WP)

The West Coast L&WP defines Contaminated Land as:

“Contaminated land means land that has a hazardous substance in or on it that;

- (a) Has significant adverse effects on the environment; or*
- (b) Is reasonably likely to have significant adverse effects on the environment.”*

As potential areas of contamination have been identified consent under the L&WP may be required. The findings of the DSI will enable further characterisation of the potential for adverse effects on the environment as well as the applicability of the works.

6.2 Recommendations

Potential areas of contamination were identified across the site relating to historical building structures and potential filling. A DSI will be required to confirm consent requirements and to inform material handling, re-use and disposal options. To determine the DSI scope a more intrusive site walkover should be undertaken, accessing areas that were inaccessible during the previous walkover.

7 Summary of Conclusions

- The site is currently classified as a road reserve along the coastal erosion zone and is used for beach access.
- Based on historical aerial imagery, the site was mainly undeveloped and vegetated, and has remained so until present day. Over time ancillary buildings have extended past their respective residential boundaries along Revell Street (parallel to the site), into the site boundary. Two of these buildings were present from 1963-1988, while the third was built in 1984 and is still present. Based on the age of construction, asbestos, lead paint and / or treated timber may have been used during construction or maintenance activities. The deterioration of these materials overtime (based on wind/ rain action) or poor demolition practices may have resulted in localised shallow soil contamination.
- During the site walkover broken brick fragments were observed in the surface ground cover throughout the site with no observable source, and impromptu conversations with residents mentioned the use of historical offal pits and illegal dumping in the sand dunes on site, however evidence of this within the site was not noted on historical aerial photographs.
- HAIL I 'Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment' is considered to meet there 'more likely than not' threshold related to the potential deterioration of ACM and / or lead paint and /or treated timber from historical building structures.
- Based on the information review the potential presence of buried waste/ fill is not considered to meet the 'more likely that not' threshold for soil contamination under HAIL G3 - Landfill Sites or HAIL G5 - Waste Disposal to land. However, it remains possible that contamination from historical filling may be present along the length of the site.
- Identified potentially complete exposure pathways include:
 - Exposure of construction workers to contaminants in soils during site redevelopment – dermal contact, ingestion or inhalation of dust/vapours.
 - Sediment and runoff directly into surface water.
- It is unlikely that Permitted Activity (PA) soil disturbance volume thresholds can be met under the NESCS, therefore Resource Consent will be required. Due to the short timeframes for consent submission, consent as a discretionary activity will be required with completion of a DSI and CSMP (if determined to be required based on the DSI findings) included as conditions of consent.
- Consent under the West Coast Regional L&WP may be required depending on the findings of the DSI.
- A DSI is also recommended to inform material management, handling, re-use and disposal.
- If the buildings that extend on to site need to be demolished for the installation of the proposed seawall extension, an asbestos demolition survey with appropriate removal of identified ACM is required prior to their demolition.

8 Reviewing Statement

This report has been reviewed by Phillip Ware, CEnvP Site Contamination Specialist. Phil is a suitably qualified and experienced practitioner (SQEP) with over 20 years' experience as a contaminated land, hydrogeological and environmental consultant. He is a Technical Director and Beca's lead Technical Reviewer of contaminated soil, groundwater, and remediation projects across Australasia. Phil is technically proficient in the science of contaminated land assessment and remediation, and has led projects across the UK, Europe, Australia, and New Zealand. Phil has been a Certified Environmental Practitioner Site Contamination Specialist since 2015.



9 Limitations

This report has been prepared by Beca Ltd (Beca) solely for West Coast Regional Council (Client). Beca has been requested by the Client to provide a Preliminary Site Investigation (Contamination) to extend the Hokitika seawall from its current northern end position to the end of the township at Richards Drive (site). This report is prepared solely for the purpose of the assessment of potential soil and groundwater contamination (scope). The contents of this report may not be used by the Client for any purpose other than in accordance with the stated Scope.

This report is confidential and is prepared solely for the Client. Beca accepts no liability to any other person for their use of or reliance on this report, and any such use or reliance will be solely at their own risk.

In preparing this report Beca has relied on key information including the following:

- Publicly available historical aerial photographs sourced from West Coast Regional Council, Retrolens and Google Earth
- Site Contamination Enquiry and Property File provided by West Coast Regional Council and Westland District Council

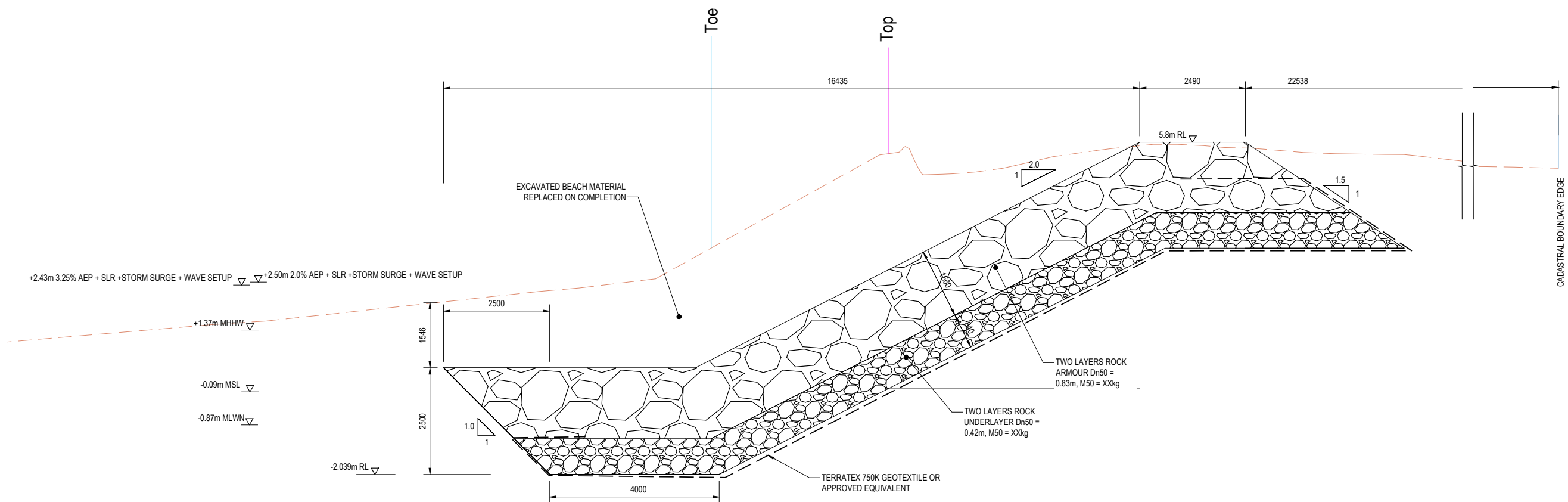
Unless specifically stated otherwise in this report, Beca has relied on the accuracy, completeness, currency and sufficiency of all information provided to it by, or on behalf of, the Client or any third party, including the information listed above, and has not independently verified the information provided. Beca accepts no responsibility for errors or omissions in, or the currency or sufficiency of, the information provided. Publicly available records are often inaccurate or incomplete.

The contents of this report are based upon our understanding and interpretation of current legislation and guidelines ("Standards") as consulting professionals and should not be construed as legal opinions or advice. Unless special arrangements are made, this report will not be updated to take account of subsequent changes to any such Standards.

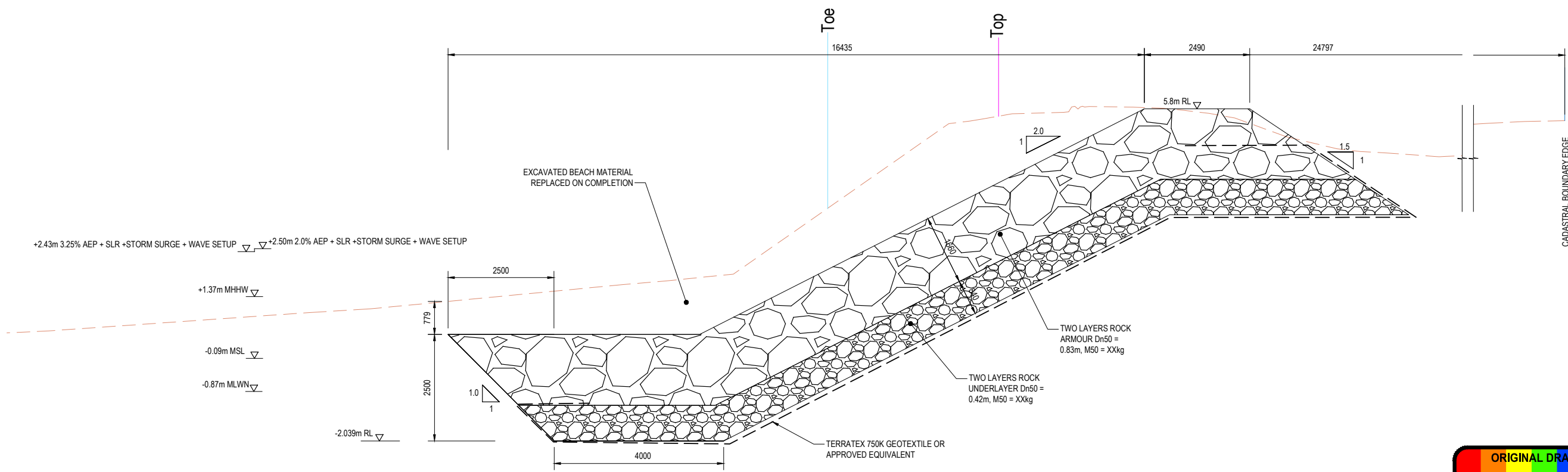
This report should be read in full, having regard to all stated assumptions, limitations and disclaimers.

A large, white, sans-serif capital letter 'A' is centered on a teal background. The letter is bold and has a clean, modern appearance.

Appendix A – Hokitika Seawall Draft Design



REVETMENT CROSS SECTION CH 900
1:50 (A1)



REVETMENT CROSS SECTION CH 1000
1:50 (A1)

ORIGINAL DRAWING
IN COLOUR
DRAFT
NOT FOR CONSTRUCTION

No.	Revision	By	Chk	Appd	Date



Drawing Originator:	Design	HD	Approved For Construction?
Original Scale (A1)	Drawn	HD	Date
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Reduced Scale (A3)	Dwg Check		
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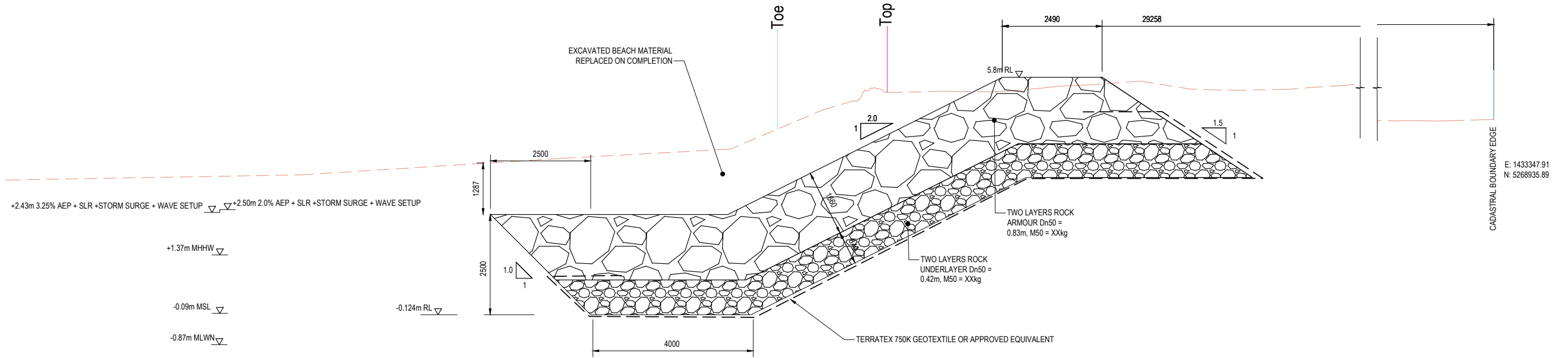
Client:	Project:
	HOKITIKA SEAWALL

Title:
HOKITIKA TYPICAL CROSS SECTION

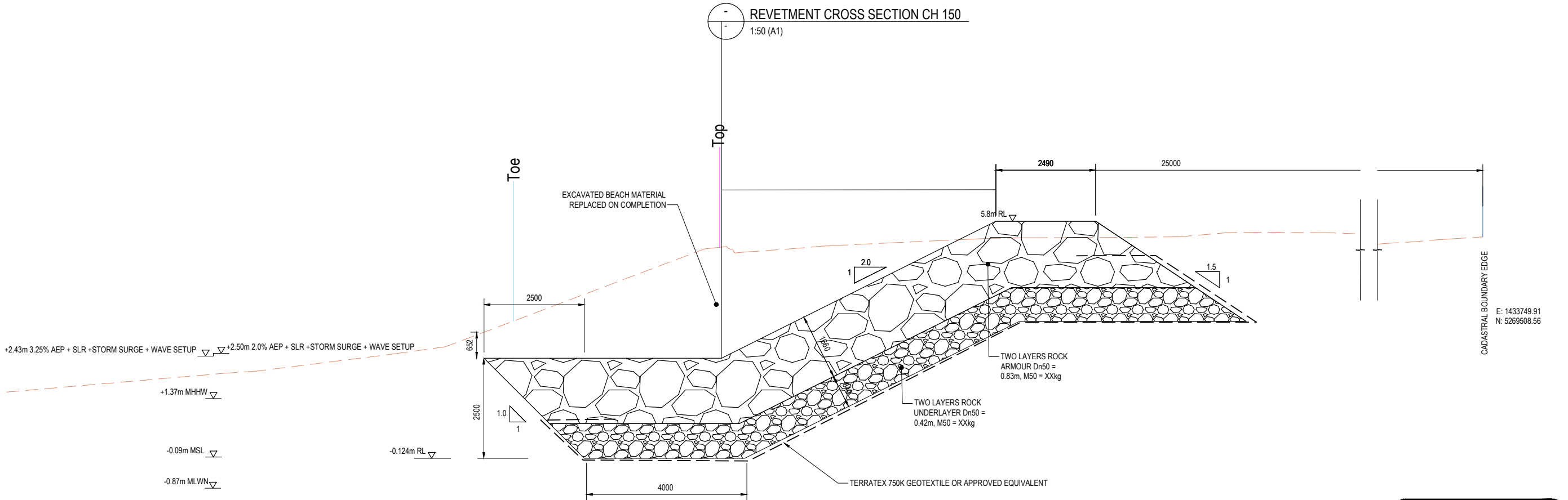
Discipline:	CIVIL ENGINEERING
Drawing No.:	SECTION 1
Rev.:	A

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N: 5269550.09

E: 1433833.79
N: 5269632.99



REVETMENT CROSS SECTION CH 150
1:50 (A1)



REVETMENT CROSS SECTION CH 850
1:50 (A1)

ORIGINAL DRAWING
IN COLOUR

DRAFT
NOT FOR CONSTRUCTION

No.	Revision	By	Chk	Appd	Date



Original Scale (A1)	1:50	Design	HD	Approved For Construction*
Drawn	HD	Drawn	HD	Date
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		Dwg Check		

* Refer to Revision 1 for Original Signature

Client:
Project: **HOKITIKA SEAWALL**

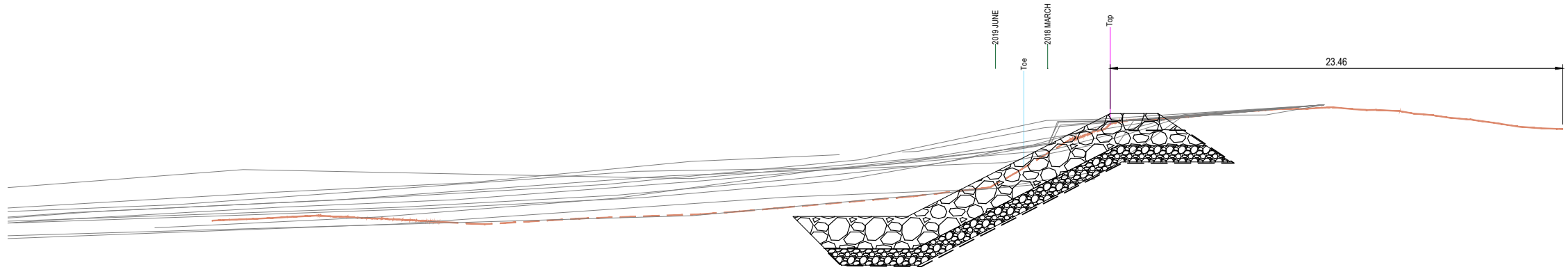
Title: **HOKITIKA TYPICAL CROSS SECTION**

Discipline: **CIVIL ENGINEERING**
Drawing No: **SECTION 2**

Rev: **A**

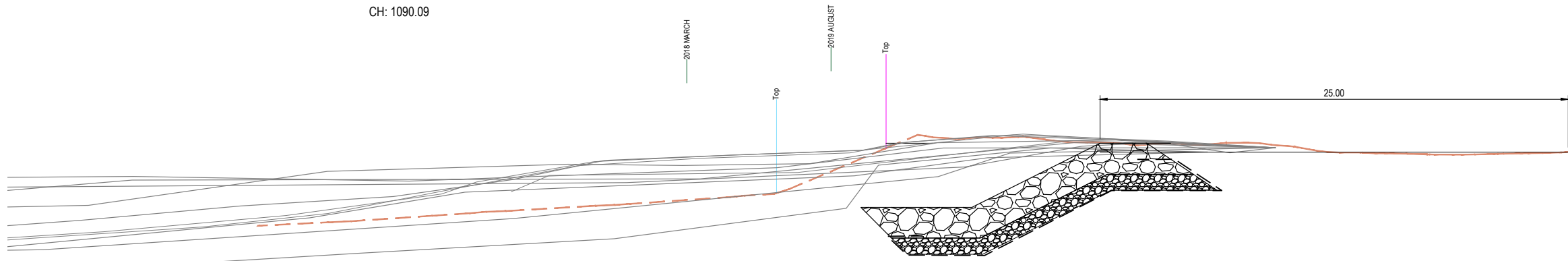
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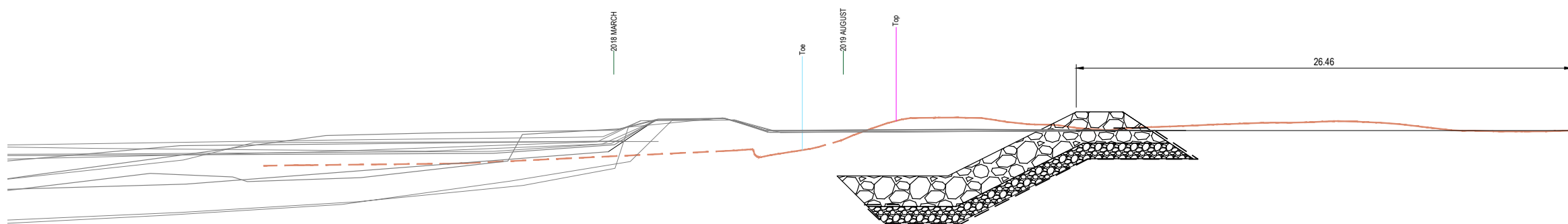
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CH: 1090.09



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CH: 650.00



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CH: 200.00

ORIGINAL DRAWING
IN COLOUR
DRAFT
NOT FOR CONSTRUCTION

No.	Revision	By	Chk	Appd	Date



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Reduced Scale (A3)	1:100	Drawn	HD	Date
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		Dag Check		
* Refer to Revision 1 for Original Signature				

Client:
Project: HOKITIKA SEAWALL

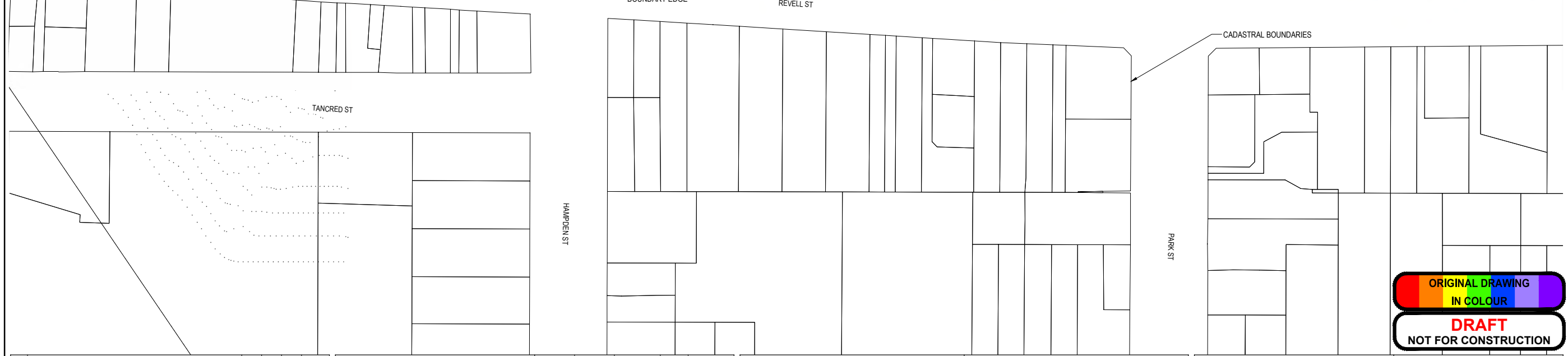
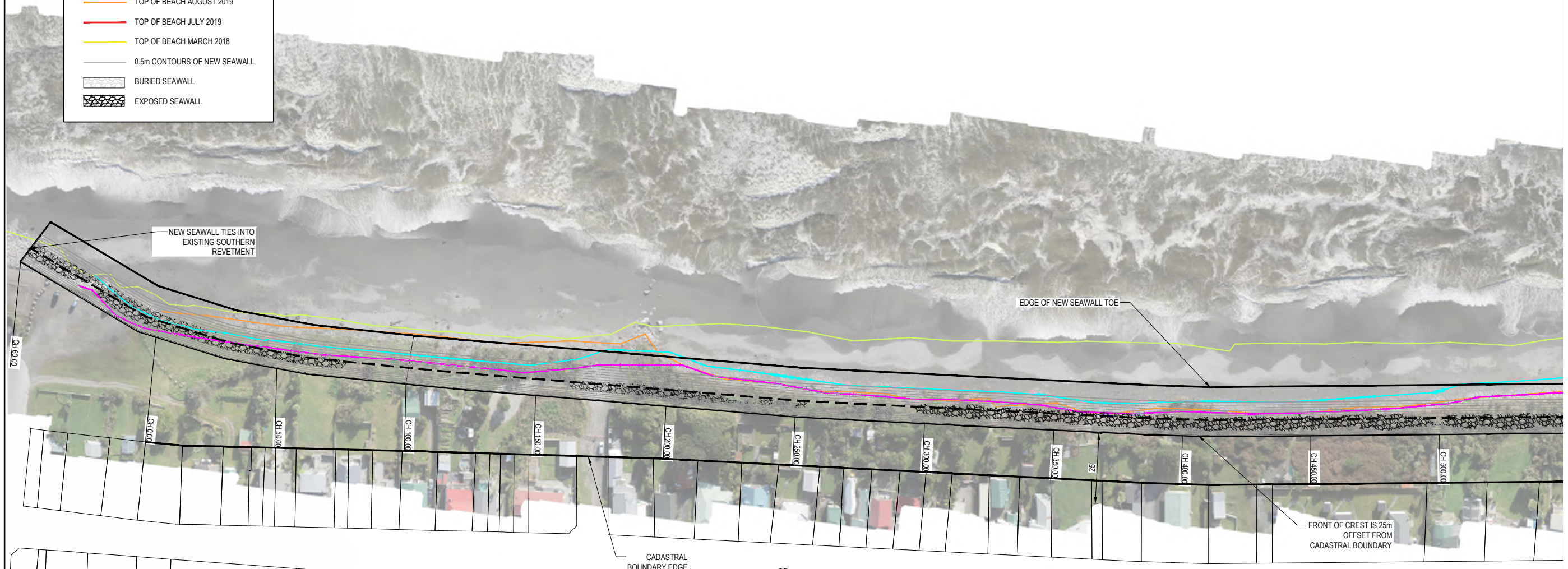
Title: HOKITIKA TYPICAL CROSS SECTION

Discipline: CIVIL ENGINEERING
Drawing No: SECTION 3
Rev: A



KEY

- FRONT CREST EDGE OF NEW SEAWALL
- NEW SEAWALL EXTENT
- TOP OF EXISTING SEAWALL
- TOE OF EXISTING SEAWALL
- TOP OF BEACH AUGUST 2019
- TOP OF BEACH JULY 2019
- TOP OF BEACH MARCH 2018
- 0.5m CONTOURS OF NEW SEAWALL
- BURIED SEAWALL
- EXPOSED SEAWALL



No.	Revision	By	Chk	Appd	Date

Drawing Originator:
Beca

Original Scale (A1)	Design	HD	Approved For Construction*
NTS	Drawn	HD	Date
Reduced Scale (A3)	Dwg Verifier		
NTS	Dwg Check		

* Refer to Revision 1 for Original Signature

Client: _____

Project: **HOKITIKA SEAWALL**

Title: **HOKITIKA REVETMENT SOUTHERN PLAN**

Discipline	CIVIL ENGINEERING
Drawing No.	Hokitika Plan
Rev.	A

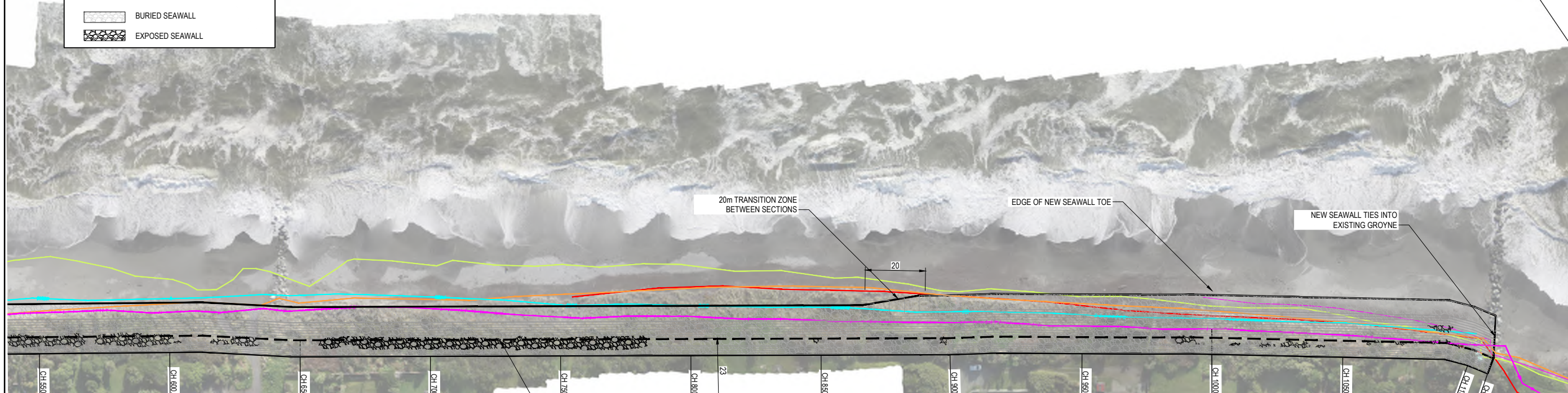
ORIGINAL DRAWING IN COLOUR

DRAFT NOT FOR CONSTRUCTION



KEY

- FRONT CREST EDGE OF NEW SEAWALL
- NEW SEAWALL EXTENT
- TOP OF EXISTING SEAWALL
- TOE OF EXISTING SEAWALL
- TOP OF BEACH AUGUST 2019
- TOP OF BEACH JULY 2019
- TOP OF BEACH MARCH 2018
- 0.5m CONTOURS OF NEW SEAWALL
- BURIED SEAWALL
- EXPOSED SEAWALL



**ORIGINAL DRAWING
IN COLOUR**
DRAFT
NOT FOR CONSTRUCTION

No.	Revision	By	Ck	Appd	Date



Original Scale (A1) NTS	Design Drawn HD	Drawn HD	Approved For Construction? Date
Reduced Scale (A3) NTS	Design Verifier	Design Check	
* Refer to Revision 1 for Original Signature			

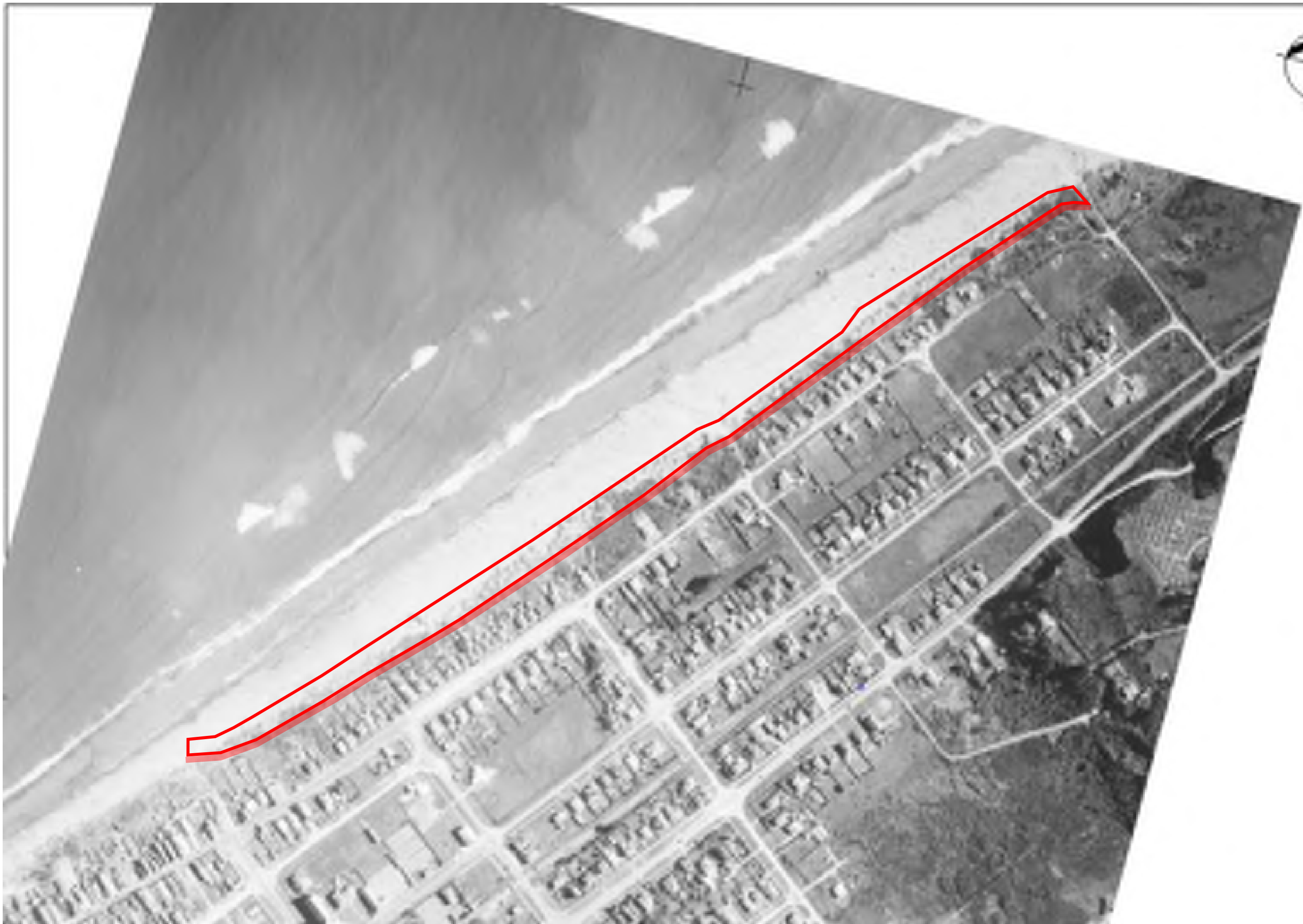
Client: _____ Project: **HOKITIKA SEAWALL**

Title: **HOKITIKA REVETMENT NORTHERN PLAN**

Discipline: **CIVIL ENGINEERING**
 Drawing No.: **Hokitika Plan**
 Rev: **A**

B

Appendix B – Historical Aerial Photographs



No.	Revision	By	Chk	Appd	Date

Drawing Originator:



Original Scale (A1)	Design		
Reduced Scale (A3)	Drawn		
	Dwg Verifier		
	Dwg Check		

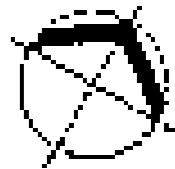
* Refer to Revision 1 for Original Signature

Client: WEST COAST REGIONAL COUNCIL

Project: PRELIMINARY SITE INVESTIGATION - HOKITIKA SEAWALL EXTENSION

Title: HISTORICAL AERIAL IMAGERY RETROLENS 1951

Discipline	
Drawing No.	Rev.



No.	Revision	By	Chk	Appd	Date

Drawing Originator:

Original Scale (A1)	Design			
Reduced Scale (A3)	Drawn			
	Dwg Verifier			
	Dwg Check			

* Refer to Revision 1 for Original Signature

Client: WEST COAST REGIONAL COUNCIL

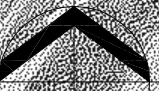
Project: PRELIMINARY SITE INVESTIGATION - HOKITIKA SEAWALL EXTENSION

Title: HISTORICAL AERIAL IMAGERY RETROLENS 1963

Discipline	
Drawing No.	
Rev.	

DO NOT SCALE

IF IN DOUBT ASK



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www.beca.com

No.	Revision	By	Chk	Appd	Date

Drawing Originator:



Original Scale (A1)	Design		
Reduced Scale (A3)	Drawn		
	Dwg Verifier		
	Dwg Check		

* Refer to Revision 1 for Original Signature

Client: WEST COAST REGIONAL COUNCIL

Project: PRELIMINARY SITE INVESTIGATION - HOKITIKA SEAWALL EXTENSION

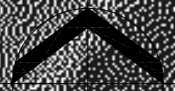
Title: HISTORICAL AERIAL IMAGERY RETROLENS 1970

Discipline	
Drawing No.	Rev.

DO NOT SCALE

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RELEASING



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No.	Revision	By	Chk	Appd	Date

Drawing Originator:



Original Scale (A1)	Design		
Reduced Scale (A3)	Drawn		
	Dwg Verifier		
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* Refer to Revision 1 for Original Signature

Client: WEST COAST REGIONAL COUNCIL

Project: PRELIMINARY SITE INVESTIGATION - HOKITIKA SEAWALL EXTENSION

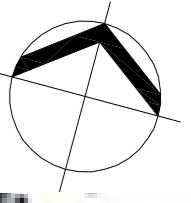
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Discipline	
Drawing No.	
Rev.	

DO NOT SCALE

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BL/EB/BA/M



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No.	Revision	By	Chk	Appd	Date

Drawing Originator:



Original Scale (A1)	Design		
Reduced Scale (A3)	Drawn		
	Dwg Verifier		
	Dwg Check		

* Refer to Revision 1 for Original Signature

Client: WEST COAST REGIONAL COUNCIL

Project: PRELIMINARY SITE INVESTIGATION - HOKITIKA SEAWALL EXTENSION

Title: HISTORICAL AERIAL IMAGERY RETROLENS 1988

Discipline	
Drawing No.	Rev.

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REBERAM



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No.	Revision	By	Chk	Appd	Date

Drawing Originator:



Original Scale (A1)	Design		
Reduced Scale (A3)	Drawn		
	Dwg Verifier		
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* Refer to Revision 1 for Original Signature

Client: WEST COAST REGIONAL COUNCIL

Project: PRELIMINARY SITE INVESTIGATION - HOKITIKA SEAWALL EXTENSION

Title: HISTORICAL AERIAL IMAGERY RETROLENS 2006

Discipline	
Drawing No.	
Rev.	

DO NOT SCALE

IF IN DOUBT ASK.

RELEASING



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No.	Revision	By	Chk	Appd	Date

Drawing Originator:



Original Scale (A1)	Design			
Reduced Scale (A3)	Drawn			
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* Refer to Revision 1 for Original Signature				

Client: WEST COAST REGIONAL COUNCIL

Project: PRELIMINARY SITE INVESTIGATION - HOKITIKA SEAWALL EXTENSION

Title: HISTORICAL AERIAL IMAGERY RETROLENS 2015

Discipline	
Drawing No.	Rev.

DO NOT SCALE

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BE/EB/AM



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No.	Revision	By	Chk	Appd	Date

Drawing Originator:



Original Scale (A1)	Design		
Reduced Scale (A3)	Drawn		
	Dwg Verifier		
	Dwg Check		

* Refer to Revision 1 for Original Signature

Client: WEST COAST REGIONAL COUNCIL

Project: PRELIMINARY SITE INVESTIGATION - HOKITIKA SEAWALL EXTENSION

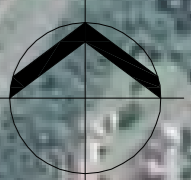
Title: HISTORICAL AERIAL IMAGERY RETROLENS 2019

Discipline	
Drawing No.	Rev.

DO NOT SCALE

IF IN DOUBT ASK

RELEASED



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No.	Revision	By	Chk	Appd	Date

Drawing Originator:



Original Scale (A1)	Design		
Reduced Scale (A3)	Drawn		
	Dwg Verifier		
	Dwg Check		

* Refer to Revision 1 for Original Signature

Client: WEST COAST REGIONAL COUNCIL

Project: PRELIMINARY SITE INVESTIGATION - HOKITIKA SEAWALL EXTENSION

Title: HISTORICAL AERIAL IMAGERY RETROLENS 2021

Discipline	
Drawing No.	Rev.

DO NOT SCALE

IF IN DOUBT ASK.

REVISION



Appendix C – Council Provided Information





388 Main South Rd, Paroa
P.O. Box 66, Greymouth 7840
The West Coast, New Zealand
Telephone (03) 768 0466
Toll free 0508 800 118
Facsimile (03) 768 7133
Email info@wcr.govt.nz
www.wcr.govt.nz

SLUS

Business ID: SLS-00000311

Site Name: SAHS_311

Last Assessment Date: 12/21/2009

Risk Assessment Comment:

Letter Comment: #Years of Operation: Up to 1980 #Previous Site Uses: Septage discharge site #Current Site Uses: Sand dunes, pasture #Primary Land Uses: Pasture, residential, beach #Storage Method: Directly into ground #Discharge Method: Leachate, coastal erosion and sea flooding #Nearest Watercourse: Tasman sea #Distance to Nearest Watercourse: 0m (see notes) #Ground Slope: Undulating #Hist. Data: Gibb (1987) Been & Neale (1992) #Notes: Septage was dumped for years in sand dune between Richards Drive and the Seaview outfall pipes. Used to be buried daily. Area is subject to chronic coastal erosion and sea flooding (see Gibb 1987/ Benn & Neale (1992). Former Hokitika Borough Council and Westland County Council would probably have been responsible for the discharge. 16/10/01 Richard Cotton WDC advised he hasn't ever heard of this dump however gave details of land title and owner, land is now all held as part of the Black Sands motels as PT RS 822 LOT 5 DP 103 LOTS 2 & 4 DP 33 PT LOT 3 DP 33 LOT 1 DP 2126 BLK I KANIERE SD Current owners ASSEN JOHN / REININK ALEXANDER 11 RICHARDS DRIVE HOKITIKA Private land, not road reserve. Seaview pipe is on this land too. This land is southwest of the oxyponds. Only impacts known are the Seaview discharge. This site is not verified. The relevant land-use history has not been confirmed. The site has been reported as one that appears on the Hazardous Activities and Industries List, but the reported use has not been confirmed.

Status: Current Record

Status From Date: 4/23/2014

Hail				
Year From	Year To	Group	Category	Comments
Unknown	1980	G. Cemeteries and waste recycling, treatment and disposal	G3. Landfill sites	

Contaminants				
Type	Contaminant	Presence	Date	Comments
Landfill sites	Landfill sites	Observed	4/23/2014	

Classification				
Classification	Context	Reason	Date	Classified By
UNVERIFIED HAIL: HAIL land use information not confirmed.	UNKNOWN		4/14/2003	wcrc\JH



388 Main South Rd, Paroa
P.O. Box 66, Greymouth 7840
The West Coast, New Zealand
Telephone (03) 768 0466
Toll free 0508 800 118
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Email info@wcrcc.govt.nz
www.wcrcc.govt.nz

SLUS

Business ID: SLS-00000316

Site Name: SAHS_316

Last Assessment Date:

Risk Assessment Comment:

Letter Comment: This site exists but for a period the location on the map was wrong. It was incorrectly located further south at approximately 111-115 Revell St. At this time it was listed as 'entered in error'. The location (point and polygon) has been shifted in 2016 to 127 Revell St. And the classification is now 'not investigated'.

#Years of Operation: Many years #Current Site Uses: Motor Cycle sales and service #Primary Land Uses: Commercial, industrial, beach, residential #Approx Area: 0.05ha #Pot. Contam. Vol.: 546 litres #Storage Method: Above ground tank #Discharge Method: Possible tank leakage, spillage #Nearest Watercourse: Tasman Sea #Distance to Nearest Watercourse: 130m #Ground Slope: Flat- slopes east #Hist. Data: WDC #Notes: Used to be Moir Motorcycle Centre & Moir still own premises. General motorcycle /machinery sales and service. In flood zone of Hokitika River and sea erosion/flood zone. See WCRC flood maps/notes and WDC dangerous goods licence for details. 05/11/01 Richard Gardiner WDC advised This tank still remains. Land use is a farm equipment maintenance shop.

Anecdotal information from local residents indicated the following site history (chronological): possibly a taxi stand in the early 1940's-50's; Olgivie Chainsaws; Moir Motorcycles (Derek and Margaret Moir); Machinery and pump equipment (Keenan); Kens Pots and Souvenirs; SPCA (2016).

Status: Current Record

Status From Date: 4/23/2014

Hail				
Year From	Year To	Group	Category	Comments
Unknown		F. Vehicle refuelling, service and repair	F7. Service stations	

Contaminants				
Type	Contaminant	Presence	Date	Comments
Service stations and fuel storage facilities	Service stations and fuel storage facilities	Observed	4/23/2014	

Classification				
Classification	Context	Reason	Date	Classified By
VERIFIED HAIL SITE: RISK NOT QUANTIFIED: Insufficient information to quantify adverse effects or risks.	COMMERCIAL		4/14/2003	wcrc\JH



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 www.wcr.govt.nz

SLUS

Business ID: SLS-00000317

Site Name: SAHS_317

Last Assessment Date: 6/27/2003

Risk Assessment Comment:

Letter Comment: #Years of Operation: Many years - until 1994 #Previous Site Uses: Transport depot #Current Site Uses: Garden Centre and Vege retail store #Primary Land Uses: Commercial, residential, industrial, beach #Approx Area: 0.15ha #Pot. Contam. Vol.: 2230 litres (see notes) #Storage Method: Underground fuel tank #Discharge Method: Possible tank leakage, spillage, possible coastal erosion #Nearest Watercourse: Tasman Sea, underground stream, Hokitika River #Distance to Nearest Watercourse: 40m, 200m, 450m #Ground Slope: Flat-slopes east #Hist.Data: Site is very untidy. Underground fuel tank contains 2230 litres of diesel (see WDC dangerous goods licence for details. In river and sea erosion/flood zone. See WCRC flood maps/notes and Gibb (1987) for details. 31/10/01 Advised by Richard Gardiner WDC 'This tank was removed 1994. The current land use is vegetable retail outlet and garden centre.'

Status: Current Record

Status From Date: 4/23/2014

Hail				
Year From	Year To	Group	Category	Comments
Unknown	1994	F. Vehicle refuelling, service and repair	F7. Service stations	

Contaminants				
Type	Contaminant	Presence	Date	Comments
Service stations and fuel storage facilities	Service stations and fuel storage facilities	Observed	4/23/2014	

Classification				
Classification	Context	Reason	Date	Classified By
<p>VERIFIED HAIL SITE: RISK NOT QUANTIFIED: Insufficient information to quantify adverse effects or risks.</p>	COMMERCIAL	<p>Changed by JH. This was classified as 'entered in error', but by all accounts this site appears to have been used for fuel storage according to the anecdotal information provided. There has been no soil testing thus the classification is changed to 'not investigated', but should be considered as a confirmed HAIL site.</p>	4/14/2003	wcrc\TEST



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 www.wcr.govt.nz

SLUS

Business ID: SLS-00000322

Site Name: SAHS_322

Last Assessment Date: 12/21/2009

Risk Assessment Comment:

Letter Comment: #Years of Operation: Garage closed mid - late 1970's #Previous Site Uses: Service Station #Current Site Uses: Commercial office #Primary Land Uses: Commercial, industrial, residential, river, sea #Approx Area: 0.05ha #Storage Method: Underground tanks #Discharge Method: Possible spillage, leakage, flooding #Nearest Watercourse: Underground channel, Hokitika River, Tasman Sea #Distance to Nearest Watercourse: 150, 340, 400m #Ground Slope: Flat #Hist. Data: West Coast Regional Council #Notes: Between Weld and Stafford Street. In flood zone of Hokitika River and sea. Garage that was on site was owned by Harold Schroder. See WCRC flood maps and notes for details, and Gibb (1987) 05/11/01 advised by Richard Gardiner WDC No record of the service station other than a building permit application form 1963. Our records indicate that the premises was a rental car outlet from the early 1970s to 1985. One underground tank was stored on site (2070 ltr petrol). There's no record of whatever happened to it. 05/11/01 Land owner John White advised never any underground tank on site. Was built by Henry Shroder around 1963 it was a car rental company till around mid 1970's when it was converted into office space and the oil and greasing pit was filled in. Land Corp had property until White bought it in 1996.

Status: Current Record

Status From Date: 4/23/2014

Hail				
Year From	Year To	Group	Category	Comments
1963	1978	F. Vehicle refuelling, service and repair	F7. Service stations	

Contaminants				
Type	Contaminant	Presence	Date	Comments
Service stations and fuel storage facilities	Service stations and fuel storage facilities	Observed	4/23/2014	

Classification				
Classification	Context	Reason	Date	Classified By
UNVERIFIED HAIL: HAIL land use information not confirmed.	COMMERCIAL		4/14/2003	wcrc\JH



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 Facsimile (03) 768 7133
 Email info@wcr.govt.nz
 www.wcr.govt.nz

SLUS

Business ID: SLS-00000327

Site Name: SAHS_327

Last Assessment Date: 2/10/2012

Risk Assessment Comment:

Letter Comment: #Years of Operation: closed in 1974-75 #Previous Site Uses: Service station #Primary Land Uses: Residential, Beach #Approx Area: 0.085ha #Discharge Method: Possible tank leakage, spillage, flooding #Nearest Watercourse: Tasman Sea, Underground channel #Distance to Nearest Watercourse: 80m, 160m #Ground Slope: Flat - slopes east #Hist. Data: Gibb (1987), West Coast Regional Council #Notes: Garage was owned by Jerry West with fuel supplied by Atlantic Petroleum Ltd. Closed in 1970's. Close to beach dunes. May still have tanks in position (breather pipe still there). In sea flooding zone - see Gibb (1987) and WCRC flood maps for details. Site has flooded by seawater. Martyn Scott of 81 Revell St confirmed that the actual site of the former service station was 243 Revell St, Hokitika. K&A Pugh 4/12/03 confirmed he was the owner & said Westpower removed some pipework related to the service. This pipework appeared not to be connected to any tank. Anecdotal evidence supplied by Stan Dawson & Ross Woolhouse who remember tanks & excavation in ~1975. Mr Pugh sought more substantial evidence of tank removal from Mobil (bought out Atlantic) who had no record of tanks existing. WDC had no record of tanks ever existing in that location (records go back to 1976). Trevor James (WCRC) inspected site on 8/12/03: Witnessed trench dug to 1m deep x 1.2m long x .4m wide & 2m rod sunk into ground in all directions with no resistance. Ground clearly backfill (chunks of concrete & air gap under concrete plinth). No oil sheen when ground was mixed with oil. No odour even from sniffing vent pipe at edge of garage wall. Strong evidence for the tanks having been removed. Photo on file - obviously a garage. Site classification updated 22/01/10. Not Investigated - see Contaminated Sites Strategy 2009 for definition.

Status: Current Record

Status From Date: 4/23/2014

Hail				
Year From	Year To	Group	Category	Comments
Unknown	1975	F. Vehicle refuelling, service and repair	F7. Service stations	

Contaminants				
Type	Contaminant	Presence	Date	Comments
Service stations and fuel storage facilities	Service stations and fuel storage facilities	Observed	4/23/2014	

Classification				
Classification	Context	Reason	Date	Classified By
VERIFIED HAIL SITE: RISK NOT QUANTIFIED: Insufficient information to quantify adverse effects or risks.	Residential		4/14/2003	wcrc\KATET



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SLUS

Business ID: SLS-00000380

Site Name: SAHS_380

Last Assessment Date: 7/2/2003

Risk Assessment Comment:

Letter Comment: #Current Site Uses: Motels #Primary Land Uses: Residential, beach #Approx Area: 0.62ha #Pot. Contam. Vol.: 1000 litres #Storage Method: aboveground fuel tank #Discharge Method: Possible tank leakage, spillage #Nearest Watercourse: Drain, Tasman sea #Distance to Nearest Watercourse: 20m, 100m #Ground Slope: Flat - slopes east #Hist.Data: WDC #Notes: Underground tank contains 1000 litres of diesel. See WDC dangerous goods licence for details. Close to historical coastal erosion and sea flooding zone (see Gibb (1987). 05/11/01 advised by Richard Gardiner WDC This tank was above ground storage. It was replaced with 2 above ground 500 ltr diesel tanks in 1997. Land use is Blacksands Motor Lodge.

Status: Current Record

Status From Date: 4/23/2014

Hail				
Year From	Year To	Group	Category	Comments
Unknown		F. Vehicle refuelling, service and repair	F7. Service stations	

Contaminants				
Type	Contaminant	Presence	Date	Comments
Service stations and fuel storage facilities	Service stations and fuel storage facilities	Observed	4/23/2014	

Classification				
Classification	Context	Reason	Date	Classified By
VERIFIED HAIL SITE: RISK NOT QUANTIFIED: Insufficient information to quantify adverse effects or risks.	Residential		4/14/2003	Wcrcllg



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SLUS

Business ID: SLS-00000446

Site Name: SAHS_446

Last Assessment Date: 2/10/2012

Risk Assessment Comment:

Letter Comment: #Years of Operation: Closed around 1973 as a drycleaners #Previous Site Uses: Drycleaners #Current Site Uses: Vacant #Primary Land Uses: Commercial, Residential, Industrial, Beach #Approx Area: 0.02ha #Storage Method: Drums #Discharge Method: Leakage, Spillage, Flooding, Coastal Erosion #Nearest Watercourse: Tasman Sea, Underground Stream #Distance to Nearest Watercourse: 150m, 260m #Ground Slope: Flat - slopes east #Hist. Data: West Coast Regional Council, Gibb (1987) #Notes: Former Coopers Carpets and Vinyls Premises. In commercial part of town. Site is vacant and for sale. Was drycleaners for many years. Operated by Charles Woolhouse, closed in early - Mid 1970's. In Hokitika River Flood Zone, and Sea Erosion / Flood Zone. See WCRC flood maps / notes and Gibb 1987 for details. 01/11/01 Denis Schroder land owner advised site was a Mens clothing store until the laundry took over. Laundry closed in early 1970's. The carpet and vinyls store which was run by Charlie Wilson closed in the late 1980's. Site is still vacant. Site classification updated 03/05/10. Not investigated - A site whose past or present use has been reported and verified as one that appears on the Hazardous Activities and Industries List (HAIL); and, The site has not been subjected to investigation including, but not limited to, sampling and analysis of site related soil, water and/or ambient air, and assessment of the associated analytical data. This category is for sites for which it is known that an activity or use as defined in the HAIL has taken place on the site, but there is insufficient information to characterise any risks to human health or the environment from those activities undertaken on the site. Contamination may have occurred, but should not be assumed to have occurred.

Status: Current Record

Status From Date: 4/23/2014

Hail				
Year From	Year To	Group	Category	Comments
Unknown	1973	A. Chemical manufacture, application and bulk storage	A5. Dry-cleaning premises or bulk storage of dry-cleaning solvents	

Contaminants				
Type	Contaminant	Presence	Date	Comments
Dry cleaning	Dry cleaning	Observed	4/23/2014	

Classification				
Classification	Context	Reason	Date	Classified By
VERIFIED HAIL SITE: RISK NOT QUANTIFIED: Insufficient information to quantify adverse effects or risks.	VACANT - COMMERCIAL		4/14/2003	wcrc\KATET

B

Appendix B – Letter from Ngāti Waewae



29 March 2022

West Coast Regional Council
C/- Randal Beal
Director of Operations
PO Box 66
Greymouth 7840

Emailed to: rb@wrc.govt.nz

Tēnā Koe Randal,

RE: Preliminary Support for extending the Hokitika Seawall Draft Consent Application

Thank you for taking the time to meet with me on 28 February 2022 to talk through the proposal and for your email on 7 March 2022 which included a copy of your draft resource consent application for extending the Hokitika Seawall.

Te Rūnanga o Ngāti Waewae understands that the West Coast Regional Council (WCRC) is seeking to construct an approximately 1100 metre long extension to the existing Hokitika seawall, between Stafford Street and Richards Drive, to protect an area which is under threat from sea level rise and erosion events. The proposed works will require resource consents for construction and operation from both the Westland District Council and WCRC. The draft consent application has covered both applications.

The draft application states that the proposed seawall extension is a short to medium (up to 15 years) solution. We understand that this term will allow the WCRC to plan and implement a longer term adaptive coastal management strategy, in response to Central Government legislation.

The purpose of this letter is to advise that Te Rūnanga o Ngāti Waewae provides preliminary support for the WCRC proposal to extend the Hokitika seawall subject to the mitigation measures outlined within the application and summarised in Appendix 1 of this letter. We are comfortable for the WCRC to lodge their consent applications with the two councils now.

Ngāti Waewae would like to advise the WCRC that we seek additional information and the adoption of additional mitigation measures before the preparation of a written approval letter would be considered by the rūnanga. The additional information and mitigation measures we consider are necessary include:

- The preparation of a Cultural Impact Assessment report which assesses the effects of the proposal on Ngāti Waewae values and provides recommendations on ways to avoid, remedy or mitigation these effects.

- A report prepared by an expert on blue penguins to consider the effects of the proposed structure on the species and their habitat. It would be beneficial to know how effective the currently proposed 'public accessways' will be in facilitating access for penguins to the backshore for breeding etc.
- A peer review of the coastal wall design by an independent coastal engineer and an assessment of the potential effects of the seawall extension on coastal processes and flooding events associated with the Hokitika River. Will the seawall extension create more pressure on the Hokitika River stopbanks when the river is in flood?
- Information on the legality of the current rock protection works installed as part of 'emergency works' back in 2019/2020. Has this rock protection work been subsequently consented?
- The inclusion of the consideration of alternative resilience measures which could include the consideration of managed retreat. Is the Council proposing any measures to discourage further development on the properties behind the seawall if this is deemed appropriate?
- The inclusion of a consent condition which requires the WCRC to plan for and implement an adaptive management strategy for the longer-term management of the coastal hazards at Hokitika within a specified timeframe to enable these measures to be implemented before the consents requested expire.

Ngāti Waewae would also appreciate the opportunity to comment on the proposed consent conditions to be included on the consents before the consents are granted.

If you have any queries regarding this letter, please contact Philippa Lynch at Poutini Environmental via phone on 0212422715 or via email at Philippa.Lynch@ngaitahu.iwi.nz in the first instance.

Nō reira, mauri tū, mauri oho, mauri ora,

Nāku noa



Nā Francois Tumahai
Chairman
Te Rūnanga o Ngāti Waewae
021425 229
Francois.Tumahai@ngaitahu.iwi.nz

APPENDIX 1

- No exposed areas will be worked in water. Construction and maintenance works will be restricted to periods when machinery can work above water level, when tidal conditions allow.
- Mini tankers will be brought to site when refuelling of machinery is required. Use of oil spill kit and the operators will be trained to use it.
- Refuelling and washing of equipment and containers will take place away from the foreshore and any water courses.
- Any newly established surfaces landward of MHWS and the observed runup zone and any areas cleared will be revegetated to prevent sediment from entering water.
- Erosion and sediment control measures will be undertaken near to the small unnamed creek discharges to the north of Richards Drive.
- Vegetation disturbance will be minimised as far as practicable (particularly in regard to indigenous species - Harakeke, Pinqao and cabbage tree) on the small backshore dunes where wall constructed.
- A Vegetation Planting Plan will be developed to provide the basis for removal and replanting of indigenous plants (such as Pīngao), restoration of vegetation that was disturbed or removed during construction. This Plan will be provided for comment prior to finalisation.
- The contractor will be required to prepare a Construction Environmental Management Plan (CEMP) prior to the commencement of any work at the site. The CEMP will outline the proposed construction activities, the effects of these activities and the measures to be undertaken to mitigate any adverse effects on the environment. Consent conditions have been proposed in respect of the content, timing and proposed mitigation and approvals of the CEMP.
- The West Coast Penguin Trust (WCPT) was commissioned by WCRC to prepare a report and complete a survey of the project area. WCPT made some recommendations regarding the management of penguins during construction to minimise adverse effects. Measures will be taken to minimize disturbance to Blue Penguin/Kororā during seawall construction and these will be formalised in consent conditions and in the CEMP. They include:
 - Work carried out between mid-March and mid-June if possible and that a daily pre- construction inspection will be carried out of the proposed work area to confirm the absence/presence of penguins.
 - Access to any active nests found will be maintained overnight.
 - Where existing refuge sites are compromised, nest boxes will be located within foreshore habitat associated with the access paths.
 - WPCT will be consulted in respect of box location and any shade plantings.
 - Ramps included in the seawall design to provide for public access may also facilitate access for penguins to the backshore.
 - Some voids within the rocks placed on the wall (where exposed) may provide additional habitat and refuge for penguins once constructed.
- Access along the beach will be maintained where practicable, noting that any beach side works will be generally confined to periods of low to mid tide and when sea conditions allow.
- A detailed site investigation (DSI) report will be undertaken to address risk from any potentially contaminated site. Also include a Contaminated Land Management Plan, including handling requirements and disposal options of materials and any other matter to ensure contaminated material is managed in a way to avoid, remedy or mitigate adverse effects on the environment.
- An Accidental Discovery Protocol will be developed by the contractor in consultation with Te Rūnanga o Ngāti Waewae.
- Regular ongoing inspections and mitigation/repair.

C

Appendix C – Basis of Design Report and Drawings

Hokitika Revetment Extension

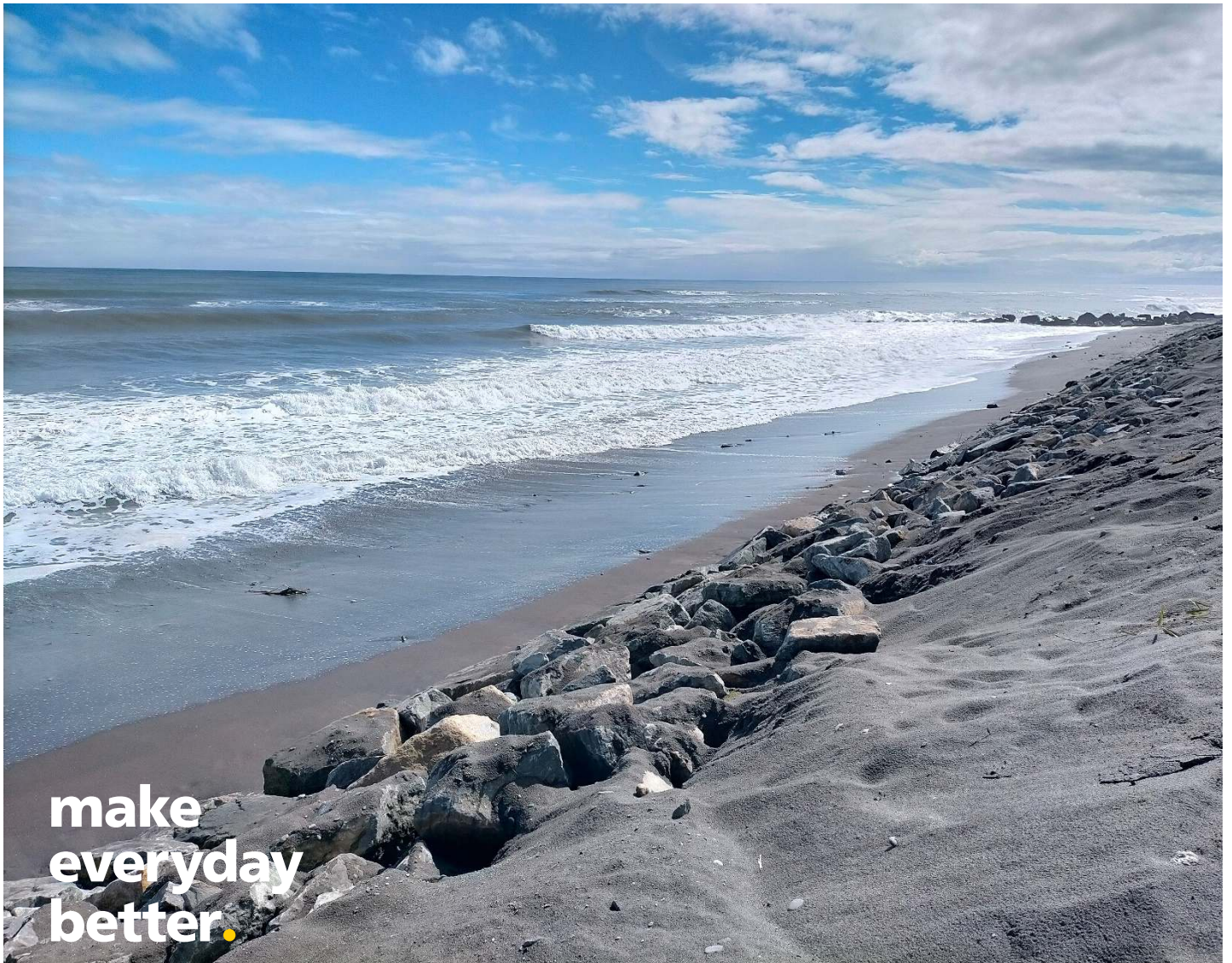
Basis of Design Report

Prepared for West Coast Regional Council

Prepared by Beca Limited

Click or tap here to enter text.

1/December/2021



**make
everyday
better.**

Revision History

Revision N°	Prepared By	Description	Date
1.0	Hamish Dallas	Draft for Client Review	26.11.21

Document Acceptance

Action	Name	Signed	Date
Prepared by	Hamish Dallas		26.11.21
Reviewed by	Reza Shafiei / Kane Satterthwaite		29.11.21
Approved by	Jennifer Hart		29.11.21
on behalf of	Beca Limited		

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1 Introduction

The West Coast Regional Council (WCRC) is proposing to construct an approximately 1100m long extension of the existing Hokitika revetment between Stafford Street and Richards Drive. The existing revetment is a 1000m long rock structure with the latest addition designed and constructed in 2013, to protect a portion of the township between Hokitika River mouth and Stafford Street (see Figure 1). Temporary emergency works have been undertaken in sections from October 2019 up until early October 2021, with rock now placed on the upper beach for all almost the full length of the Stafford Street to Richards Drive frontage (approximately 1.1 km).

Areas of the Hokitika township are under threat from sea level rise and coastal erosion events. The construction of a revetment along the Stafford Street to Richards Drive beach frontage will help to provide interim protection against coastal erosion and reduction in wave overtopping to adjacent low lying properties presently between 25m and 40m from the upper beach erosion scarp.

The revetment is considered a medium term (10 to 15 years) solution. The medium term approach is intended to be consistent with the intent of the New Zealand Coastal Policy Statement 2010: the proposed 10 to 15-year design life will allow time for the planning and implementation of a long term coastal strategy.

The proposed works will require consents for construction and operation from both the Westland District Council (WDC) and WCRC.



Figure 1: Hokitika Extension Seawall Project location

This report provides the basis of design for the detailed design of the Stafford Street to Richards Drive rock revetment extension. It outlines the standards and guidelines to be used and key environmental and design criteria.

2 Design Standards and Guidelines

The following sections list the principal design standards, guidelines and references that will be used in the detailed design of the revetment.

2.1 Design Standards and Guidelines

The design standards and guidelines to be used on the project are as follows:

- CIRIA, The Rock Manual, The use of rock in hydraulic engineering (2007).
- EurOtop, Wave Overtopping of Sea Defences and Related Structures Assessment Manual (2018).
- United States Army Corps of Engineers, Coastal Engineering Manual (USACE) (2008-2011).
- Ministry of the Environment (MfE) (2017) Coastal Hazards and Climate Change: Guidance for Local Government.

2.2 Design References

The design references considered on this project are as follow:

- NIWA (2016) The Climate and Weather of West Coast, 2nd edition.
- NIWA (2019) Coastal Flooding Exposure Under Future Sea-level Rise for New Zealand.
- LINZ (2021) Standard port tidal levels <https://www.linz.govt.nz/sea/tides/tide-predictions/standard-port-tidal-levels> [10/11/2021].

3 Design Life

This section outlines the design life and design event that have been adopted, based on the existing site information, relevant codes of practice, and Beca's engineering experience.

3.1 Design life

As agreed with WCRC, the design life for the revetment is to be 10-15 years. This is less than the typical 50 year design life for rock revetments for the reasons described in Section 1. Towards the end of the design life decisions will need to be made regarding the future of the structure.

Maintenance will be required and the frequency will be dependent on the scale of storm events and the quality of the rock sourced for construction; quality properties are outlined in Section 4.1. Rock quality may also impact on design life. Maintenance requirements and any design life considerations will be outlined in the detailed design report.

In addition, maintenance may be required due to scour at the revetment toe or overtopping during the design life. Regular inspections and record keeping of the revetment condition is recommended.

3.2 Design event

The design event for the revetment is a combination of wave and water level conditions. The wave height at the revetment will be depth limited i.e. dependent on the water depth. The water depth is dependent on tide level and storm surge (comprising wind set-up and barometric set-up) and wave set-up. The design event for the revetment is therefore described in terms of the Annual Exceedance Probability (AEP)¹ of a storm surge event.

The design event for the Hokitika revetment has been considered with reference to typical New Zealand practice for design events for rock revetments. A 50 year design life and a 1% AEP design event are usually adopted for rock revetments (BS 6349 - Maritime works (2000); CIRIA (2007)). The 1% AEP design event has a 39% probability of occurrence during the 50 year design life.

For a 15 year period, consistent with the upper bound for the design life (refer Section 3.1), the comparable event is the 3.25% AEP event. That is, a 3.25% AEP event has a 39% probability of occurrence during a 15 year period. A more conservative approach would be to adopt a 2% AEP event, which has a 26% probability of occurrence during a 15 year period.

In plain terms:

- Should the 3.25% AEP event be adopted, there is a 39% probability (almost 2 in 5) that at least one such event will occur during the 15 year period.
- Should the 2% AEP event be adopted, there is a 26% probability (slightly more than 1 in 4) that at least one such event will occur during the 15 year period.

We seek agreement with WCRC on the event to be adopted for the design.

¹ Annual Exceedance Probability is the probability of an event of a given magnitude being reached or exceeded in any one year.

4 Site Data and Provided Information

4.1 Material Availability

The 2013 revetment was constructed from rock sourced from WCRC's Camelback Quarry which is an established source. The Camelback Quarry site at Kowhitirangi is the nearest quarry to the site. It is located 25km southeast of Hokitika. Quarrying is reportedly able to produce large blocks of angular and subangular limestone rock up to 3m diameter. Current rock test results are not available, however "Rock and Aggregate Export Potential Survey (Temple, 2000)" report describes the rocks at Camelback Quarry as "excellent quality armourstone" and provides the following test results from rock samples:

Table 1: Camelback Quarry rock properties

Test	Value (Average)	Description
Compressive Strength (UCS)	71 MPa	Strong rock
Los Angeles Abrasion Test	13.6% loss	Suitable for high energy sites
Slake Durability Test	99.3% retained	Very highly durable
Sodium Sulphate Soundness Test	0.2% loss	Very high soundness
Density	2600 kg/m ³	Dense rock
Moisture Content	0.6%	Low moisture content

The test results do not cover all the properties typically specified for armour rock and some values are below those usually specified for a 50 year design life structure.

It is understood, however, that WCRC require that the new revetment extension be designed to use the Camelback Quarry rock. While the 10-15 years design life will help to accommodate this, it is expected that maintenance of the revetment extension will be required during the design life.

The rock density of 2600 kg/m³ given above will be adopted for the revetment design.

5 Environmental Data

5.1 Datum

The following horizontal and vertical datums will be used on the Project:

- Horizontal datum: New Zealand Transverse Mercator 2000 (NZTM2000).
- Vertical datum: NZ Vertical Datum 2016 (NZVD16).

To correctly implement datums and thus relative sea and land levels in the design, Chris J Coll Surveying Ltd. was engaged by WCRC to clarify the Hokitika vertical datums (datum conversion memorandum, dated 13 November 2020- refer to Appendix A). The relationship between NZVD16, Hokitika Chart Datum (CD) and Lyttelton Vertical Datum 1937 (LVD37) follows:

- 0.00m CD = -2.13m NZVD16.
- 0.00m LVD37 = -0.35m NZVD16
- 0.00m CD = -1.78m LVD37

5.2 Bathymetry and Topography

Bathymetric and topographic survey information is available as follows:

- Bathymetry:
 - LINZ Chart NZ 72 Cape Foulwind to Heretaniwha Point (does not include bathymetric data for the nearshore area at the site)
- Topography:
 - A GPS survey of upper beach and foredune at the site was carried out in October 2021 by Coastwide Surveys Ltd, which provides cross sections of the beach, scarp and foredune at 50m intervals.
 - A 2020 LiDAR survey has been completed and provided by WCRC in 2021. The LiDAR survey provides topographic information for the upper beach and foredune.
 - The 2021 cross section survey and 2020 LiDAR survey are not in agreement (differences of up to 0.3m inland and 2.0m foreshore). It is proposed that the more conservative (i.e. lower) of the levels be used for detailed design, with a comprehensive topographic survey undertaken on site immediately prior to construction, and the design reviewed and updated as necessary based on that survey before the contractor commences physical works on site. Given the importance of the topographic information for the design, WCRC's approval to proceed on this basis is sought.

5.3 Water Levels

5.3.1 Tide Levels

The tide levels have been taken from LINZ (2021) Standard Port tidal levels for Westport due to the proximity to the site. The following table provides the tide levels in CD and RL:

Table 2: Tide levels for Westport (LINZ, 2021- accessed 11/11/2021)

Tide level	Level (m CD)	Level (m NZVD16)
Highest Astronomic Tide (HAT)	3.88	1.75
Mean High Water Springs (MHWS)	3.50	1.37
Mean High Water Neaps (MHWN)	2.82	0.69
Mean Sea Level (MSL)	2.04	-0.09
Mean Low Water Neaps (MLWN)	1.26	-0.87

Mean Low Water Springs (MLWS)	0.56	-1.57
Lowest Astronomic Tide (LAT)	0.18	-1.95

We note that the current Standard Port tidal levels (accessed on 11/11/2021) have increased some 0.24 to 0.33m from previous levels accessed on 23/11/2020 and also used in the Coll's datum conversion memorandum. Given the importance of these levels for the design, we have approached LINZ and received their confirmation and advice to use the tide levels accessed on 11/11/2021.

5.3.2 Storm Surge Heights

Storm surge refers to elevated coastal water levels during storm events. It comprises barometric set-up and wind set-up components.

Surge height at Hokitika has been extracted from "Hokitika Milk Outfall Hindcast MetOcean Study (MetOcean, 2019)".

Table 3: Storm surge heights at Hokitika

AEP (%)	Storm Surge Height (m)
10% (20 year ARI)	0.48
3.25% (30.3 year ARI)	0.54
2% (50 year ARI)	0.57
1% (100 year ARI)	0.60

"Coastal Impacts of ex-Cyclone Fehi on the South Island West Coast (Neale, 2018)" refers to the tide gauge at Jackson Bay for Cyclone Fehi which recorded a storm surge of about 1.0m. The AEP of this storm surge event has not been determined.

5.3.3 Sea Level Rise

Sea Level Rise (SLR) allowances for the revetment design life have been assessed using the Ministry for Environment's national guidance (MfE, 2017). The more conservative SLR scenarios corresponding to the Representative Concentration Pathways (RCPs) RCP 8.5M and 8.5 H* have been considered, essentially these are emissions scenarios. Table 4 shows the projections of SLR corresponding to different RCPs, relative to 0m sea level in 1986-2005.

Table 4 Sea level rise projections from the 1986-2005 baseline for the four emission scenarios (MfE, 2017)

Year	RCP 2.6 M	RCP 4.5 M	RCP 8.5 M	RCP 8.5 H*
1986-2005	0	0	0	0
2022	0.10	0.10	0.11	0.13
2032 (10 years)	0.15	0.15	0.17	0.20
2037 (15 years)	0.17	0.18	0.20	0.25

A SLR of 0.12m (= 0.25m - 0.13m) over the next 15 years (i.e. until the end of the 10-15 years design life) has been adopted.

The Intergovernmental Panel on Climate Change (IPCC) has released Climate Change 2021: the Physical Science Basis. The report provides information on global climate change which will be used in the upcoming Sixth Assessment Report. The current New Zealand climate change guidance (MfE, 2017) is based on the 2013 IPCC Physical Science Basis report and the 2014 IPCC Fifth Assessment Report. Considering the design life of the seawall (i.e. 10-15 years), any difference between the current MfE guidance and the Sixth

Assessment Report is not expected to be significant for that period and the MfE (2007) guidance will be used for the revetment design, as noted above.

5.3.4 Wave Set-up

Wave set-up is the increase in water level in the surf zone that is generated by wave breaking. Stockdon et al. (2006) have developed a formula from empirical measurements made on 10 natural sandy beaches on the USA and the Netherlands coastlines, as given below:

$$\eta = 0.35 \beta_f (H_0 L_0)^{0.5}$$

where, η is the wave set-up, β is the beach slope in the breaker zone, H_0 is the deep water wave height and L_0 is the deep water wave length.

The wave set-up was estimated assuming an average beach slope of 1 in 50 between shoreline and 1km offshore (based on available data). A sensitivity test of the beach slope will be undertaken as part of the detailed design. Table 5 gives the wave set-up for the 3.25% and 2% AEP offshore wave conditions (refer to Section 5.4.1) .

Table 5: Wave set-up

% AEP	Wave Set- up (m)
3.25% (30 year ARI)	0.40
2% (50 year ARI)	0.44

5.3.5 Design Water Level

The design water level is to consist of MHWS, surge height and SLR. To assess the structure a number of scenario combinations will be considered, to evaluate the influence of the water level on the design and associated risk profile. This will enable WCRC to select a design, which meets their acceptable level of risk and affordability. The design water level combinations that will be considered are as follows:

- MHWS + 3.25% AEP storm surge + 3.25% AEP wave setup + 15-year SLR.
- MHWS + 2% AEP storm surge + 2% AEP wave setup + 15-year SLR.

5.4 Wave Climate

5.4.1 Offshore Wave

Offshore wave conditions are not used for the revetment design directly. However, the information is used to inform wave set-up and nearshore wave periods for design and a brief summary is therefore included below.

Offshore wave conditions were extracted from MetOcean wave hindcast database for an offshore location at approximately 10km from shoreline. Table 6 gives the significant wave height (H_s) and peak wave period (T_p) for the offshore location (see Figure 2).

Table 6: Offshore wave conditions

% AEP	Significant Wave Height, H_s (m)	Peak Wave Period, T_p (s)
3.25% (30 year ARI)	10.6	14
2% (50 year ARI)	11.2	15

Figure 3 shows the MetOcean wave rose at the offshore location. The dominant offshore waves approaching Hokitika is from the South westerly sector.



Figure 2: MetOcean nodes positions at Hokitika

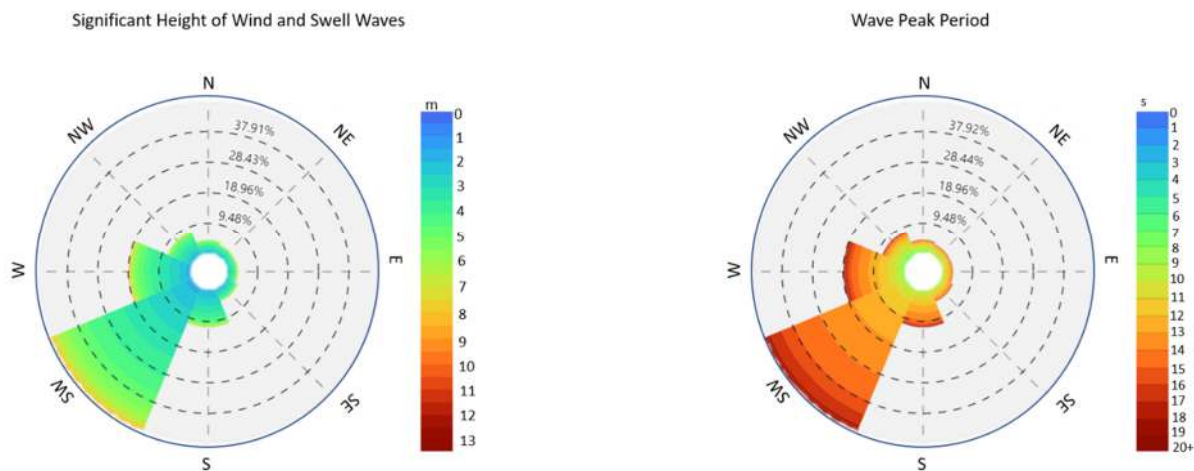


Figure 3: Offshore wave rose at Hokitika at MetOcean wave station (virtual point 42.5S, 171.0E)

5.4.2 Nearshore Wave (Design Wave)

As the offshore waves approach the shore and surf zone they break as the water shallows. This wave transformation process on the foreshore area is referred to as depth limited breaking where for a given water depth a wave height cannot exceed a value related to that depth. This principle can be used to calculate the depth limited wave height close to the seawall structure using the extreme sea level values established above. The ratio of wave height to water depth is referred to as the breaker index. A value of 0.8 has been adopted based on research of wave behaviour over gently sloping beaches (give reference/s).

Table 7 gives different depth limited wave conditions for present-day and in 2037. The water depth near the structure was calculated assuming a seabed level of 0m RL (which is approximately 20-40m offshore (location varies along the shoreline) from the toe of the seawall) and 0.5m allowance for instantaneous

sediment suspension during storm events (which causes temporary beach lowering). The nearshore beach level of 0m RL is the lowest level based on historical shoreline surveys. These values are used to establish the seawall rock component sizes and characteristics.

Table 7: 3.25% and 2% AEPs depth limited waves

% AEP	Water Depth (m)		Maximum Wave Height (m)		Peak Wave Period (s)	
	Present-day	2037	Present-day	2037	Present-day	2037
3.25% MHWS + 0.4m wave setup + 0.54m storm surge	2.31	2.43	1.85	1.95	14	14
2% MHWS + 0.44m wave setup + 0.57m storm surge	2.38	2.50	1.90	2.00	15	15

5.5 Currents

The seawall is to be located on the open coast and will only be partially submerged during the upper tidal cycle. Currents are not considered to be a dominant load for this project.

5.6 Tsunami

Tsunami on the West Coast have been recorded, although mostly as raised water levels and inundation and surges in tidal rivers adjacent to settlements. Some locally generated effects have

been documented as resulting from local earthquakes (which have the potential to generate large waves) early last century, and current studies have identified local offshore faults which have the potential to generate tsunami waves. Larger tsunami from local events cannot be ruled out, although the West Coast is not considered as exposed as other sections of the New Zealand coast to the effects of more distant events.

Detailed tsunami risk analysis for the district has not been undertaken. National studies (Power, 2013) indicate that the Hokitika revetment site is no worse than many existing sites on the West Coast in terms of tsunami exposure.

Consistent with existing practice on the West Coast and given the limited design life and more modest tsunami risk exposure (Power, 2013), the revetment will not be designed for tsunami conditions. If such an event occurred, it is expected the structure would need to be repaired.

5.7 Geotechnical Information

The geology of the coastal area is comprised of young marine deposits of beach sands with some rounded beach gravel of Holocene age (<12,000 years old). Underlying these deposits, and outcropping inland, are slightly weathered glacial outwash gravels and till from the Otira glaciation period. The published geology does identify buried swamp deposits such as soft muds/silts or peat, however the distance of the hillslopes to the east suggest that it is unlikely that the site would be underlain by these. It is expected that the soil profile at the site will comprise beach sand overlying glacial derived gravels and tills. It is of note that the glacial tills comprise subrounded to subangular clasts up to boulder size in a ‘tight’ clayey matrix.

The GNS active faults database indicates that the nearest active fault is the Alpine Fault which lies roughly 25 km to the southeast. This fault is known as one of the world’s major geological features as it is the “on-land” boundary of the Pacific and Australian tectonic plates. It has a high probability of rupturing in the next

50 years (greater than 20%), inducing significant shaking with a Magnitude up to 8.1, resulting in significant damage to the ground and overlying structures.

Geotechnical investigations were carried out by Beca on the beach at Hokitika on the 5th October 2021. These consisted of 5 Scala Penetrometer tests (up to 3m depth) located along the beach at the approximate toe location of the proposed sea wall. The tests recorded very loose to loose material (inferred to be sand) to depths of between 0.65m to greater than 2m, overlying medium dense to dense material (again inferred to be sand). The density of the inferred sand appeared to increase towards the north. Scattered gravels were observed within the sands on the beach surface.

No deeper investigations (such as borehole drilling) were carried out, per the scope agreed with WCRC. As no exploratory holes such as hand augers or borehole drilling were carried out, the inferred presence of sand is based on the surface observations and published geology. Additionally, as the Scala tests terminated at 3m depth, the thickness of the sand and the underlying ground conditions were not proven.

The results of the Scala penetrometer tests indicate that there is likely to be adequate bearing capacity for the proposed seawall where it is founded in medium dense to dense sand or in glacial till (if encountered), subject to the consistency of the till. Excavation for the toe would likely encounter sand with scattered gravels, increasing in consistency from loose to medium dense to dense with depth. Where the profile of loose to very loose sand is present, indicatively to the south, the seawall toe design will need to accommodate these conditions.

Loading from the seawall will induce settlement of the underlying deposits. Where loose sand is present the design of the sea wall will need to take account of the settlement that will arise, however this settlement is expected to occur immediately on loading. It is expected that the glacial till will be over-consolidated and as such is not expected to experience any significant settlement as a result of loading from the seawall.

The revetment extension, consistent with normal practice for similar structures (e.g. existing Hokitika revetment) will not be designed to resist seismic loads. If an earthquake occurred, it is expected the structure would experience a level of damage and may need to be repaired.

Visual observations of the beach sands are that they contain little, if any fines (silt and clay) and are expected to be highly permeable. Excavations to place the toe rock are expected to encounter water, which if uncontrolled, has the potential to destabilise the excavation. There is potential for the excavations to encounter glacial gravel/till, depending on the depth of the rock toe and the elevation of the glacial deposits, which may be difficult to excavate and/or contain groundwater that is difficult to control.

6 Design Criteria

This section outlines the key design parameters and methods/guidance to be adopted for design of the revetment extension.

6.1 Rock Stability

The design of revetment slope stability using rock will be undertaken in accordance with CIRIA (2007). The following table summarizes values to be used for each design parameter.

Table 8 Rock Armour Design Parameters

Design Parameter	Design Value	Source
Duration of storm event	4 hours	
Damage level parameter (slopes of < 1v:3h)	2	CIRIA (2007)
Notional Permeability Parameter	0.2	CIRIA (2007)
Density of seawater	1025 kg/m ³	
Density of rock	2600 kg/m ³	Table 1: Camelback Quarry rock properties

A damage level parameter of 2 represents damage of 0 – 5% (i.e. 0 – 5% of the rock in the zone of attack will be displaced by the wave action).

6.2 Filter Layer

Filter layer design, including use of either granular or geotextile filters, will be undertaken in accordance with CIRIA (2007).

6.3 Toe Stability

Toe stability and scour protection design will be undertaken in accordance with CIRIA (2007). The scour assessment will consider a range of water levels.

6.4 Wave Run-up and Overtopping

To assess the crest level and width required for the revetment, wave run-up and overtopping will be assessed using the approach for a simple revetment structure, in EurOtop II (2018). Wave overtopping is the quantity of water from wave impact on the structure, propelling over the crest towards the hinterland, which can cause damage or safety concerns to areas behind the revetment crest.

The revetment for this project is to provide erosion protection to the shoreline, which consists of grassed land areas. Overtopping of the crest will be assessed and the erodibility of the hinterland. The assessment will consider the rate of overtopping and the damage/safety concerns this will cause based on guidance from EurOtop II (2018), which will inform any additional protection requirements to the crest that is required to mitigate erosion.

6.5 Revetment Alignment

As far as practicable, the revetment alignment will look to limit the revetment footprint on the beach and earthworks associated with the structure. At this stage, it is anticipated that the revetment would generally follow the erosion scarp that lies immediately landward of the beach, with a transition section at the southern end of the revetment extension to match into the existing permanent revetment at Stafford Street. The

concept of a buried revetment, landward of the beach, will also be discussed with WCRC as an alternative. One of the two approaches will be taken forward to detailed design.

Appendix A: Vertical Datum Conversion Memorandum

Memorandum

To Jennifer Hart, Beca
Ian Goss, Beca
Brendon Russ, West Coast Regional Council

From Chris Coll, Chris J Coll Surveying Ltd

Date 13th November 2020

Re Hokitika Vertical Datums

Introduction

New Zealand Vertical Datum 2016 (NZVD2016) is the current official national vertical datum in New Zealand. Generally and for the present, LINZ-recommended best practice requires updating and transforming levels from “old” datums (such as local chart datums, MSL Lyttelton 1937 etc.) so they are in terms of NZVD2016.

Chart Datum

Westport and Greymouth have had reliable, long term records from their harbour and fishing ports. Their chart datums (also often referred to as “harbours datums”) have a zero reduced level that was adopted to closely match the lowest astronomical tide level likely to be reached during a 19 year recording at each location. I have been unable to find reliable chart datum or tide gauge records for Hokitika. However, Westport and Greymouth chart or harbour datum values agree within <0.05m with each other and could be used to transform sea level values at Hokitika.

MSL Lyttelton 1937

Until about 2009, LINZ recommended using MSL Lyttelton 1937 (Lyttelton 1937) as the datum for the mid-half of the South Island and this included the West Coast of the South Island.

Benchmarks and trigs that have heights available in terms of Lyttelton 1937 are available in the LINZ Geodetic Database but these need to be carefully scrutinised before adoption. The “order” of vertical accuracy is a necessary first consideration and the dates of any updates need to be examined.

From about 2000 to 2016, we used Lyttelton 1937 as the vertical datum for all our work on West Coast Regional Council projects. In 2009, LINZ introduced a new datum called New Zealand Vertical Datum 2009 (NZVD2009). This was an official nationwide vertical datum until 2016 but there were so many technical problems it was abandoned and superseded by NZVD2016.

New Zealand Vertical Datum 2016

NZVD2016 is a transformation surface that transforms heights obtained with GPS/GNSS as ellipsoidal heights to orthometric heights i.e. the heights that we would obtain using surveying instruments like total stations or level and staff.

From about 2016, we have used NZVD2016 as the vertical height datum for all West Coast Regional Council projects. We have had to transform data from being in terms of other datums into NZVD2016.

Transformations

During the conversion of data that we use have used along the coastal margins of the West Coast, we have encountered some interesting findings.

Buller District – Westport Harbour

We have found that to convert Westport Harbour Chart Datum levels to NZVD2016, we take the Chart Datum levels and apply a negative correction of 2.13m in order to determine a final reduced level in terms of the “nationally consistent” datum.

i.e. 0.00m in terms of Westport Harbour Chart Datum = -2.13m in terms of NZVD2016.

In the case of the recently constructed protection rock wall at Westport Airport, the top of the wall was set in the specifications for the project at a reduced level of 5.00m in terms of NZVD2016. This height in terms of Westport Harbour Chart Datum would be 7.13m. In order to “reverse” the transformation to see what the height would be in terms of Westport Harbour Chart Datum, we apply a positive correction of 2.13m i.e. $5.00\text{m} + 2.13\text{m} = 7.13\text{m}$.

To convert Lyttelton 1937 levels to NZVD2016, we apply a negative correction of 0.35m to obtain reduced levels in terms of NZVD2016.

Grey District – Greymouth Harbour

We have found similar correction values are required to convert from Greymouth Harbour Chart Datum to NZVD2016 and from Lyttelton 1937 to NZVD2016.

In and around the Greymouth Harbour/Port area, to convert Chart Datum levels to NZVD2016, we take the Chart Datum levels and apply the same negative correction of 2.13m in order to determine final reduced levels in terms of NZVD2016.

To convert Lyttelton 1937 levels to NZVD2016, it is necessary to apply a negative correction of 0.31m in order to determine a final reduced level in terms of NZVD2016.

Westland District – Hokitika River Mouth and WCRC Cross-sections

In the absence of a harbour or port authority tide gauge that has been used to develop a localised datum as in the case of Westport and Greymouth Harbours, the best method of getting all the levels in the same terms is to transfer the same conversion method to the levels in Hokitika by transforming/converting them all into NZVD2016.

To convert tide table Chart Datum levels into NZVD2016, it is necessary to apply a negative correction of 2.13m in order to determine final reduced levels in terms of NZVD2016.

To convert Lyttelton 1937 levels into NZVD2016 terms, it is necessary to apply a negative correction of 0.34m in order to determine final reduced levels in terms of NZVD2016.

In the course of finding a standard “average” conversion value for transforming Lyttelton 1937 levels to NZVD2016 values, we discovered several anomalies in the LINZ Geodetic Database that we have queried with LINZ. Some of the conversions from NZVD2016/Lyttelton 1937 seem to have had their positive/negative corrections reversed. For example, Trig 5092 (LINZ Geodetic Code: AP6E) located at the mouth of the Hokitika River on the true left (south) bank has a positive correction of 0.39m applied to convert from Lyttelton 1937 to NZVD2016. Trig EA (LINZ Geodetic Code: A8KF) has a positive correction of 0.35m applied to convert from Lyttelton 1937 to NZVD2016. Trig J Blue Spur (LINZ Geodetic Code: 1421) has a positive correction of 0.41m applied to convert from Lyttelton 1937 to NZVD2016.

Conclusion

Ian will recall a project we were associated with at the Fox River mouth where some bach owners and Buller District Council were looking at closing some legal road adjoining the sea. I provide expert witness evidence relating to the line of Mean High Water Springs (MHWS). At Westport Harbour (and consequently, Westport), MHWS is determined as being 3.25m above the local Chart Datum. This then converts as being 1.12m in terms of NZVD2016 and 1.47m in terms of Lyttelton 1937.

In order to obtain a reduced level in any of the datums discussed, the following table can be used to guide conversions.

Conversion Table

*NB: Ensure that the **positive or negative sign** is correct when applying the correction.*

	Chart Datum	Lyttelton 1937	NZVD2016
Mean Low Water (MLW)	0.00	-1.78	-2.13
Mean Sea Level (MSL)	+1.75	-0.03	-0.38
Mean High Water Springs (MHWS)	+3.25	+1.47	+1.12
Typical Sea Wall (e.g. Westport Airport)	+7.13	+5.34	+5.00

Murray Marsh has correctly applied the correction for transformations in the Hokitika Sea Wall area. I think that all datums (Chart, Lyttelton 1937, any assumed datums etc.) should be transformed to standardise on a common datum i.e. NZVD2016. In the future, this will become easier and more familiar. This will make comparisons of structures and topography along the West Coast more straightforward. All local authorities, mining companies, agricultural and river control works would benefit from the adoption of a common, universal vertical datum. The obvious choice is LINZ's NZVD2016 as this would provide additional benefit if data is input or output from national systems and databases.

If you would like to discuss anything covered in this memorandum, please do not hesitate to contact us.

Yours faithfully,



Chris Coll
 FNZIS, RPSurv., Licensed Cadastral Surveyor, Regd. Surveyor,
 DIP. SURV., NZCE(Civil), COC Mine Surveyor



CIVIL ENGINEERING
Project No 3325253

HOKITIKA REVETMENT EXTENSION

DETAILED DESIGN

Prepared for



By
Beca

1 APRIL 2022



LOCALITY PLAN
NTS

DRAWING LIST		
DRAWING NO.	REV	DRAWING TITLE
3325253-CA-000	A	COVER PAGE, LOCALITY PLAN AND DRAWING LIST
3325253-CA-001	A	HOKITIKA REVETMENT SOUTHERN PLAN
3325253-CA-002	A	HOKITIKA REVETMENT NORTHERN PLAN
3325253-CA-003	A	TYPICAL CROSS SECTIONS SHEET 1
3325253-CA-004	A	TYPICAL CROSS SECTIONS SHEET 2
3325253-CA-005	A	SOUTHERN REVETMENT ACCESSWAYS
3325253-CA-006	A	NORTHERN REVETMENT ACCESSWAYS
3325253-CA-007	A	ROCK ARMOUR SPECIFICATIONS



Drawing No.	3325253-CA-000	Rev.	A
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NOTES:

- DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
- HORIZONTAL COORDINATE SYSTEM IS IN NZTM 2000
- VERTICAL LEVEL TO NZVD 2016 AND REFERRED TO AS REDUCED LEVEL (RL).
- SET-OUT LINE REFERS TO FRONT OF PROPOSED SEAWALL CREST. REFER TO DRAWINGS CA-003 AND CA-004.
- SET-OUT POINTS ARE INDICATIVE AND ACTUAL SET OUT TO SUIT SHORELINE, TO BE CONFIRMED ON SITE BY THE ENGINEER.

KEY

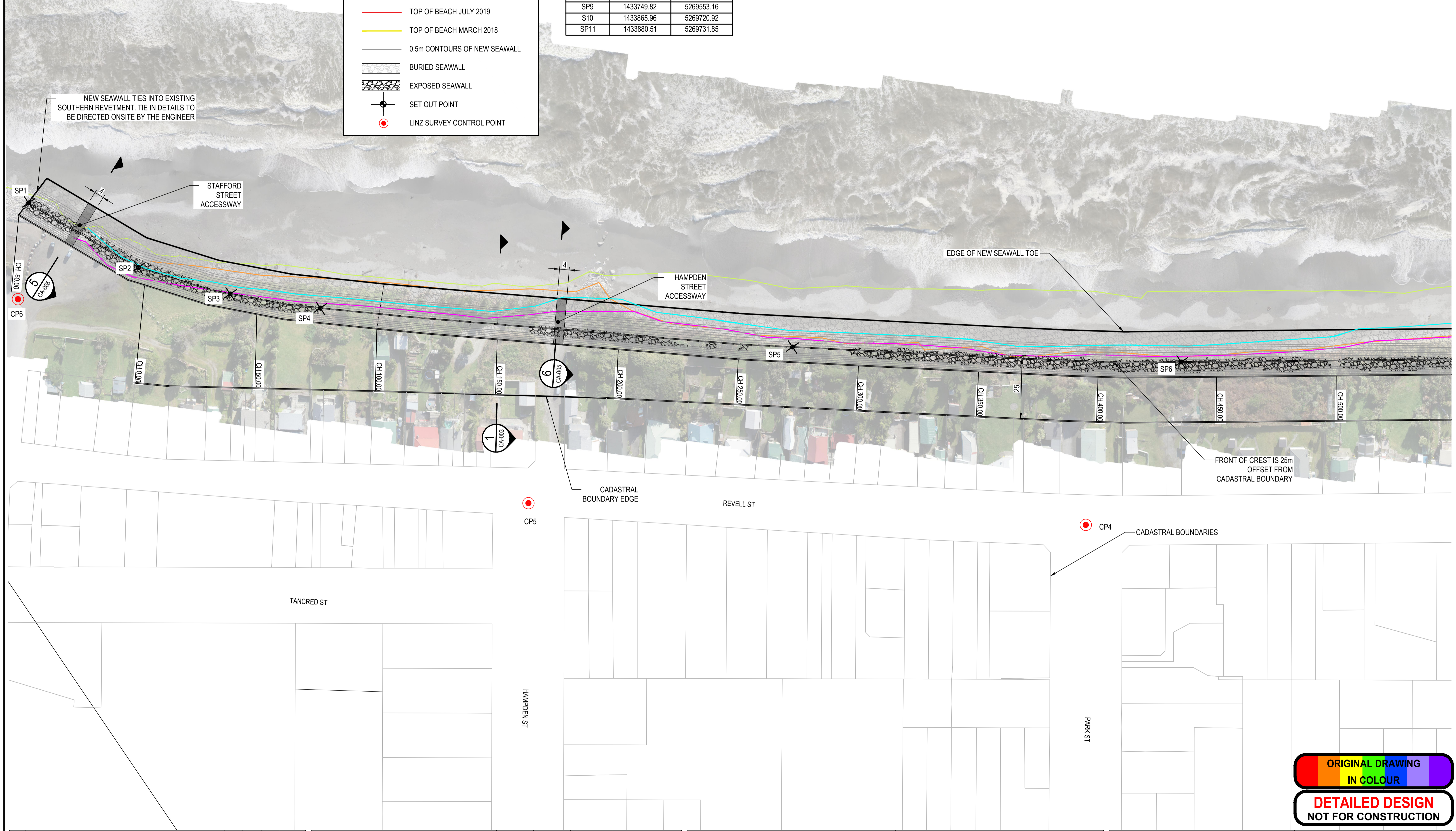
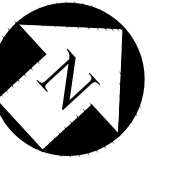
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- NEW SEAWALL EXTENT
- TOP OF EXISTING SEAWALL
- TOE OF EXISTING SEAWALL
- TOP OF BEACH AUGUST 2019
- TOP OF BEACH JULY 2019
- TOP OF BEACH MARCH 2018
- 0.5m CONTOURS OF NEW SEAWALL
- BURIED SEAWALL
- EXPOSED SEAWALL
- ⊙ SET OUT POINT
- LINZ SURVEY CONTROL POINT

SETTING OUT POINTS

POINT	EASTING	NORTHING
SP1	1433173.02	5268820.08
SP2	1433220.83	5268842.76
SP3	1433251.36	5268868.15
SP4	1433277.25	5268895.83
SP5	1433400.85	5269049.09
SP6	1433496.73	5269179.20
SP7	1433592.62	5269323.38
SP8	1433615.19	5269353.53
SP9	1433749.82	5269553.16
S10	1433865.96	5269720.92
SP11	1433880.51	5269731.85

CONTROL CO-ORDINATES

SURVEY	EASTING	NORTHING
POINT ID	EASTING	NORTHING
CP1	1433928.535	5269693.572
CP2	1433790.606	5269491.454
CP3	1433659.813	5269299.772
CP4	1433530.412	5269108.413
CP5	1433392.849	5268921.882
CP6	1433203.631	5268793.961



No.	Revision	By	Chk	Appd	Date
A	DETAILED DESIGN	HD	RS	KS	1.04.22



Original Scale (A1)	NTS	Design	HD	1.04.22
Reduced Scale (A3)	NTS	Drawn	HD	1.04.22
		Dwg Verifier		
		Dwg Check		



Project: HOKITIKA REVETMENT EXTENSION

Title: HOKITIKA REVETMENT SOUTHERN PLAN

Discipline	CIVIL ENGINEERING
Drawing No.	3325253-CA-001
Rev.	A

**ORIGINAL DRAWING
IN COLOUR**

**DETAILED DESIGN
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NOTES:

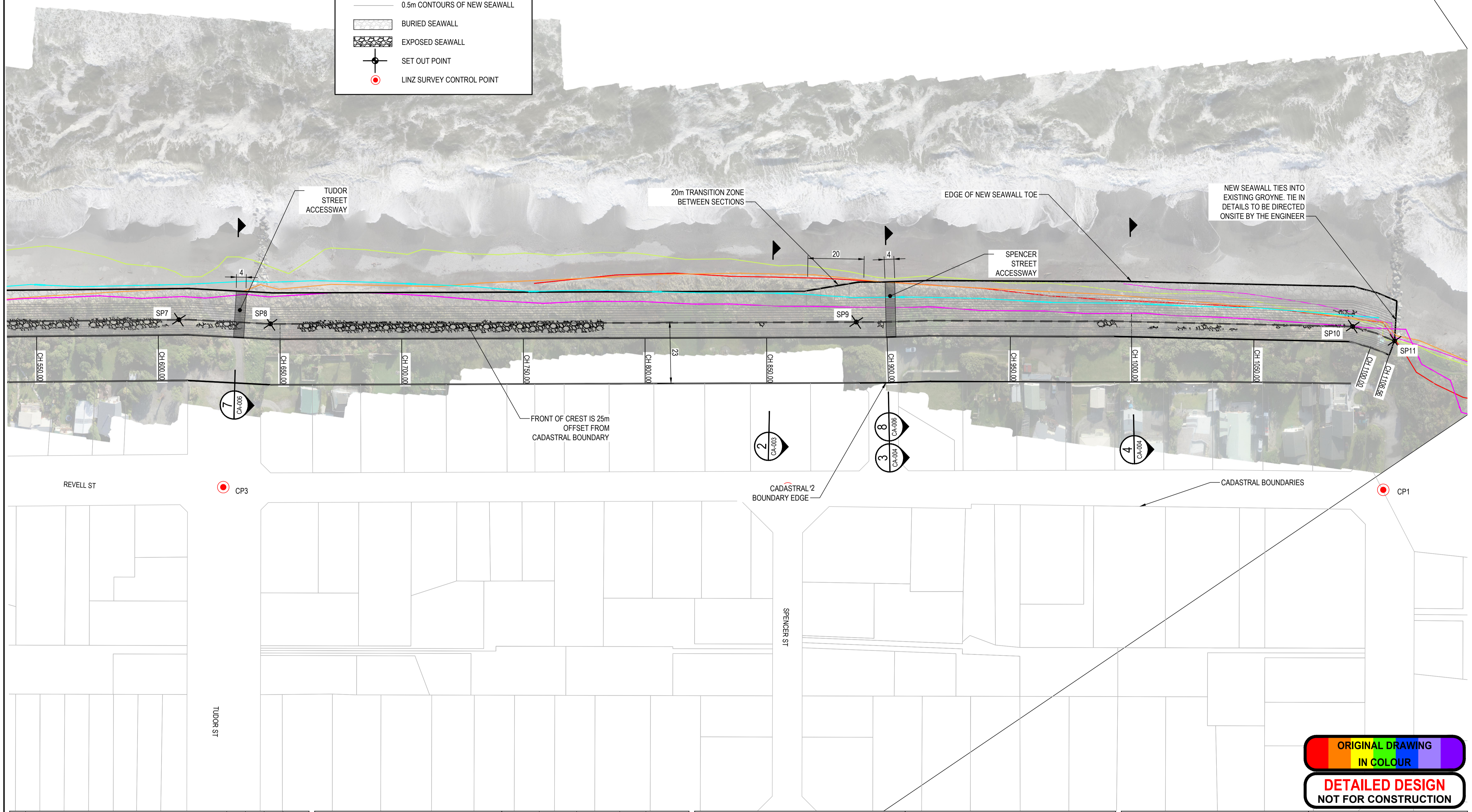
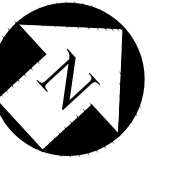
1. DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
2. HORIZONTAL COORDINATE SYSTEM IS IN NZTM 2000
3. VERTICAL LEVEL TO NZVD 2016 AND REFERRED TO AS REDUCED LEVEL (RL).
4. SET-OUT LINE REFERS TO FRONT OF PROPOSED SEAWALL CREST. REFER TO DRAWINGS CA-003 AND CA-004.
5. SET-OUT POINTS ARE INDICATIVE AND ACTUAL SET OUT TO SUIT SHORELINE, TO BE CONFIRMED ON SITE BY THE ENGINEER.

KEY

- FRONT CREST EDGE OF NEW SEAWALL
- NEW SEAWALL EXTENT
- TOP OF EXISTING SEAWALL
- TOE OF EXISTING SEAWALL
- TOP OF BEACH AUGUST 2019
- TOP OF BEACH JULY 2019
- TOP OF BEACH MARCH 2018
- 0.5m CONTOURS OF NEW SEAWALL
- BURIED SEAWALL
- EXPOSED SEAWALL
- SET OUT POINT
- LINZ SURVEY CONTROL POINT

SETTING OUT POINTS		
POINT	EASTING	NORTHING
SP1	1433173.02	5268820.08
SP2	1433220.83	5268842.76
SP3	1433251.36	5268868.15
SP4	1433277.25	5268895.83
SP5	1433400.85	5269049.09
SP6	1433496.73	5269179.20
SP7	1433592.62	5269323.38
SP8	1433615.19	5269353.53
SP9	1433749.82	5269553.16
S10	1433865.96	5269720.92
SP11	1433880.51	5269731.85

CONTROL CO-ORDINATES		
POINT ID	EASTING	NORTHING
CP1	1433928.535	5269693.572
CP2	1433790.606	5269491.454
CP3	1433659.813	5269299.772
CP4	1433530.412	5269108.413
CP5	1433392.849	5268921.882
CP6	1433203.631	5268793.961



No.	Revision	By	Chk	Appd	Date
A	DETAILED DESIGN	HD	RS	KS	1.04.22



Original Scale (A1)	NTS	Design	HD	1.04.22
Reduced Scale (A3)	NTS	Drawn	HD	1.04.22
		Dwg Verifier		
		Dwg Check		



Client: THE WEST COAST REGIONAL COUNCIL
Project: HOKITIKA REVETMENT EXTENSION

Title: HOKITIKA REVETMENT NORTHERN PLAN

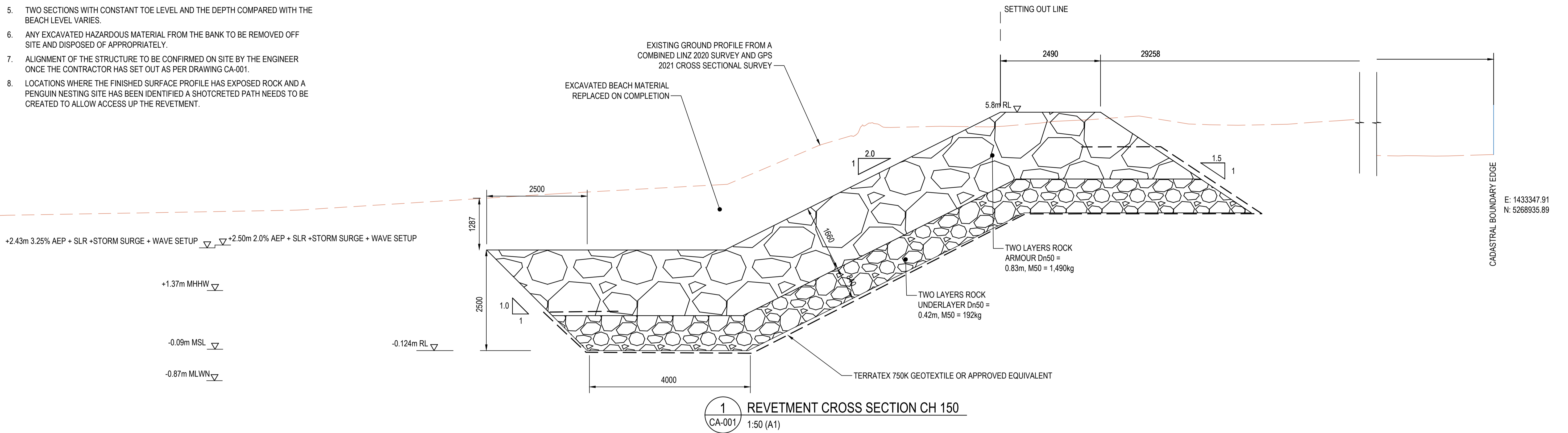
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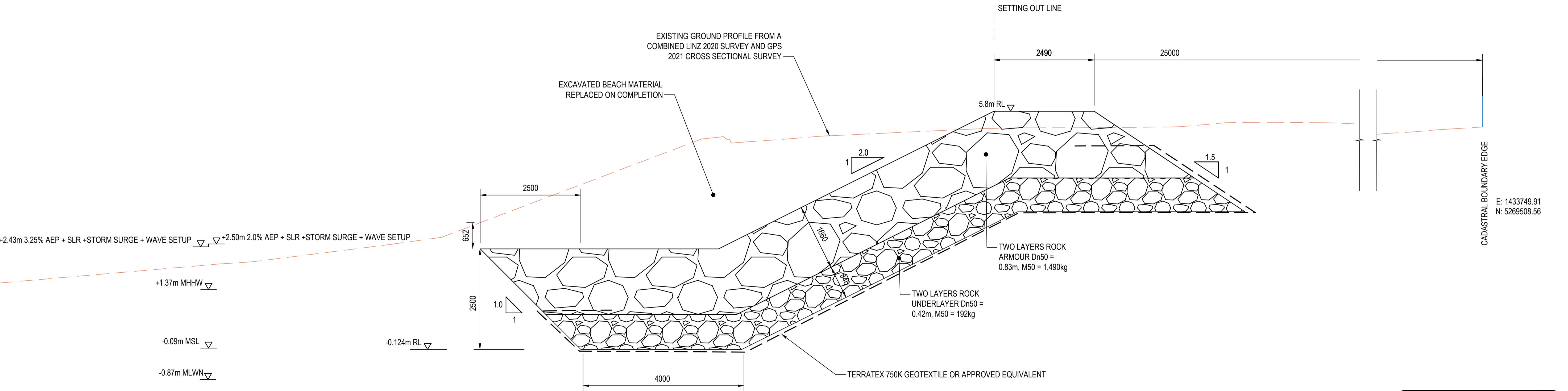
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Drawing No.	3325253-CA-002
Rev.	A

NOTES:

1. DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
2. LEVELS ARE IN TERMS OF NZVD16 AND REFERRED TO AS REDUCED LEVEL (RL).
3. TO BE READ IN ACCORDANCE WITH THE ROCK SPECIFICATION. REFER TO DRAWING CA-007.
4. TOE LEVEL TO BE MINIMUM 500mm BELOW THE BEACH LEVEL.
5. TWO SECTIONS WITH CONSTANT TOE LEVEL AND THE DEPTH COMPARED WITH THE BEACH LEVEL VARIES.
6. ANY EXCAVATED HAZARDOUS MATERIAL FROM THE BANK TO BE REMOVED OFF SITE AND DISPOSED OF APPROPRIATELY.
7. ALIGNMENT OF THE STRUCTURE TO BE CONFIRMED ON SITE BY THE ENGINEER ONCE THE CONTRACTOR HAS SET OUT AS PER DRAWING CA-001.
8. LOCATIONS WHERE THE FINISHED SURFACE PROFILE HAS EXPOSED ROCK AND A PENGUIN NESTING SITE HAS BEEN IDENTIFIED A SHOTCRETED PATH NEEDS TO BE CREATED TO ALLOW ACCESS UP THE REVETMENT.



1 REVETMENT CROSS SECTION CH 150
CA-001 1:50 (A1)



2 REVETMENT CROSS SECTION CH 850
CA-002 1:50 (A1)

ORIGINAL DRAWING
IN COLOUR

DETAILED DESIGN
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No.	Revision	By	Chk	Appd	Date
A	DETAILED DESIGN	HD	RS	KS	1.04.22



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Drawn	HD	Dwg Verifier		
Reduced Scale (A3)	1:100	Dwg Check		



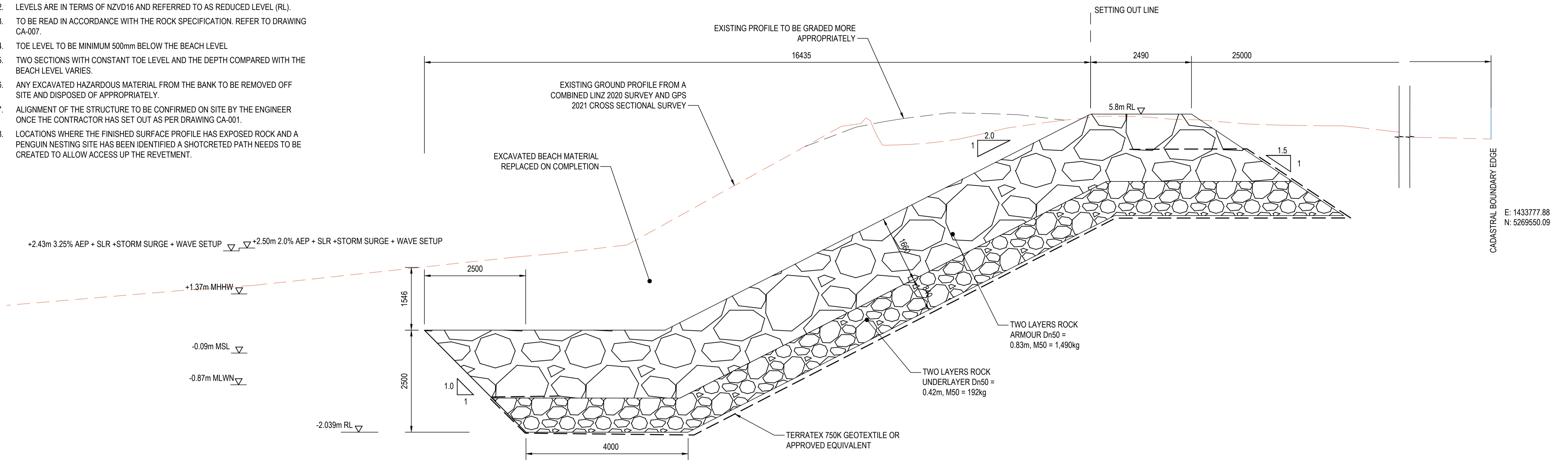
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Title: **HOKITIKA TYPICAL CROSS SECTION SHEET 2**

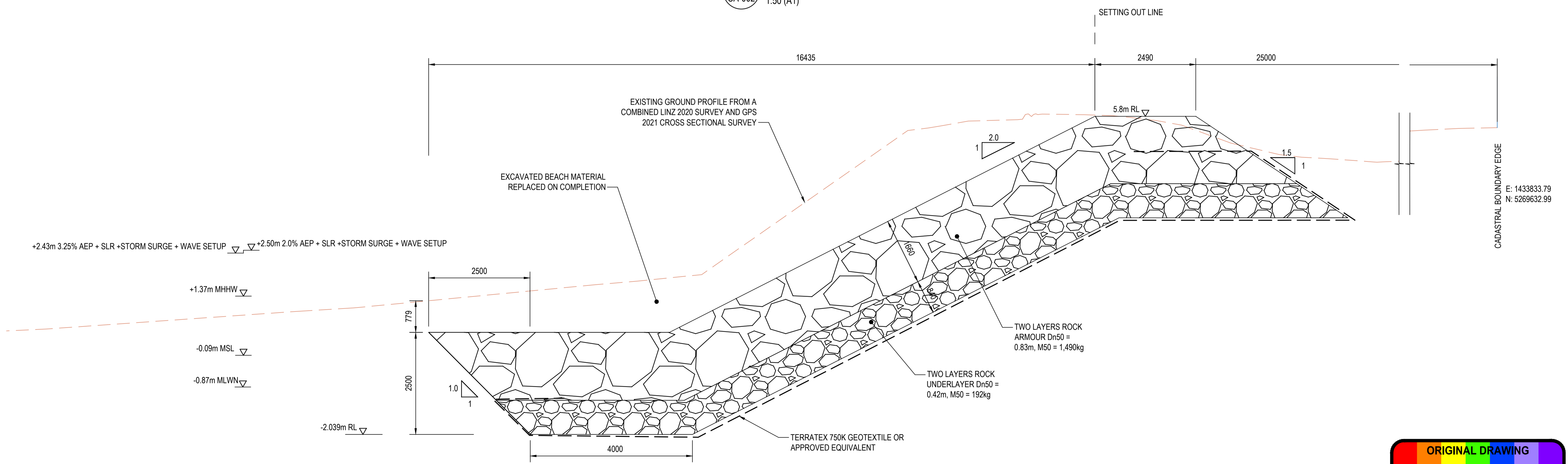
Discipline	CIVIL ENGINEERING
Drawing No.	3325253-CA-003
Rev.	A

NOTES:

1. DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
2. LEVELS ARE IN TERMS OF NZVD16 AND REFERRED TO AS REDUCED LEVEL (RL).
3. TO BE READ IN ACCORDANCE WITH THE ROCK SPECIFICATION. REFER TO DRAWING CA-007.
4. TOE LEVEL TO BE MINIMUM 500mm BELOW THE BEACH LEVEL
5. TWO SECTIONS WITH CONSTANT TOE LEVEL AND THE DEPTH COMPARED WITH THE BEACH LEVEL VARIES.
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8. LOCATIONS WHERE THE FINISHED SURFACE PROFILE HAS EXPOSED ROCK AND A PENGUIN NESTING SITE HAS BEEN IDENTIFIED A SHOTCRETED PATH NEEDS TO BE CREATED TO ALLOW ACCESS UP THE REVETMENT.



3 REVETMENT CROSS SECTION CH 900
CA-002 1:50 (A1)



4 REVETMENT CROSS SECTION CH 1000
CA-002 1:50 (A1)

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IN COLOUR
DETAILED DESIGN
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No.	Revision	By	Chk	Appd	Date
A	DETAILED DESIGN	HD	RS	KS	1.04.22

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Original Scale (A1)	Design	HD	1.04.22
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Reduced Scale (A3)	Dwg Verifier		
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Client: **THE WEST COAST REGIONAL COUNCIL**

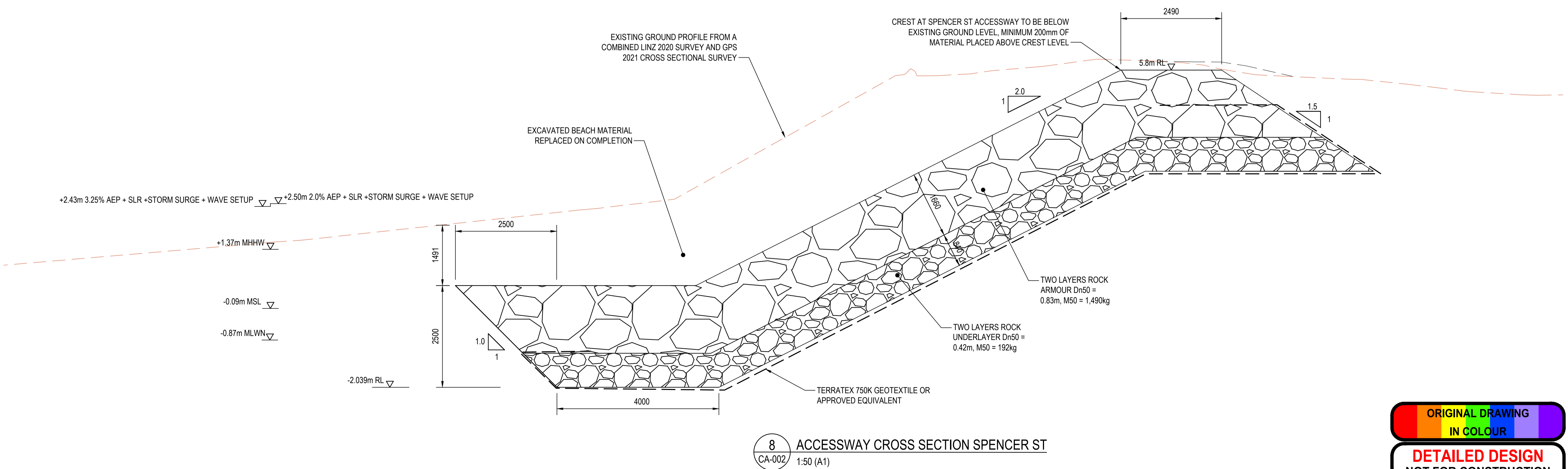
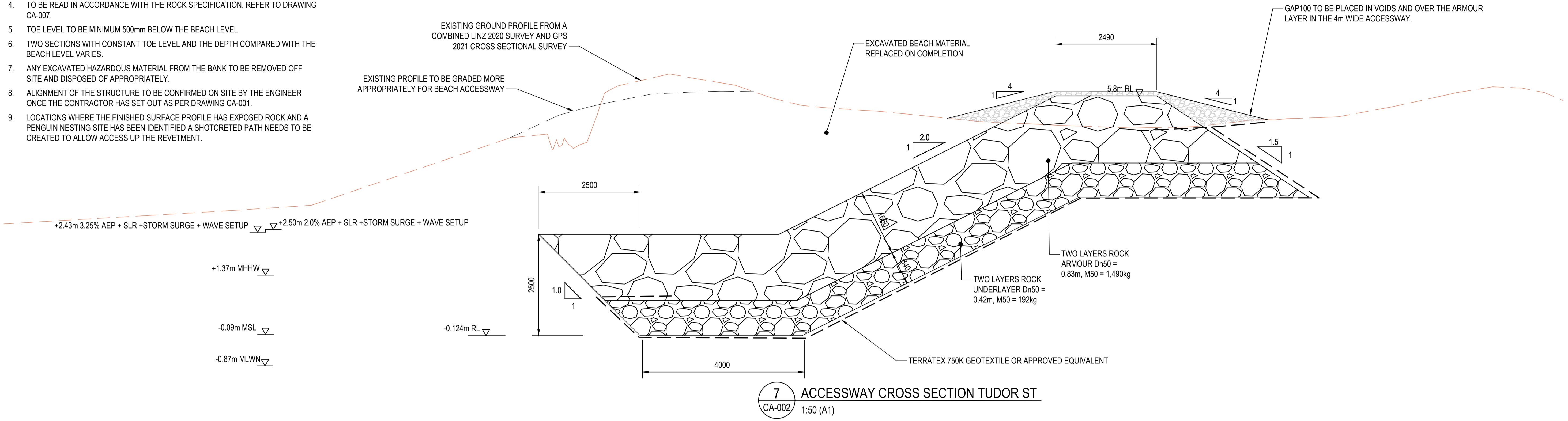
Project: **HOKITIKA REVETMENT EXTENSION**

Title: **HOKITIKA TYPICAL CROSS SECTION SHEET 1**

Discipline	CIVIL ENGINEERING
Drawing No.	3325253-CA-004
Rev.	A

NOTES:

1. DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
2. ACCESSWAYS ARE TO HAVE A WIDTH OF 4m.
3. LEVELS ARE IN TERMS OF NZVD16 AND REFERRED TO AS REDUCED LEVEL (RL).
4. TO BE READ IN ACCORDANCE WITH THE ROCK SPECIFICATION. REFER TO DRAWING CA-007.
5. TOE LEVEL TO BE MINIMUM 500mm BELOW THE BEACH LEVEL.
6. TWO SECTIONS WITH CONSTANT TOE LEVEL AND THE DEPTH COMPARED WITH THE BEACH LEVEL VARIES.
7. ANY EXCAVATED HAZARDOUS MATERIAL FROM THE BANK TO BE REMOVED OFF SITE AND DISPOSED OF APPROPRIATELY.
8. ALIGNMENT OF THE STRUCTURE TO BE CONFIRMED ON SITE BY THE ENGINEER ONCE THE CONTRACTOR HAS SET OUT AS PER DRAWING CA-001.
9. LOCATIONS WHERE THE FINISHED SURFACE PROFILE HAS EXPOSED ROCK AND A PENGUIN NESTING SITE HAS BEEN IDENTIFIED A SHOTCRETED PATH NEEDS TO BE CREATED TO ALLOW ACCESS UP THE REVETMENT.



No.	Revision	By	Chk	Appd	Date
A	DETAILED DESIGN	HD	RS	KS	1.04.22



Original Scale (A1)	1:50	Design	HD	1.04.22
Reduced Scale (A3)	1:100	Drawn	HD	1.04.22
		Dwg Verifier		
		Dwg Check		



Client: HOKITIKA REVETMENT EXTENSION

Title: HOKITIKA NORTHERN ACCESSWAYS CROSS SECTIONS

ORIGINAL DRAWING
IN COLOUR

DETAILED DESIGN
NOT FOR CONSTRUCTION

Discipline	CIVIL ENGINEERING
Drawing No.	3325253-CA-006
Rev.	A

ARMOUR ROCK SPECIFICATION:

GENERAL

THIS SPECIFICATION SHALL BE READ IN CONJUNCTION WITH THE STANDARD "CIRIA C683 THE ROCK MANUAL - THE USE OF HYDRAULIC ROCK IN ENGINEERING, 2007" AND ALL MATERIALS AND WORKMANSHIP SHALL COMPLY WITH THIS STANDARD UNLESS EXPRESSLY NOTED OTHERWISE. THE CONTRACTOR SHALL PREPARE A METHOD STATEMENT FOR THE ENGINEER'S REVIEW INCLUDING SOURCES OF MATERIAL AND QUARRYING, HOW THE SPECIFIED GRADINGS WILL BE ACHIEVED, TRANSPORT AND STOCKPILING, ROCK PLACEMENT, SURVEY TECHNIQUES, HEALTH AND SAFETY AND ENVIRONMENTAL MATTERS.

THE CONTRACTOR SHALL NOMINATE AT THE TIME OF TENDER, THE SOURCE AND MATERIAL TYPE FOR THE ROCK. SOURCE TESTING AND GRADING IS REQUIRED FOR EACH OF THE TESTS DESCRIBED BELOW UNDER ROCK QUALITY AND ROCK GRADING AND RESULTS SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW PRIOR TO THE COMMENCEMENT OF WORKS. TESTING IS TO BE UNDERTAKEN AT AN IANZ ACCREDITED LABORATORY.

THE CONTRACTOR SHALL CONDUCT A TRIAL TO DEMONSTRATE HOW THE PROPOSED WORK METHODS AND RESOURCES WILL RESULT IN THE REVETMENT BEING BUILT IN FULL ACCORDANCE WITH THE SPECIFICATION. THE TRIAL SHALL EXTEND OVER THE FULL LAYER HEIGHT IN A SINGLE PASS AND MINIMUM WIDTH OF 10m. PROVIDED THE TRIAL MEETS THE SPECIFICATION, THE TRIAL PANEL MAY BE INCORPORATED INTO THE PERMANENT WORKS.

THE CONTRACTOR SHALL CARRY OUT PRE AND POST WORK SURVEYS AND MEASUREMENT SURVEYS TO SUPPORT PROGRESS PAYMENT APPLICATIONS. SURVEY OF ROCK BE CARRIED OUT USING A PROBE WITH A SPHERICAL END OF DIAMETER 0.5D₅₀, WHERE D_{n50} IS THE SIZE OF THE CUBE WITH EQUIVALENT VOLUME TO THE BLOCK WITH MEDIAN WEIGHT. ALTERNATIVELY, A DGPS SYSTEM RIGGED TO CONSTRUCTION EQUIPMENT MAY BE USED. THE PROPOSED SURVEY SYSTEM IS TO BE INCLUDED IN THE CONTRACTOR'S WORK METHOD STATEMENT FOR REVIEW BY THE ENGINEER.

ROCK QUALITY

EACH TEST SPECIFIED BELOW SHALL COMPRISE A MINIMUM OF THREE SAMPLES.

- ARMOUR STONE SHALL BE HARD, DURABLE, CRUSHED, QUARRIED OR NATURAL STONE FREE FROM DUST, CLAY, ORGANIC MATTER AND OTHER DELETERIOUS MATERIAL. THE STONE SHALL BE FREE FROM LAMINATIONS AND CLEAVAGES AND SHALL NOT DISINTEGRATE ON EXPOSURE TO WEATHERING.
- THE SOLID DENSITY (SSD) OF ARMOUR STONE SHALL BE AT LEAST 2.6 t/m³ IN ACCORDANCE WITH NZS 4407:2015.
- THE ARMOUR STONE SHALL HAVE A WATER ABSORPTION LESS THAN 3.0% IN ACCORDANCE WITH NZS 3111:1986.
- RESISTANCE TO ABRASION - LOS ANGELES ABRASION NOT MORE THAN 25% LOSS IN WEIGHT IN ACCORDANCE WITH NZS 4407:2015.
- THE QUARRY STONE USED FOR ARMOUR AND UNDERLAYER SHALL HAVE A QUALITY INDEX OF AA, AB, BA WHEN TESTING IN ACCORDANCE WITH NZS 4407:2015.

ROCK GRADING AND SHAPE

6. THE ARMOUR ROCK GRADING IS AS FOLLOWS:

ROCK GRADING						
M ₅₀	D _{n50}	LAYER THICKNESS	MAX	<15% PASSING	MIN	D _{n50} /D _{n15}
(kg)	(m)	(m)	(kg)	(kg)	(kg)	-
1,490	0.83	1.66	2 x M ₅₀	0.65 x M ₅₀	0.45 x M ₅₀	<1.5
190	0.42	0.84	2.2 x M ₅₀	0.5 x M ₅₀	0.3 x M ₅₀	<1.5

6a. M₅₀ IS THE MEAN MASS, M = SSD x D_n³
 D_n IS THE NOMINAL DIAMETER. CONSIDER THE ROCK AS A CUBE.
 D IS THE SIEVE SIZE AND USED FOR ON SITE MEASUREMENT, CONVERSION TO BE CONFIRMED ON CONFIRMATION OF ROCK SUPPLY.

7. ROCK SHAPE : ARMOUR AND STONE SHALL HAVE A LENGTH (L) TO WIDTH (W) RATIO OF LESS THAN 3. FIFTY PERCENT (50%) OF STONES SHALL NOT HAVE A LW RATIO GREATER THAN 2.

TEST FREQUENCY

- ROCK PROPERTIES AND GRADING TO BE UNDERTAKEN AND SUBMITTED TO THE ENGINEER FOR REVIEW PRIOR TO WORK COMMENCING.
- ROCK PROPERTIES AND GRADING TO BE REPEATED IF MATERIAL SOURCE CHANGES.
- ROCK UNDERLAYER AND ARMOUR GRADING AND SHAPE TO BE TESTED AT SOURCE AND THEREAFTER AT 3000m² INTERVALS.

CONSTRUCTION

- PLACING OF EACH LAYER SHALL COMMENCE AT THE TOE AND SHALL PROCEED UPWARDS TOWARDS THE TOP.
- ROCKS SHALL BE PLACED TO:
 - ACHIEVE A WELL KEYED, DENSELY PACKED STRUCTURE WITH A TARGET BULK DENSITY OF 1.64 t/m³ WITH A TOLERANCE OF ±0.1 t/m³. WHERE THE CONTRACTOR USES A HIGHER ROCK DENSITY (SSD) THAN 2.6t/m³ THEY SHALL SPECIFY THE REVISED ROCK DENSITY AND ADJUST THE TARGET PLACED DENSITY PRO-RATA.
 - ACHIEVE EFFECTIVE INTERLOCKING, SO THAT EACH ROCK IS SECURELY HELD IN PLACE BY ITS NEIGHBOURS AND DOES NOT DEPEND ON FRICTIONAL RESISTANCE FOR STABILITY PRIOR TO PLACING FURTHER STONES.
 - ACHIEVE A FINISHED LAYER AT LEAST TWO ROCKS THICK UNLESS SHOWN OTHERWISE ON THE DRAWINGS.
 - AVOID FORMING, WITHIN THE OVERALL THICKNESS OF THE LAYER, SEPARATE LAYERS IN THE PLANE PARALLEL TO THE SLOPE OF THE UNDERLYING MATERIAL.
- RIPRAP, UNDERLAYER AND ARMOUR ROCK SHALL BE PLACED AS SOON AS PRACTICABLE TO PROTECT THE UNDERLYING MATERIAL. MATERIAL ERODED BY WAVE ACTION OR ANY OTHER CAUSE SHALL BE MADE GOOD BY THE CONTRACTOR, AT THE CONTRACTOR'S OWN EXPENSE BEFORE PLACING THE APPROPRIATE PROTECTIVE LAYER.
- UNDERLAYER ROCK SHALL BE DEPOSITED CAREFULLY SO THAT GEOTEXTILE FABRIC IS NOT PUNCTURED. MAXIMUM DROP HEIGHT OF THE UNDERLAYER ROCK SHALL BE LIMITED TO 0.5m. ARMOUR ROCK SHALL BE INDIVIDUALLY PLACED PIECE BY PIECE INTO THE STRUCTURE TO ACHIEVE A MINIMUM 3-POINT SUPPORT.

TOLERANCES

- VERTICAL TOLERANCE FOR TRIMMED SLOPE FOR ROCK REVETMENT CONSTRUCTION TO BE ±100mm.
- HORIZONTAL TOLERANCE FOR ROCK RIPRAP, UNDERLAYER AND ARMOUR TO BE ±0.30m.
- VERTICAL TOLERANCE FOR UNDERLAYER TO BE ±0.10m AND FOR RIPRAP AND ROCK ARMOUR ±0.15m.

GEOTEXTILE

- GEOTEXTILE SHALL COMPLY WITH AS 3706, GEOTEXTILES.
- GEOTEXTILE SHALL BE KEPT IN ITS PROTECTIVE WRAPPING ON THE SITE AND STORED OUT OF DIRECT SUNLIGHT SO IT IS NOT EXPOSED TO ULTRA-VIOLET LIGHT PRIOR TO INSTALLATION. GEOTEXTILE THAT IS NOT IMMEDIATELY COVERED AFTER INSTALLATION SHALL BE COVERED WITH AN APPROVED MATERIAL OF SUFFICIENT THICKNESS TO PROTECT IT FROM ULTRA-VIOLET LIGHT. GEOTEXTILE THAT IS DAMAGED SHALL BE REJECTED AND REMOVED FROM SITE.
- THE MINIMUM LAP WIDTH OF ADJACENT STRIPS OF GEOTEXTILE SHALL BE 1000mm.

HARDFILL

- ROCK IS TO BE ANGULAR OR SUB-ANGULAR.
- GRADING IS TO BE GAP100 WITH LESS THAN 5% FINES.

GAP100 GRADING	
SIEVE SIZE	PERCENTAGE PASSING
100mm	100
75mm	80-92
63mm	70-85
37.5mm	54-75
19.0mm	39-60
9.5mm	27-46
4.75mm	20-34
2.36mm	15-25
1.18mm	10-18
600µm	6-13

- CRUSHING RESISTANCE ≥ 120kN.
- WEATHERING QUALITY INDEX TO BE AA, AB, AC, BA, BB, OR CA.
- HARDFILL SHALL BE COMPACTED WITH A VIBROCOMPACTOR WEIGHING LESS THAN 75kg.

No.	Revision	By	Chk	Appd	Date
A	DETAILED DESIGN	HD	RS	KS	1.04.22



Original Scale (A1)	Design	HD	1.04.22
NTS	Drawn	HD	1.04.22
Reduced Scale (A3)	Dwg Verifier		
NTS	Dwg Check		



Project: HOKITIKA REVETMENT EXTENSION

Title: ROCK ARMOUR SPECIFICATION

DETAILED DESIGN
NOT FOR CONSTRUCTION

Discipline	CIVIL ENGINEERING
Drawing No.	3235521-CA-007
Rev.	A

D

Appendix D – Letters re Marine and Coastal Act 2011

11 April 2022

Attention: Victoria Henstock

Te Rūnanga o Ngāi Tahu

Tēnā koutou

Hokitika Seawall Extension

The Marine and Coastal Area (Takutai Moana) Act (MACAA) 2011 establishes a legislative framework for the recognition of customary interests in the common marine and coastal area between the line of mean high-water springs and the outer limits of the territorial sea. Under the MACAA, iwi, hapū and whānau can apply to the Crown to seek agreement to recognise Customary Marine Title (CMT).

We are writing to inform you of a proposal by the West Coast Regional Council (WCRC), as we understand that Ngāi Tahu Whanui has applied for recognition of Customary Title (Application Number MAC-01-13-002) that intersects with the site of the proposed activity.

This letter outlines the details of the proposed activity, for which consents are being sought from the WCRC and Westland District Council (WDC). We are advising you of this proposal in accordance with Section 62 (3) of the MACAA.

Proposed works

The WCRC is applying for resource consents to extend the current Hokitika seawall from the northern end of Beach Street in the town centre, north to Richards Drive.

Areas of the Hokitika township are under threat from sea level rise and erosion events and the construction of the seawall extension that ties into the existing wall will provide interim protection for low lying properties presently located between 25 and 40m from the upper beach. In the longer term, an adaptive management strategy will be developed and implemented by the WCRC and WDC, in consultation with key stakeholders, to deal with the expected impacts of expected climate change and sea level rise.

The extension of the seawall will be approximately 1100m long (see Figure 1 in **Attachment A**) and is part of “the Hokitika and Kaniere Resilience Project” that has received funding from Central Government’s “shovel ready” fund to construct a range of resilience projects to better protect the township.

WCRC is proposing to lodge the consents applications in February 2022.

Construction Method

The wall will be constructed to appropriate design standards for the high energy coastal environment and excavated beach material will be reinstated on completion of construction. Sand will bury portions of the structure.

The proposed works will be carried out on an unformed legal road owned by WDC and are not expected to significantly restrict public access along the beach during the construction phase.

The indicative seawall construction sequence is:

- Remove existing vegetation and store for re-planting
- Remove existing rocks and set aside for sorting for re-use
- Excavate embankment material and store onsite
- Place geotextile, underlayer and rock armour
- Fill voids in the rock armour crest with smaller size rocks
- Place excavated material over the revetment reinstating the existing beach profile, excess material to be disposed.
- Seeding/planting of the bank, reusing removed vegetation where possible.

Once constructed, the seawall will help maintain public access and nearby penguin roosting areas.

Ngā mihi mō ō whakaaro e pā ana ki tēnei pukapuka tono.

Thank you for your time in considering this application.

Ngā mihi nui



Graeme Jenner

Senior Associate – Environmental

**on behalf of
Beca Limited**

Phone Number: 03 374 3156 Mob 027 495 8387

Email: graeme.jenner@beca.com

Attachment A



Figure 1 Location of existing Hokitika seawall and proposed seawall extension

11 April 2022

Te Rūnanga o Toa Rangatira

Tēnā koutou

Hokitika Seawall Extension

The Marine and Coastal Area (Takutai Moana) Act (MACAA) 2011 establishes a legislative framework for the recognition of customary interests in the common marine and coastal area between the line of mean high-water springs and the outer limits of the territorial sea. Under the MACAA, iwi, hapū and whānau can apply to the Crown to seek agreement to recognise Customary Marine Title (CMT).

We are writing to inform you of a proposal by the West Coast Regional Council (WCRC), as we understand that Te Rūnanga o Toa Rangatira has applied for recognition of Customary Title (Application Number MAC-01-12-021) that intersects with the site of the proposed activity.

This letter outlines the details of the proposed activity, for which consents are being sought from the WCRC and Westland District Council (WDC). We are advising you of this proposal in accordance with Section 62 (3) of the MACAA.

Proposed works

The WCRC is applying for resource consents to extend the current Hokitika seawall from the northern end of Beach Street in the town centre, north to Richards Drive.

Areas of the Hokitika township are under threat from sea level rise and erosion events and the construction of a seawall extension that ties into the existing wall will provide interim protection for low lying properties presently located between 25 and 40m from the upper beach. In the longer term, an adaptive management strategy will be developed and implemented by WCRC and WDC, in consultation with key stakeholders, to deal with the impacts of expected climate change and sea level rise.

The extension of the seawall will be approximately 1100m long (see Figure 1 in **Attachment A**) and is part of “the Hokitika and Kaniere Resilience Project” that has received funding from Central Government’s “shovel ready” fund to construct a range of resilience projects to better protect the township.

WCRC is proposing to lodge the consents applications in February 2022.

Construction Method

The wall will be constructed to appropriate engineering design standards for the high energy coastal environment and excavated beach material will be reinstated on completion of construction. Sand will bury portions of the structure.

The proposed works will be carried out on within an unformed legal road owned by WDC and are not expected to restrict public access along the beach during the construction phase.

The indicative seawall construction sequence is:

- Remove existing vegetation and store for re-planting

- Remove existing rocks and set aside for sorting for re-use
- Excavate embankment material and store onsite
- Place geotextile, underlayer and rock armour
- Fill voids in the rock armour crest with smaller size rocks
- Place excavated material over the revetment reinstating the existing beach profile, excess material to be disposed.
- Seeding/planting of the bank, reusing removed vegetation where possible.

Once constructed, the seawall will help maintain public access and nearby penguin roosting/nesting areas:

Ngā mihi mō ō whakaaro e pā ana ki tēnei pukapuka tono.

Thank you for your time in considering this application.

Ngā mihi nui



Graeme Jenner

Senior Associate - Environmental

on behalf of

Beca Limited

Phone Number: 03 374 3156 Mob 027 495 8387

Email: graeme.jenner@beca.com

Attachment A



Figure 1 Location of existing Hokitika seawall and proposed seawall extension

E

Appendix E – Proposed Consent Conditions

Proposed Consent Conditions

Conditions applying to construction related consents (for a term of 5 years from commencement)

1. The seawall extension work authorised by this consent shall be constructed in general accordance with the details contained in the consent application submitted to the Consent Authority, except where inconsistent with these conditions.
2. The Consent Holder shall supply any agent or contractor carrying out the works, the subject of this consent, with a copy of consent conditions.
3. Any person working under these conditions shall have a copy of the consent conditions on site and be able to present it to an officer of the Consent Authority upon request.
4. Construction and maintenance works will be carried out in dry conditions when tidal conditions allow.
5. All equipment refuelling, lubrication, mechanical repairs shall be undertaken to ensure that no spillages to land or water occur. No refuelling or lubrication shall be undertaken in the coastal marine area or near watercourses.
6. Access along the beach will be maintained during construction where practicable.
7. In the event of any disturbance of Koiwi Tangata (human bones) or Taonga (artefacts), including pounamu, the Consent Holder shall:
 - a) Cease any further excavation for a period of at least 24 hours
 - b) Immediately advise the Consent Authority of the disturbance
 - c) Immediately advise the Upoko of the Papatipu Runanga, or the representative of the disturbance
 - d) Immediately advise the Regional Archaeologist of Heritage New Zealand except in relation to disturbance of unworked pounamu.
8. Prior to commencement of any works associated with the proposed seawall extension, the consent holder shall submit a design and specification for the works to the Westland District Council. The design and specification shall be prepared in accordance with the Westland District Council Code of Practice for Engineering Works.
9. A Construction Environmental Management Plan (CEMP) outlining the construction processes and processes to be adopted in undertaking the proposed work, shall be submitted to the Westland District Council, at least one month prior to commencement of the construction work. Construction work will not commence until the CEMP has been reviewed and approved by the Consent Authority. The CEMP shall include as a minimum, a Penguin Management Plan, a Spill Response Plan, a Vegetation Planting Plan and a Stakeholder Engagement Plan.
10. The Penguin Management Plan shall consider the management of penguins during both construction and operation of the seawall extension and be prepared in consultation with the West Coast Penguin Trust.

The Vegetation Planting Plan, which shall be prepared in conjunction with Ngāti Waewae, shall include consideration of the relocation of existing native vegetation (such as Pingao) during construction and the planting of native vegetation following completion of works.

11. All work shall be carried out in accordance with the CEMP, except that, at any time amendments to the Plan may be submitted to the Westland District Council, provided those amendments comply with consent conditions and are for the purpose of improving efficiency and/or quality of the construction work, or to avoid, remedy or mitigate an adverse effect.

12. A detailed site investigation (DSI) report shall be provided to the Westland District Council at least ten (10) working days prior to the start of earthworks.
13. The DSI shall be prepared by a suitably qualified and experienced contaminated land practitioner (SQEP) and in accordance with the Ministry for the Environment (MfE) *Contaminated Land Management Guidelines No. 1 – Reporting on Contaminated Sites in New Zealand* (2011) and the MfE *Contaminated Land Management Guidelines No. 5 – Site Investigation and Analysis* (2011) and meet the criteria of ‘Detailed Site Investigation’ as defined in those documents.
14. The DSI report shall include a Contaminated Land Management Plan, including handling requirements and disposal options of materials and any other matter required to be addressed to ensure contaminated material is managed in a way to avoid, remedy or mitigate adverse effects on the environment. All earthworks on sites identified as contaminated in the DSI report shall be undertaken in accordance with the Contaminated Land Management Plan.
15. Depending on the findings of the DSI, a Remedial Action Plan, Site Validation Report and a Long-term Site Management Plan shall be submitted, as necessary to the Westland District Council. The Remedial Action Plan must be submitted for approval prior to remedial works occurring.
16. Any contaminated soils and/or materials removed from the site must not be disposed of at a cleanfill facility and must be disposed of at an authorised facility whose waste acceptance criteria permit the disposal.
17. In the event that any unexpected, contaminated soil or material is uncovered by the works (e.g., visible staining, odours and/or other conditions that indicate soil contamination), an accidental discovery protocol shall be implemented, including but not limited to the following steps:
 - a. Earthworks within ten metres of unexpected contaminants shall cease immediately;
 - b. All practicable steps shall be taken to prevent the contaminated material becoming entrained in stormwater or otherwise entering the environment. Immediate steps shall include, where practicable:
 - i. Diverting any stormwater runoff from surrounding areas away from the contaminated material; and
 - ii. Minimising the exposure of the contaminated material, including covering the contaminants with an impervious cover;
 - c. Notification to Westland District Council within 24 hours of the discovery;
 - d. Earthworks within ten metres of unexpected contaminants shall not recommence until a SQEP confirms to Westland District Council that continuing works does not represent a significant risk to the environment;
 - e. Any remedial or management measures required, as directed by the SQEP, must be reported to and approved by Westland District Council ;
 - f. All records and documentation associated with the discovery shall be kept and copies shall be provided to Westland District Council upon request.
18. Westland District Council shall be notified in writing of the proposed commencement of the construction work, at least 5 working days prior to the start of the work.
19. Within three months of the completion of the proposed work, a suitably qualified Engineer shall certify that all work has been undertaken and completed in accordance with the drawings submitted as part of the consent application. As built plans of all the works undertaken shall be lodged with Westland District Council.
20. The consent holder shall, at least 10 working days prior to commencing the construction work:
 - a) Place a public notice in the Hokitika Guardian newspaper

- b) Erect and maintain signs near the entrance to Revell Street for the duration of the construction works in that area.
21. The public notice and signage required by Condition 19 shall include but not be limited to the following information:
- a) A description of the works
 - b) An estimation of the duration of the construction work including when work is likely to commence in an area, expected completion date and hours of work
 - c) Contact details to allow community members to place feedback, lodge complaints and receive an update on work status
 - d) Advice regarding public access around the work area during construction and through the structure once completed.
22. Notwithstanding any other conditions of these consents, the Consent Holder shall report any breaches of conditions to the Consent Authority within 48 hours of becoming aware of the breach and advise the Consent Authority of the measures that the Consent Holder will implement (or has already implemented) to prevent any further breaches.
23. Pursuant to Section 128 of the Resource Management Act 1991, the Consent Authority may review the conditions of these consents by serving notice within a one-month period of the anniversary of the date of commencement of the consents for any of the following purposes:
- (a) To change compliance standards imposed by the conditions of these consents or to impose additional conditions in relation to standards of monitoring in order to avoid, remedy or mitigate any adverse effects on the environment which may arise from the exercise of these consents and which it is appropriate to deal with at a later stage.
 - (b) To assess the appropriateness of imposed compliance standards or monitoring regimes and frequencies and to alter these accordingly.
 - (c) To deal with any adverse effect on the environment which may arise from the exercise of these consents and which it is appropriate to deal with at a later stage.
To require the Consent Holder to adopt the best practicable option to remove or reduce any adverse effect on the environment.

Conditions related to operation related consents (for a term of 15 years from commencement)

24. The consent holder shall undertake a visual inspection of the seawall extension authorised by this consent within 6 months of commissioning and thereafter at annual intervals for the duration of the consent. Inspections shall also be carried out following a significant storm event. Photographs shall be taken during inspections to allow for comparison of the rock shape, displacement of rocks, condition of the bank face and any other noticeable changes. Regular maintenance of the seeding/planting shall be carried out of the exposed bank slope/ground surface until grass/plants have established.
- A report shall be submitted to Westland District Council, within 1 month of the annual inspection. The report, which will be prepared by a suitably qualified professional engineer, will include:
- a) The date and time of the inspection
 - b) A description of the condition of the structure
 - c) A description of any maintenance work and if required, a programme for completion of the work.
25. All maintenance and repair work will be carried out in accordance with the Penguin Management Plan prepared in accordance with Condition 10.

