AKAROA WHARF REPLACEMENT STORMWATER MANAGEMENT

Christchurch City Council

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STORM ENVIRONMENTAL LTD

Akaroa Wharf Replacement - Stormwater Management Report

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1 Introduction

Akaroa Wharf has reached the end of its design life, and it is no longer economically viable to maintain the existing structure. Christchurch City Council ("CCC") is seeking to rebuild a new wharf in the existing wharf's location. The new wharf structure needs to accommodate the modern needs of both commercial and recreational wharf users and will incorporate floating pontoons on both the northern and southern faces to meet the demand for additional berth space.

Concept designs for the new Akaroa Wharf have been prepared by Holmes[1] and Isthmus[2] and a floating pontoon layout prepared by Enviser and Shearwater Consulting. These form the basis of the assessment in this report.

A suite of resource consents are required, from CCC and the Canterbury Regional Council ("ECan"), which will be publicly notified and decided by hearing. This document provides evidence in support of the consent with regards to stormwater management.

CCC engaged Storm Environmental Ltd to develop a stormwater management concept for the replacement Akaroa wharf. This report reviews the proposed design, identifies potential impacts on stormwater quantity and quality arising from the structure, and recommends mitigation measures to address potential impacts. The discharge from the wharf when operational is identified as a permitted activity, and therefore the level of detail in this report reflects that assessment.

2 Site Description

The Akaroa Wharf is on the eastern shore of the Akaroa Harbour on Banks Peninsula, southeast of Christchurch (Figure 1).

The existing wharf consists of an approximately 30 m long earth formation followed by a 155 m long timber sub-structure. The total area of the wharf is estimated to be 1,125 m^2 (excluding the abutment access). The existing wharf has the following surfaces and approximate areas:

- Asphalt (200 m^2 at tie-in to road)
- Timber (750 m^2 for main wharf)
- Concrete (300 m^2 in the middle of the wharf)

The pontoons both currently have timber decking. No stormwater treatment is required nor provided on the existing Akaroa Wharf.

There are two buildings integrated within the existing Akaroa Wharf - the Blue Pearl and Black Cat building - connected to the wharf along its southern edge and are accessed from the wharf.

There is a diesel bowser and a privately owned hoist on the northern side. A mains water supply is available on both the northern and southern sides of the wharf, including on the northern pontoon. Petrol is required by some vessels and this is sourced from the service station located in Akaroa and transported to vessels via small portable petrol tanks (e.g. jerry cans).

The wharf is used in a recreational capacity by pedestrians, swimmers, casual fishers, tourists, recreational boats and for dinghy tie-ups. Commercial fishing, crayfish and mussel vessels generally tie up to the main wharf structure for loading and unloading.

[1] Holmes (5 July 2024) Akaroa Wharf Renewal – Design Features Report – Concept Design
[2] Isthmus (23 May 2025) Akaroa Wharf Concept Design - Axonometric

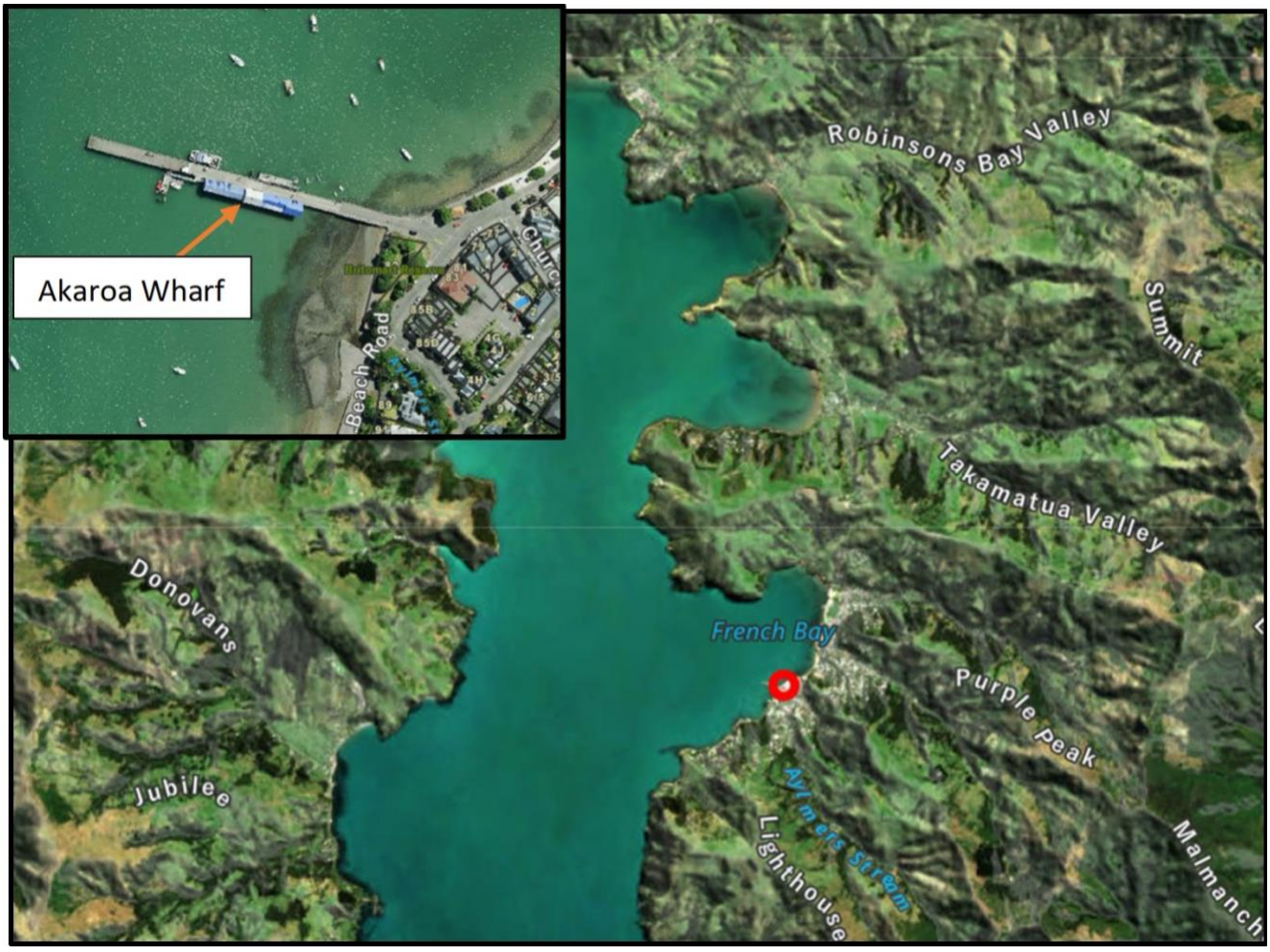


Figure 1 Akaroa Wharf location map – wharf location indicated by red circle (Canterbury Maps, 2024)

3 Project Description

The Akaroa Wharf will be rebuilt generally in the existing wharf's location. To allow for minor adjustments in the alignment of the wharf through detailed design, a construction envelope is proposed for the new wharf. This envelope covers the existing alignment of the wharf, and an option to move the wharf to the north by 1.5 – 2.5 m. The alignment may also be adjusted to avoid clashes with the existing pile layout. The wharf deck and supporting piles will all be constructed within this envelope. Ancillary features, like ladders, fender piles and other fittings, may extend beyond the envelope. The exact orientation of the wharf will be dependent on the piling layout and will be refined during detailed design.

The wharf will be approximately 185 m long and 8 m wide. The current buildings on the wharf (Black Cat and Blue Pearl) will be retained on existing piles and connected to the new wharf via a gangway. This retains the current footprint.

The new wharf will follow a similar form to the existing wharf but with the changes described below.

3.1 Marine-side elements

- The wharf height will be raised to 3.06 m LVD-37 or 12.10 m CDD which is between 500-600 millimetres higher than the existing deck to allow for sea-level rise and storm surges.
- The proposed wharf will be approximately in its original location or, potentially, offset from its existing alignment by 1.5 – 2.5 m to the north.
- New floating pontoons will be arranged on the northern and southern faces of the main wharf. The pontoons will be accessed from the main wharf by gangways and small piled platforms.
- The southern floating pontoon will include infrastructure for diesel refuelling.

- A new crane will be installed on the western end of the wharf to assist commercial vessels with loading/unloading.
- Removal of part of the original 1887 abutment and associated reclamation back, to accommodate the increase in deck height and lateral shift of the wharf. A small area of reclamation, enclosed by a concrete 'L-wall' seawall, is proposed on the northern side of where the new wharf will meet the shoreline. See Figure 2 and Attachment A for a concept of this feature and extent of abutment removal.

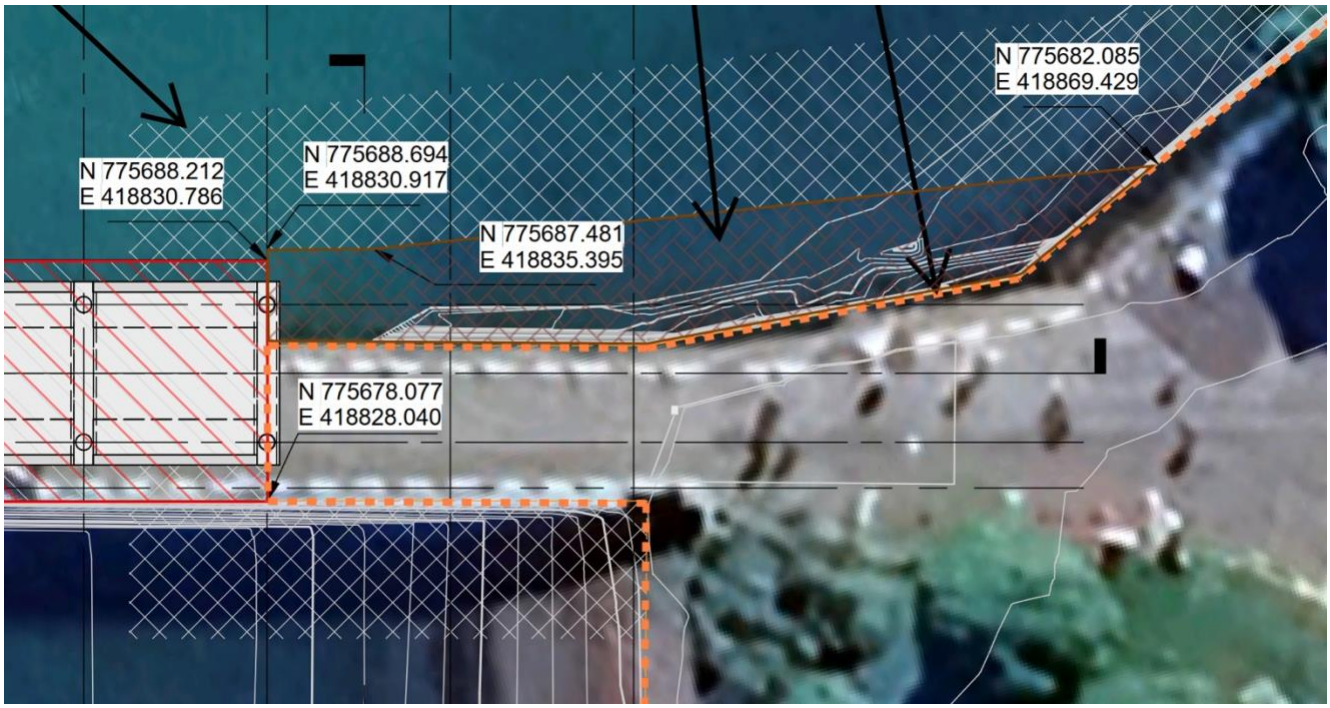


Figure 2 'L-wall' seawall, shown between red arrows, against the northern wall of the wharf abutment (Holmes, 2025)

- Wharf materials will include reinforced concrete decking, steel-encased concrete piles, timber fender piles and timber deck elements, along with various wharf fittings (bollards, lighting etc).
- To facilitate construction, a small loading ramp will be constructed on the southern side of the Akaroa boat ramp. This will require a temporary reclamation, disturbance of the seabed, placement of geotextile, granular fill and rip rap protection. A concrete surface may be required. Refer to Figure 3 for a concept of this ramp. 2-4 steel piles (610mm diameter) will be driven along the southern side of the existing boat ramp to form a training wall to facilitate the barge loading/unloading.
- The seaward approach to this ramp will require dredging to facilitate barge access (see Figure 4). The dredge channel will extend approximately 90m from the shoreline, be approximately 30m wide. In total, approximately 1,500 m^3 of seabed will be dredged with the spoil removed to/placed to the southwest of the dredge area. Dredging will be undertaken via mechanical excavator, either based on a barge, or from shore at low tide, or a combination of both.

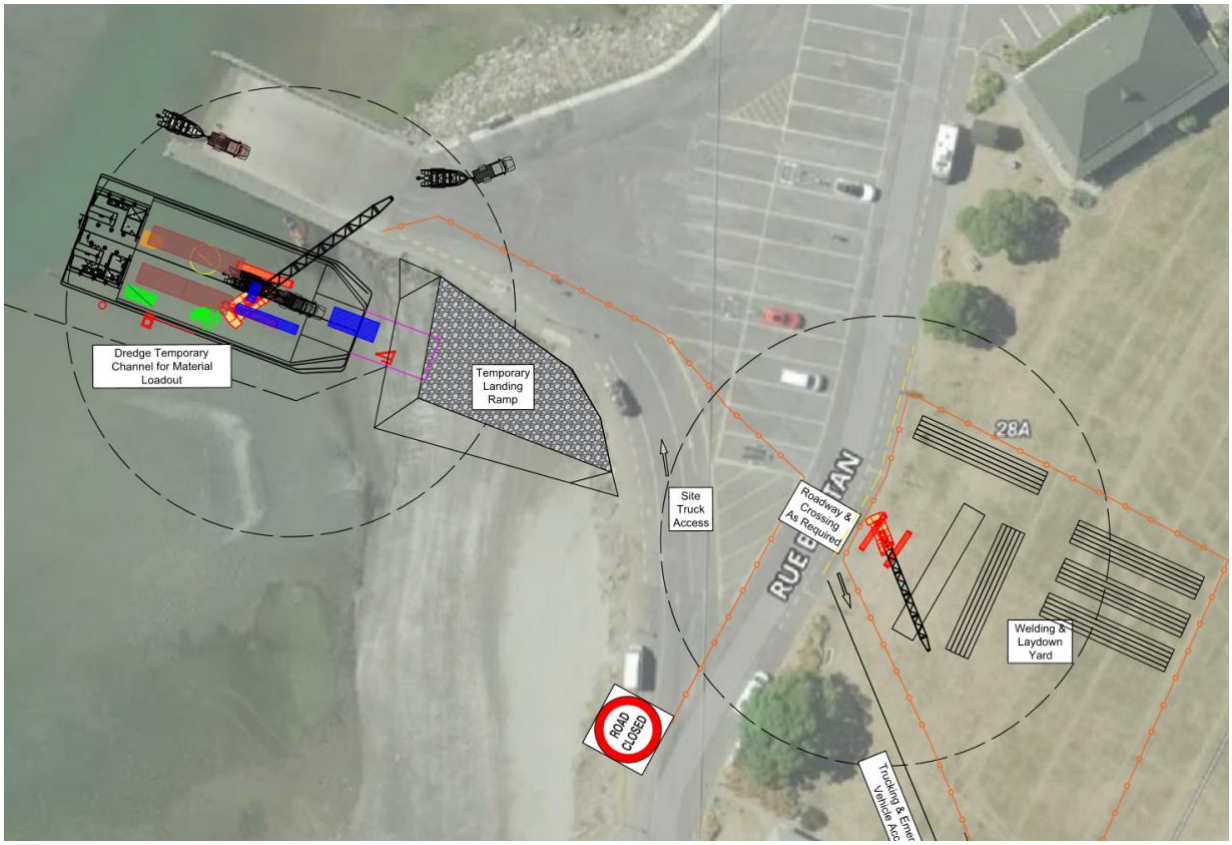


Figure 3 Temporary landing ramp at the entrance to the wharf (HEB, 2025)

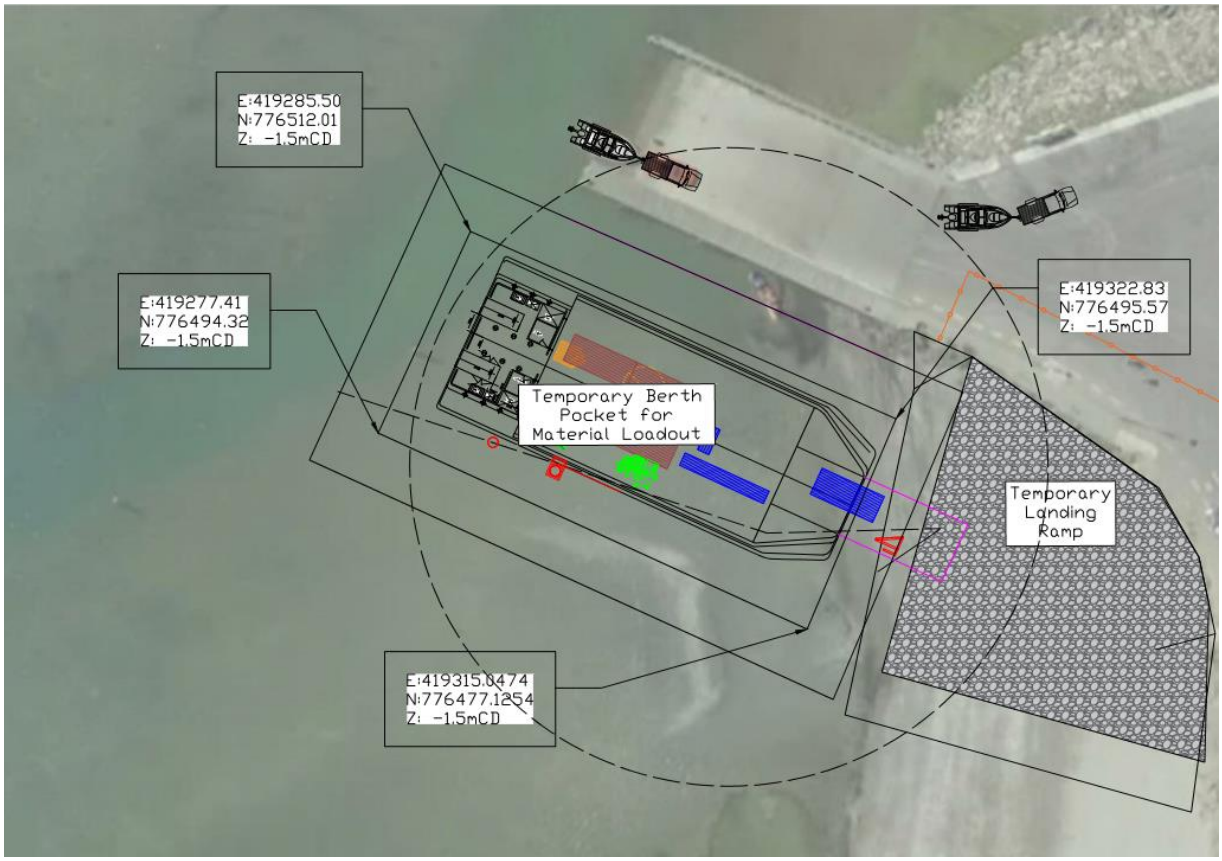


Figure 4 Temporary berth pocket at the entrance to the wharf (HEB, 2025)

3.2 Land-side elements

- Two construction phase laydown areas (1 and 2). These are described in more detail below.
- A vehicle staging area (located at Bruce Slipway on Beach Road).
- A closed section of road near the recreation ground boat ramp.
- Construction phase alterations to parking spaces and traffic movements.
- Trenching to connect services.
- Earthworks to remove the abutment and construct the new seawall, abutment and prepare for surface finishes.
- Sealing and concrete works to provide a finished surface.

3.3 Refuelling

As mentioned above, the southern floating pontoon will include infrastructure for diesel refuelling. An example of a refuelling site on a pontoon is shown in Figure 5.

Figure 5 Example of fuel supply on a pontoon in Picton (Source: bspfuels.nz)

The proposed setup has been described as: "*The fuel line layout for the pontoon will be designed by Petrotec and approved by BSP and CCC. The system will likely include a surface-mounted containment sump with a bowser positioned above. The fuel remains on a reel, and it is unlikely that an FHR (Fire Hose Reel) will be required. The fuel line is expected to run along an aluminium tray suspended beneath the wharf. It will continue along the underside of the gangway, incorporating a flexible connection at the first landing to accommodate the pivoting gangway. From there the fuel line will be included within a 400mm duct running to the centre of the pontoon beneath a bolted-down treadplate.*"

4 Construction phase

Construction includes marine and landside activities; both are described in broad terms in the following sections. This information is based on the contractor's stated methodology.

The first step will be to undertake the enabling works, this will comprise the following:

1. Establish a laydown area at the recreation ground boat ramp (**Laydown 1**), and install security, fencing, containers and traffic management at the main wharf area (**Laydown 2**)
2. Establish the boat ramp (and undertake dredging) to allow the Patiki barge to berth alongside to transfer plant and materials.
3. Mobilise the Patiki to Akaroa (from Lyttelton and loaded with plant).
4. Construct the 'L-wall' at the base of the existing wharf.

Following these enabling works, the piling and demolition works will commence. The piling methodology will rely on the existing wharf structure for support of the piling gates, so demolition will follow behind the landside piling front. The general sequence is as follows:

- Enabling works will commence, primarily the construction of the 'L-wall' to provide support and staging space for the piling.
- The piling rig (crawler crane) will track out to the first bent on the wharf
- A small section of deck will be cut out and removed in the location of one pile in the bent, the other pile will likely sit outside the face of the existing wharf.
- The piling gate (two piles) will be placed on the existing wharf deck and secured in place.
- The piling rig will pitch and place the steel piles (all piles are expected to be pitched and driven in a single length). The piles will have a steel driving tip welded to the end to enable driving into the weathered basalt.
- Vibro piling methods (using a 100-ton crawler crane with an ICE 28RF vibro hammer) will be used to drive the piles as far as possible. This is a variable frequency, resonance free hammer that minimises vibration and reduces noise.
- A bore or percussion piling hammer will then be used to drive the piles until the desired embedment into the basalt is achieved. If the required embedment cannot be achieved with percussive piling, the pile may need to be removed, and a drill used to pre-drill a socket into the basalt before the pile is re-driven.
- Once the piles are installed, they will be filled with concrete and the capping beams will be put in place.
- Temporary platforms/grillage will be installed on the capping beam to allow the piling rig to advance to the next bent. Temporary piles may be required to support this temporary works, but they will be the same diameter (or smaller) than the permanent piles.
- A second, marine-based piling crew, will undertake a similar operation with a piling rig based on the barge. The marine-based rig will work from the outer end, install piles and then demolish the existing wharf. Once it has met up with the land-based rig, it will assist the land-based operation with the capping beams and placement of concrete in the piles. The marine plant will also be used to remove all the old timber piles that clash with the new, with the remainder cut at seabed level using HEB's hydraulic shears.
- The piling rigs will not undertake piling concurrently, but the work fronts will advance together.
- Most wharf demolition materials will be shuttled by marine plant to **Laydown 1** for unloading. Some of the demolition materials, particularly those sections demolished by the landside piling rig (and the buildings) will be transported by road.
- Any remaining sections of wharf will be demolished, and the wharf deck will be constructed, which will comprise:
    - Placement of precast deck elements on the capping beam
    - Installation of temporary formwork

- Pouring the topping slab
- Finishing works (surface finishes, furniture installation, and electrical) will follow completion of the wharf deck. This section has been left until last to prevent damaging these items.

An example of the potential working setup is shown in Figure 6 and Figure 7 below.

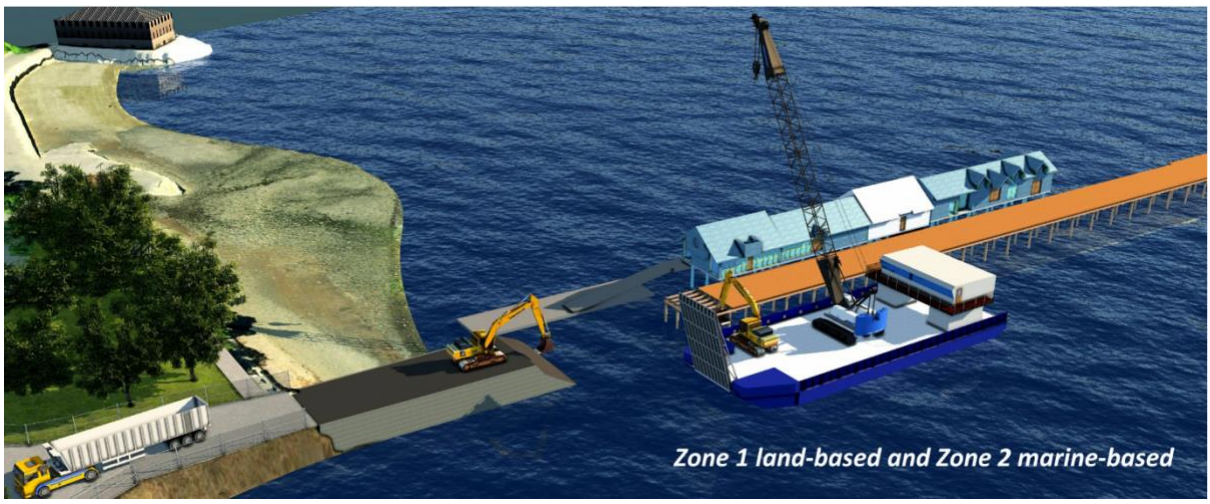


Figure 6 Conceptual machine layout (HEB, 2024)

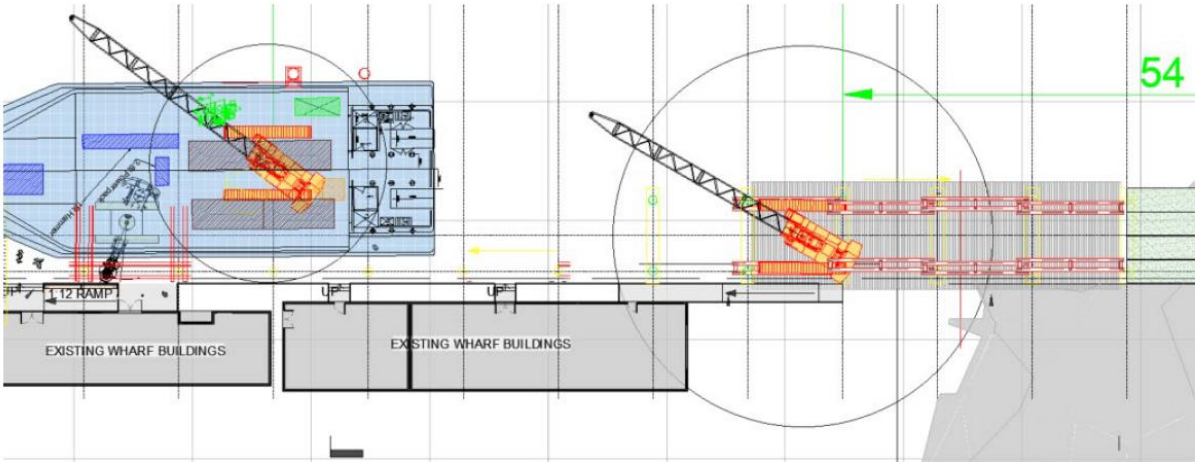


Figure 7 2D model of cranes and drill rig working ranges on the Patiki and staging (HEB, 2024)

Staging and Temporary Works Requirements

Land-based activities

- Laydown areas.
- Access, security, surfaces in the laydown areas.

Marine-based activities

- Landing ramp on the southern side of the boat ramp.
- Temporary piles to support the platforms/grillage.
- Landing ramp on the southern side of the boat ramp
- Training wall piles (2-4 steel piles 610mm diameter) at the boat ramp.
- Dredging (circa 1,500 m^3) at the boat ramp to provide barge access.

Laydowns (shown in Attachment B)

- **Laydown 1** will be used as the main load out facility (with boat ramp access kept operational for the public)
- As **Laydown 1** has enough space for the working plant to operate in and for storage of materials and containers. A 1.8m fence around the area will be erected to protect the public and existing trees. A security camera will be positioned in this location. Traffic management will be important at this location, and there will be a permanent gateman or traffic controller positioned here to direct movements and maintain traffic along Beach Road.
- **Laydown 2** is at base of the Akaroa Wharf, outside the heritage areas and the public road. This laydown includes the Weighbridge House and small carpark next to it. A 1.8m fence around the area will be erected to protect the public and existing trees. A security camera will be positioned in this location. Traffic management will be important at this location.
- **Truck Staging Area** will be a holding point for concrete trucks during concrete pours.
- **Road Closed Area** will allow safe access to the temporary loading ramp.

Logistics and Traffic Management Approach

- Some items like the demolished concrete causeway will need to be taken out by road, however, the main wharf structure will be transported on the Patiki to **Laydown 1** where it can be sorted and collected.
- Precast will be transported from the boat ramp to the work site via the Flexifloat pontoons to allow the cranes to reach items from fixed locations.
- Traffic controls will be established at the wharf entrance and boat ramp for the entire duration of the project.
- Deliveries will be coordinated around busy times to avoid congestion for the travelling public.

The following notes provide additional information on the construction methodology and assumptions:

- It is assumed that dredging is not required for vessel navigation purposes (in the operational phase).
- Material/soil etc from the abutment removal will be re-used in the 'L-Wall' or disposed of at an authorised land-based facility. If larger rocks are present, they may be re-used as riprap.
- That placement of materials on the seabed will be confined to within the design footprints for the wharf (including L-wall and riprap) and floating pontoons.

4.1 Duration of works

A full programme is yet to be prepared, but initial estimates are an overall programme over 11-14 months comprising (noting some works are concurrent):

- Site setup 1-2 months
- Demolition 2-3 months
- Piling and deck 5-6 months
- Deck furniture, services and pontoons 3-4 months

5 Existing Stormwater Management

The site was visited during rainfall on 14 November 2024 to understand the current stormwater management on the site and identify future management options.

There is no formal stormwater collection system or other management for the current wharf, apart from collection and discharge to the CMA from roof collection associated with the buildings which are not part of this report. Any stormwater generated from the wharf will discharge into the harbour based on drainage patterns on the wharf. For the wooden section of the wharf, this will be through the gaps between boards. For the existing concrete section, apart from one short section that has three small grates with holes to collect and discharge stormwater through the deck, discharge is dependent on microtopography features. There is little concentration and collection before discharge from the wharf (Figure 8).

Figure 8 Concrete portion of existing deck following rainfall

The abutment also has no formal stormwater collection. This area is generally falling to the north-east, but some flow will collect against the low wall on the southern side and travel west and onto the beach (Figure 9). There had been little accumulation following rainfall, and there were no visible effects of this flow on the beach in terms of erosion or scour.

Figure 9 Flow path at south-western abutment and discharge point of flow

During the site visit, a limited number of vehicles were observed travelling along the decking, including one small truck that was being washed down with a hose (Figure 10). Hydrocarbons were evident in water pooling adjacent to the diesel bowser on the north side (Figure 10), though the area surrounding the bowser was relatively clean. Still, there was some accumulation of hydrocarbons on the deck. There was minimal litter present, although it is likely that this will enter the harbour as wind-blown debris rather than be transported by stormwater.

Figure 10 Vehicle being washed on wharf (left) and hydrocarbons in pool beside diesel bowser (right)

Other potential contaminant sources noticed were flaking paint (primarily from buildings), corrosion of metal cladding (buildings) and wear of the anti-slip surfaces of access ramps.

To understand the potential for erosion and scour, adjacent discharge points of the CCC stormwater network were observed. No scour or erosion was noticed, as the discharge points are either into stony gravels or into rock protection at the base of sea walls (Figure 11).

Figure 11 Examples of existing stormwater discharge and erosion protection at discharge points

6 Planning Considerations

The proposed wharf is located within the Coastal Marine Area (CMA) as shown on the Coastal Plan Planning Maps. The Regional Coastal Environmental Plan contains rules to control discharges of water and contaminants into water, or onto or into land in the CMA. Stormwater runoff from the wharf is considered a discharge of water and contaminants. During high tide the discharge will generally be into water, but at low tide some of the discharge at the beginning of the wharf access ramp will be onto land within the CMA.

Rule 7.1 outlines permitted activities for discharges. The following table demonstrates that the discharge from the operational wharf would comply with Rule 7.1a of the Regional Coastal Environmental Plan and should therefore be assessed as a permitted activity discharge. As part of the discharge will be from an area classified as road, it is also noted that the discharge will comply with Rule 7.1f as well. A summary of compliance against the rules is shown in Table 1 below.

Table 1 Assessment of wharf discharge compliance against the Regional Coastal Environmental Plan

Rule	Clause	Assessment
Rule 7.1 Permitted Activities		
a. Except as provided for by paragraph (b) or (e) of this Rule, the discharge of water, into water, or onto or into land in the Coastal Marine Area, is a Permitted Activity; provided that the discharge, disregarding the effect of any natural perturbations that may affect the receiving water:	i. shall not result in any scouring or erosion of the foreshore or seabed that is not erased by wind, tidal or wave action within 24 hours; and	The majority of discharge will be distributed along the wharf and discharge directly into water and so there will be no scouring or erosion. At the tie-in to the existing road, the ramp to the new wharf height will result in concentration of flow to one point. However, this is from a limited area (<300 m^2) and the discharge will likely be onto rocks at the base of the seawall. Existing discharge points near the site show no scour or erosion. **Complies**
	ii. shall not give rise to any of the following effects in the Coastal Marine Area further than 20 metres in any direction from the point of the discharge:	
	1. within areas classified as Coastal AE water or Coastal CR water: the colour of the receiving water shall not changed by greater than ten points, as measured using the Munsell Scale, and the visual clarity of the receiving water shall not be reduced by greater than 33 %; within any other area: the colour of the receiving water shall not changed by greater than five points, as measured using the Munsell Scale, and	Akaroa Harbour in the vicinity of the wharf is classified as a Class Coastal SG Water Quality Area. Given the limited discharge, and the largely distributed nature of it, it is considered unlikely that there will be any discernible change in colour or visual clarity. **Complies**

Rule	Clause	Assessment
	the visual clarity of the receiving water shall not be reduced by greater than 20 %; or	
	2. any emission of objectionable odour; or	The discharge will contain nothing that would result in an objectionable odour. **Complies**
	3. any reduction in the concentration of dissolved oxygen in the receiving water to less than 80% of saturation; or	The discharge will not result in a reduction in dissolved oxygen. **Complies**
	4. any change by more than 3° Celsius in the natural temperature of the receiving water or any change that causes it to exceed 25° Celsius	While the discharge may be more than 3° Celsius higher than the receiving water (e.g. a summer shower running off the concrete deck) the volume of discharge compared to the receiving water at a 20 m radius means that there will be no significant change in water temperature. As an example, if the runoff from a 25 mm rainfall depth on a 40 m section of the concrete deck were to discharge at a single point at 35 °C into 20 °C water at 0.5 m depth, the mixing over a semi-circle (one side of the wharf) with a radius of 20 m would mean that the temperature would only rise by approximately 0.185 °C. This demonstrates the unlikely possibility of a temperature change greater than 3 °C. **Complies**
f. The discharge of stormwater into water or onto or into land in the Coastal Marine Area as runoff through a pipe, channel, drain, culvert or other collection system from a road where the road, its batters or retaining walls abut the Coastal Marine Area, is a Permitted Activity, provided that the discharge shall not result in:	i. any scouring or erosion of the foreshore or seabed that is not erased by wind, tidal or wave action within 24 hours; or ii. any deposition of sediment or other suspended material on the foreshore or seabed that is not erased by wind, tidal or wave action within 24 hours	The discharge from the new ramp up to the wharf will likely take place within an area that is currently road reserve (as shown in image below). For the sake of completeness, it is noted that the discharge will comply with the rules for discharge from a road as well.  **Complies**

7 Stormwater Quantity

7.1 Construction Phase

There are not expected to be any significant quantity issues arising from the construction phase discharge. The construction phase discharge is discussed in detail under stormwater quality.

7.2 Operational Phase

The majority of the runoff wharf and pontoons will discharge directly into the marine environment. This will not be concentrated but instead will discharge as the microtopography of the deck dictates as these features are largely flat except for access ramps. This is similar to how the discharge currently occurs and it is not anticipated that there will be any change in effects as a result of this discharge, and such discharges are not typically managed in a formal collection system.

As the discharge is generally directly into the sea or foreshore, there are no flooding consequences from the minor increase in overall discharge as a result in the slight increase in surface area of the decking.

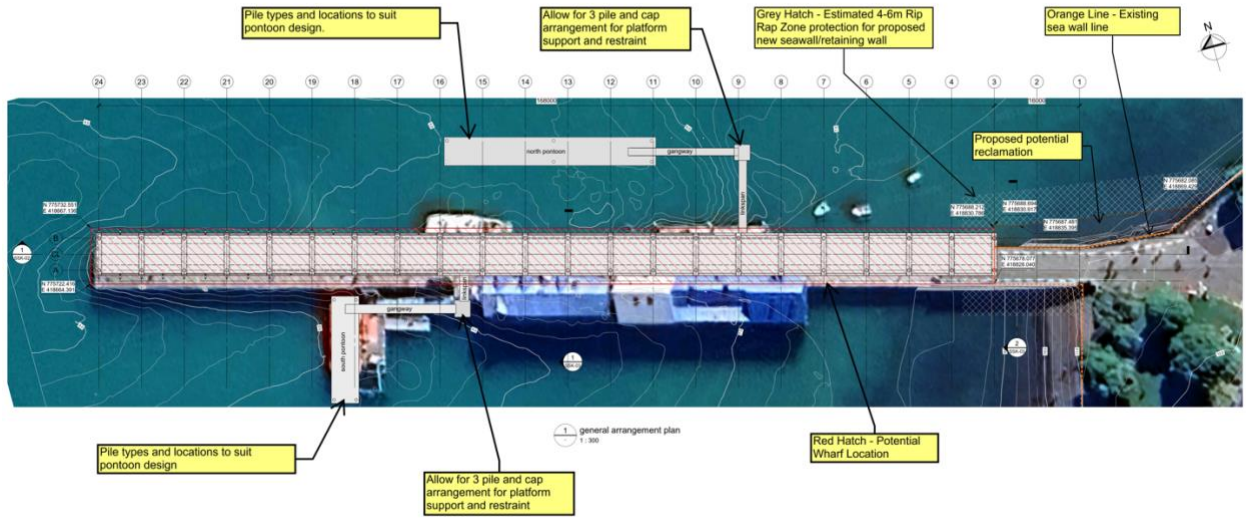


Figure 12 New wharf layout

Due to the slope and safety barriers, there may be some small concentration of flows at the eastern end of the wharf, with flows both toward the road and toward the wharf (the red area in Figure 12). There is an area of approximately 100 m^2 that will discharge toward the existing steps down to the beach on the southern side of the wharf. Given the minor nature of this discharge, it is proposed that this joins with the existing informal flow from this area and discharges directly onto the beach. It may be identified during detailed design that a formal collection point is necessary; however, it is not expected that this would change any consent requirements.

8 Stormwater Contaminant Sources

8.1 Operational Phase Contaminant Sources

The future discharge quality is anticipated to be the same or similar to that currently discharging from the wharf as the new wharf is not likely to generate additional activity but simply provide for what has occurred previously. The proposed wharf surface (concrete) will have limited contaminants discharging from the material. The principal contaminants are considered to be:

- Hydrocarbons from any spills or drips from vehicles or while refuelling
- Micro-plastics from tyres, anti-slip coatings and pontoon materials
- Zinc from tyres and any fixings, rails etc (though it is assumed the majority of fixings etc will be stainless steel)
    - Note that while uncoated claddings of buildings adjacent to the wharf are likely a source of zinc, these are not included in this analysis as they maintain a separate stormwater system from the wharf
- Copper from brake pads
- Litter

Activities or sources that may produce contaminants are discussed below. Overall, it is considered that the new structure will not increase the amount of contaminants generated during rainfall, and the use of concrete as the primary material may reduce it as it will be easier to be kept clean and have fewer old fixings.

8.1.1 Materials

This covers materials used in the construction of the wharf and pontoons. The principal material (concrete), fixings or railings (stainless steel) and details (timber) all have low contaminant generating potential. The use of zinc-coated fixings or features is considered to have low contaminant potential based on the limited use of these (based on current concept plans).

Microplastics can be generated from a number of surfaces, including anti-slip coatings on pontoon ramps. As these materials wear microplastics can accumulate and be washed off during rainfall. However, an equally probable pathway from the deck into the harbour is through wind blowing dust off the deck.

8.1.2 Land Vehicles

Land-based vehicles have access to the wharf for commercial activities. This generally involves loading and unloading goods from sea vessels, or to bring supplies to the stores. Contaminants that will arise from vehicles are largely hydrocarbons (from leaks), zinc and microplastic (from tyres) and copper (from brake pads). The low-speed environment of the wharf will reduce the wear on both tyres and brakes, reducing the total load arising from these.

It is expected that the contaminant load from vehicles on the surface of the deck will be low given the existing general very low frequency of vehicle trips, and a change in frequency of trip generation is not anticipated by the wharf replacement. In general, the contaminant load from vehicles is considered to be similar or less to that from a shared laneway.

8.1.3 Sea Vessels

Vessels which use the wharf have potential to introduce pollutants, primarily through spills which occur when loading and offloading or during refuelling. These will primarily be hydrocarbons, though there may be other materials which have the potential to spill also.

Contaminants that arise from vessels in the water (without contacting the wharf surface) are not considered in this analysis as they are not stormwater-related.

8.1.4 Litter

Litter (primarily from visitors to the site) may become entrained in stormwater runoff and enter the harbour. However, it is considered just as likely (if not more) that litter will blow into the harbour due to the exposed environment and narrow width of the wharf and associated structures.

8.2 Construction Phase

8.2.1 Staging Sites

There are two laydown sites proposed for staging. At each of these sites, there may be the potential for contaminants to be generated from:

- Spills (particularly of any fuel or other chemicals stored)
- Leaks from vehicles and other machinery
- Dust and debris from fabricating (e.g. cutting, drilling) metal or wood design elements, as well as cement
- Sediment generated by traffic movement, particularly at the interface with the foreshore
- Leachate from stockpiled old wharf elements
- Spills of flowable products, such as concrete

8.2.2 Wharf Construction

The principal stormwater-related issues from the wharf construction will be the interface with land (where there will be demolition and earthworks), as well as runoff from partially demolished or constructed structures.

9 Options Assessment

9.1 Operational Phase Mitigation

In consideration of mitigation of operational phase discharge, it is noted that the discharge is a permitted activity under the Coastal Plan rule 7.1 (a). However, there are some key actions that can be taken to reduce the impact of the discharge regardless of its status under the Plan.

9.1.1 Source Control

The primary method of reducing the impact of stormwater runoff on water quality is source control. This refers to the reduction of stormwater contaminants at source rather than after becoming entrained in runoff. For the wharf this comprises of:

- Low vehicle movements due to the nature of the wharf traffic environment
- A low speed environment which minimises wear on tyres and brakes
- Discouraging storing or washing vehicles on the wharf
- Refuse bins easily accessible to wharf users
- Routine maintenance at fuel supply locations to prevent drips and other spills
- Spill kits at the refuelling site
- Frequent monitoring of the refuelling area to address any spills that have occurred
- Frequent sweeping/cleaning of deck areas
- Maintenance to minimise degradation of plastic surfaces to reduce micro-plastic waste

9.1.2 Treatment

Treatment options could include:

- No treatment
- Coarse mesh baskets to trap litter
- Proprietary filtration devices distributed along the deck and pontoons
- Collecting and pumping stormwater to a land-side treatment facility

The wharf, apart from refuelling sites, is considered to present a low risk for the generation of stormwater contaminants. Due to the low traffic loading, and generally low contaminant generating surfaces, the overall contaminant load is considered less than the majority of the adjacent settled area of Akaroa.

In order to make treatment effective, stormwater would need to be collected into a network and treated at several locations. To accommodate the range of tide levels, these may need to pumped. The pontoon areas would need to be pumped to treatment, but there would be issues with spray and pumping seawater during heavy weather. There are also maintenance considerations for the additional infrastructure, such as safe access for maintenance, while not presenting a hazard to wharf users.

The southern floating pontoon will include infrastructure for diesel refuelling. The highest risk is spills that occur during refuelling, and a spill kit is recommended to be located adjacent to the bowser as it is currently. It is not considered practical to provide treatment to this area of the pontoon, and the volume of any contamination will be low compared to the dilution offered in the water adjacent. However, this area should be monitored frequently for any spills and these should be cleaned up as soon as possible.

Aside from the practical difficulties, the low risk of the site, the distributed nature of the discharges, and the high-volume receiving environment, mean that treatment is not considered necessary for the wharf.

9.2 Construction Phase Mitigation

In consideration of mitigation of construction phase discharge, it is noted that the discharge is a permitted activity under the Coastal Plan rule 7.1 (a). However, there are some key actions that can be taken to reduce the impact of the discharge regardless of its status under the Plan.

At the construction interface of the wharf with land, diversion of off-site water will be required to reduce the amount of water flowing through the site. Runoff from within this portion of the site, following any treatment,

should be discharged onto areas of the foreshore protected by rock erosion protection. This will minimise any scour and re-suspension of sediment as a result of the discharge.

The construction phase of the project will require a Construction Environmental Management Plan (CEMP) to address the environmental impact of the construction project. Each land-based construction site (Laydown 1 at the recreation ground boat ramp and Laydown 2 at the main wharf area) will also require an Erosion and Sediment Control Plan (ESCP) to address all potential contaminant-generating activities at each site. This will need to take into account the sources of contaminants identified above. Particular attention will need to be paid to areas where spoil or demolition materials are stockpiled. This may require treatment through portable facilities, depending on the nature of the materials.

It is recommended that erosion and sediment controls are identified and approved for each site prior to works taking place, when the detailed aspects of the management of each site are known.

10 Stormwater Management Concept

Management of stormwater quantity is not considered necessary as the discharge is directly into the coastal environment and will have no impact on flooding. As the discharge is also distributed it is considered that any effects from the minor concentration that will occur will be less than minor no treatment is considered necessary.

It is proposed to primarily manage stormwater quality through source controls to limit the generation of pollutants at the site. This includes:

- Low vehicle movements due to the nature of the wharf traffic environment
- A low speed environment which minimises wear on tyres and brakes
- Discouraging storing or washing vehicles on the wharf
- Refuse bins easily accessible to wharf users and frequently emptied
- Routine maintenance at fuel supply locations to prevent drips and other spills
- Spill kits at the refuelling site
- Frequent monitoring of the refuelling area to address any spills that have occurred
- Frequent sweeping/cleaning of deck areas
- Maintenance to minimise degradation of plastic surfaces to reduce micro-plastic waste

Construction phase stormwater will need to be managed via an EMP containing an ESCP for each site. It is considered that the overall activity should be low risk providing that it is managed adequately.

11 Conclusion

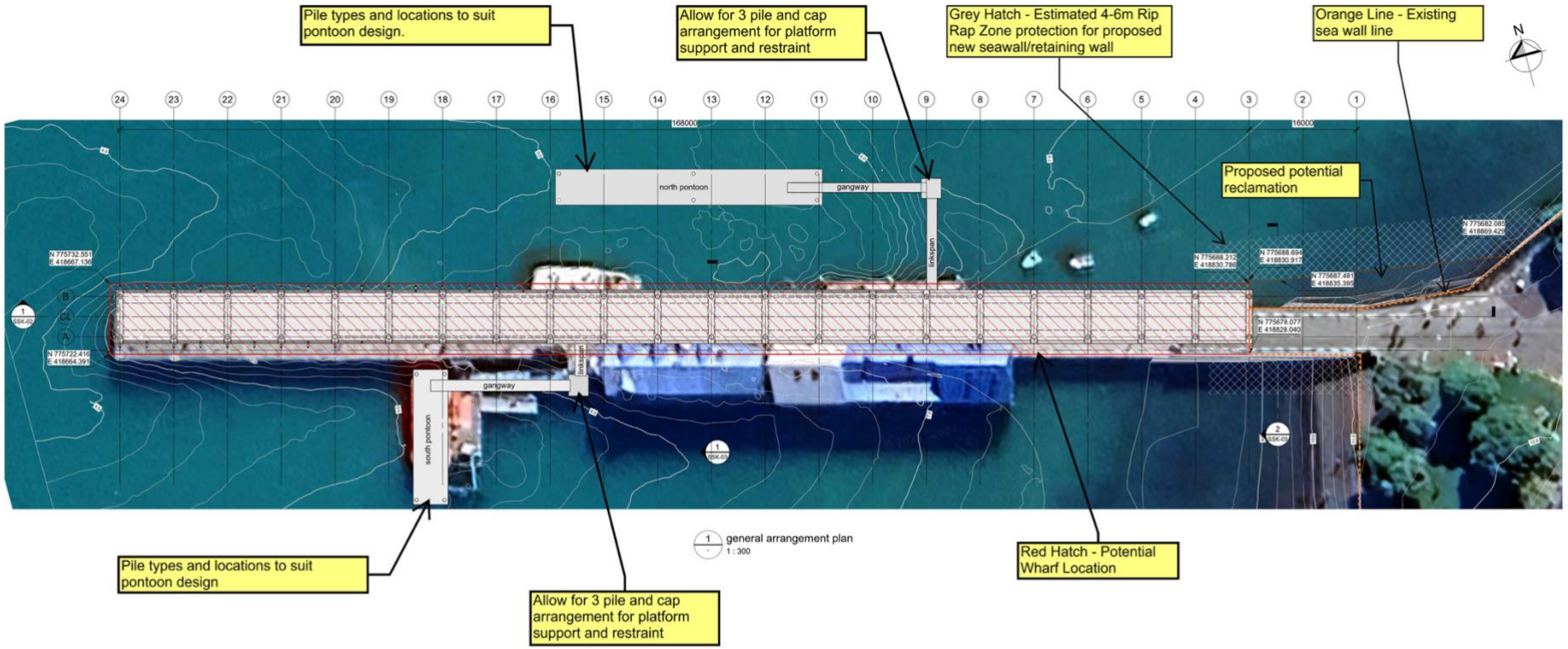
The existing wharf is located on the eastern shore of Akaroa Harbour and consists of a largely timber structure and abutment. It serves both recreational and commercial purposes. Currently, stormwater management is informal, allowing runoff from the wharf to drain directly into the harbour with no collection or treatment. Observations showed modest and localised areas of pollution, particularly hydrocarbons around the diesel refuelling area, but no significant erosion or adverse impact from stormwater flows nor signs of contaminants further from the refuelling area.

The new wharf is subject to rules under the Coastal Marine Area, which govern discharges into water. The planned discharges are expected to comply with permitted activity rules under the Regional Coastal Environment Plan.

The design for the new wharf includes concrete surfaces which will have minimal contaminant-generating potential. The primary sources of potential pollution include hydrocarbons from vehicles, litter from visitors, and plastic-based wharf materials. The construction phase is expected to have low contamination risks, with opportunities to mitigate these through an Environmental Management Plan (EMP) and site-specific Erosion and Sediment Control Plans (ESCP). The operational phase would primarily see runoff draining into the sea, with no water quantity impacts.

Overall, the main focus for stormwater management is on preventative measures like controlling pollution at the source, proper maintenance of the wharf, and monitoring of high-risk areas such as the refuelling site. The approach aims to ensure that while stormwater is not collected into a network, appropriate practices will minimise contaminant generation and protect the marine environment during both operational and construction phases.

12 Attachment A



Notes:

- All coordinates are approximate only as they are based on Calibre Lidar Survey and initial CCC topo data provided by CCC in 2020. All design documentation subject to final confirmation with cadastral survey of existing wharf.
- The coordinate system used is Mount Plesent 2000
- All Wharf coordinates are based on the edge of the proposed wharf and exclude fenders, ladders and other components
- All existing seawall and proposed reclamation coordinates are based on the outer edge of the top of the sea wall.
- Total bent numbers may vary from 24 to 18. Total number of wharf piles may also vary from 48 to 42 (exc pontoon and platform piles)
- Pontoon, platform and gangway layout taken from Enviser Pontoon Concept Layout option F Rev 0. Design by others.

All dimensions to be verified on site before making any shop drawings or commencing any work.

Rev	Date	Appd	Reason
B	4/06/2025	AZE	Resource Consent WIP
A	9/04/2025	AZE	Resource Consent WIP

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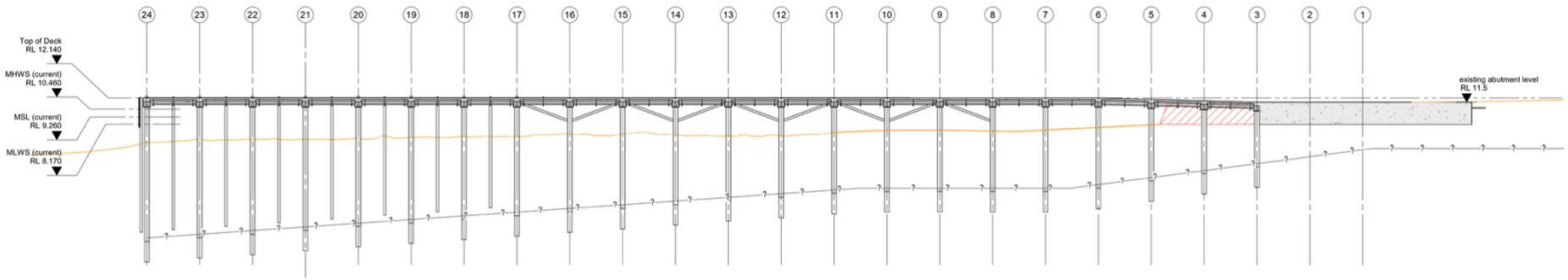
AKAROA WHARF RENEWAL

Sheet Title: general arrangement plan

Drawn: DLP | Scale: 1:300 (at A1)
Filename: 145457.31_Akaroa Wharf Renewal.rvt
Job Number: 145457.31 | Sheet Number: SSK-01 | Rev: B



1 longitudinal section
1 : 300

Notes:

- All coordinates are approximate only as they are based on Calibre Lidar Survey and initial CCC topo data provided by CCC in 2020. All design documentation subject to final confirmation with cadastral survey of existing wharf.
- The coordinate system used is Mount Plesent 2000
- All Wharf coordinates are based on the edge of the proposed wharf and exclude fenders, ladders and other components
- All existing seawall and proposed reclamation coordinates are based on the outer edge of the top of the sea wall.
- Total bent numbers may vary from 24 to 18. Total number of wharf piles may also vary from 64 to 44 (exc pontoon and platform piles)
- Pontoon, platform and gangway layout taken from Enviser Pontoon Concept Layout option F Rev 0. Design by others.

All dimensions to be verified on site before making any shop drawings or commencing any work.

Rev	Date	Appd	Reason
B	4/06/2025	AZE	Resource Consent WIP
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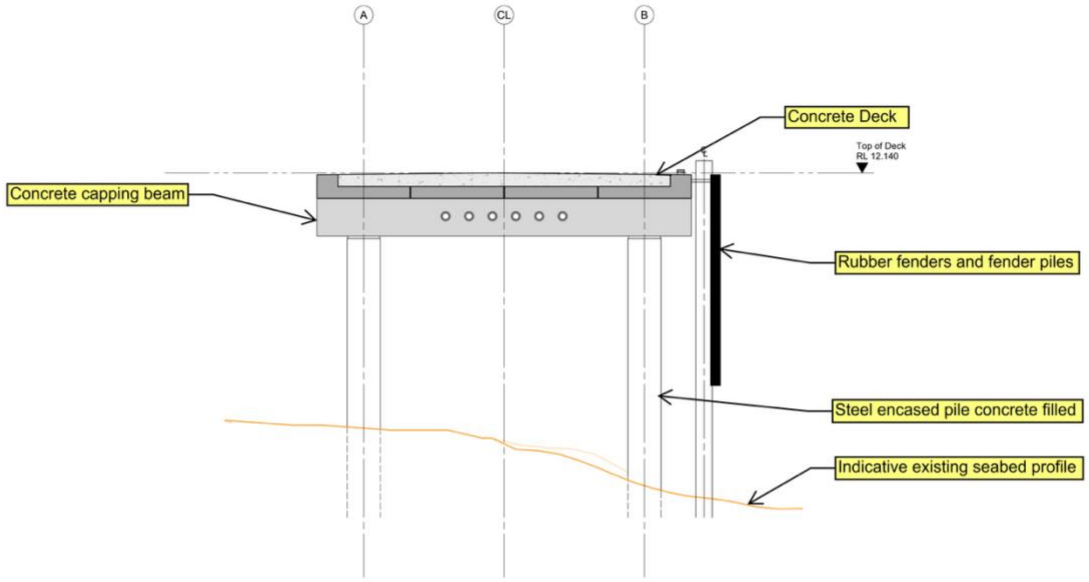
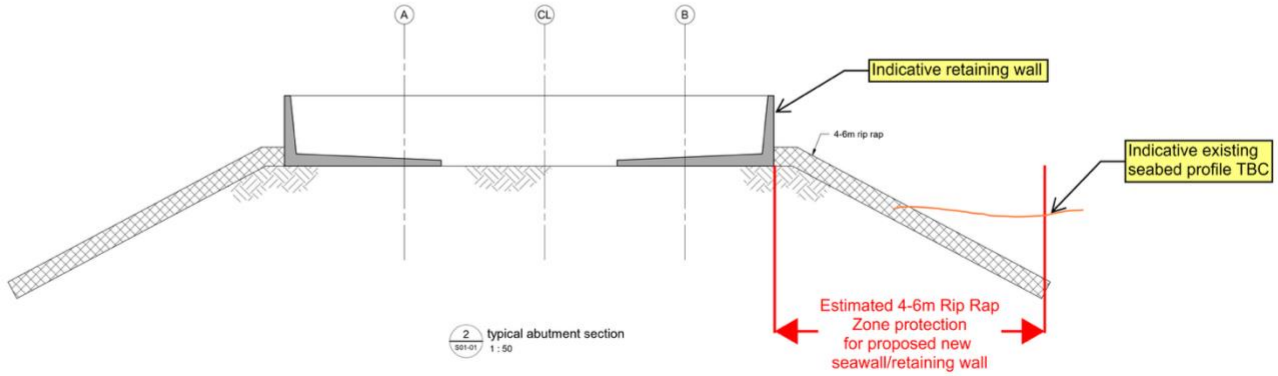
AKAROA WHARF RENEWAL

Sheet Title: longitudinal section

Drawn: AJW | Scale: 1:300 (at A1)
Filename: 145457.31_Akaroa Wharf Renewal.rvt
Job Number: 145457.31 | Sheet Number: SSK-02 | Rev: B



1 S01-01 typical bent section at buildings platform
1 : 50



2 S01-01 typical abutment section
1 : 50

All dimensions to be verified on site before making any shop drawings or commencing any work.

Rev	Date	Appd	Reason
B	4/06/2025	AZE	Resource Consent WIP
A	9/04/2025	AZE	Resource Consent WIP

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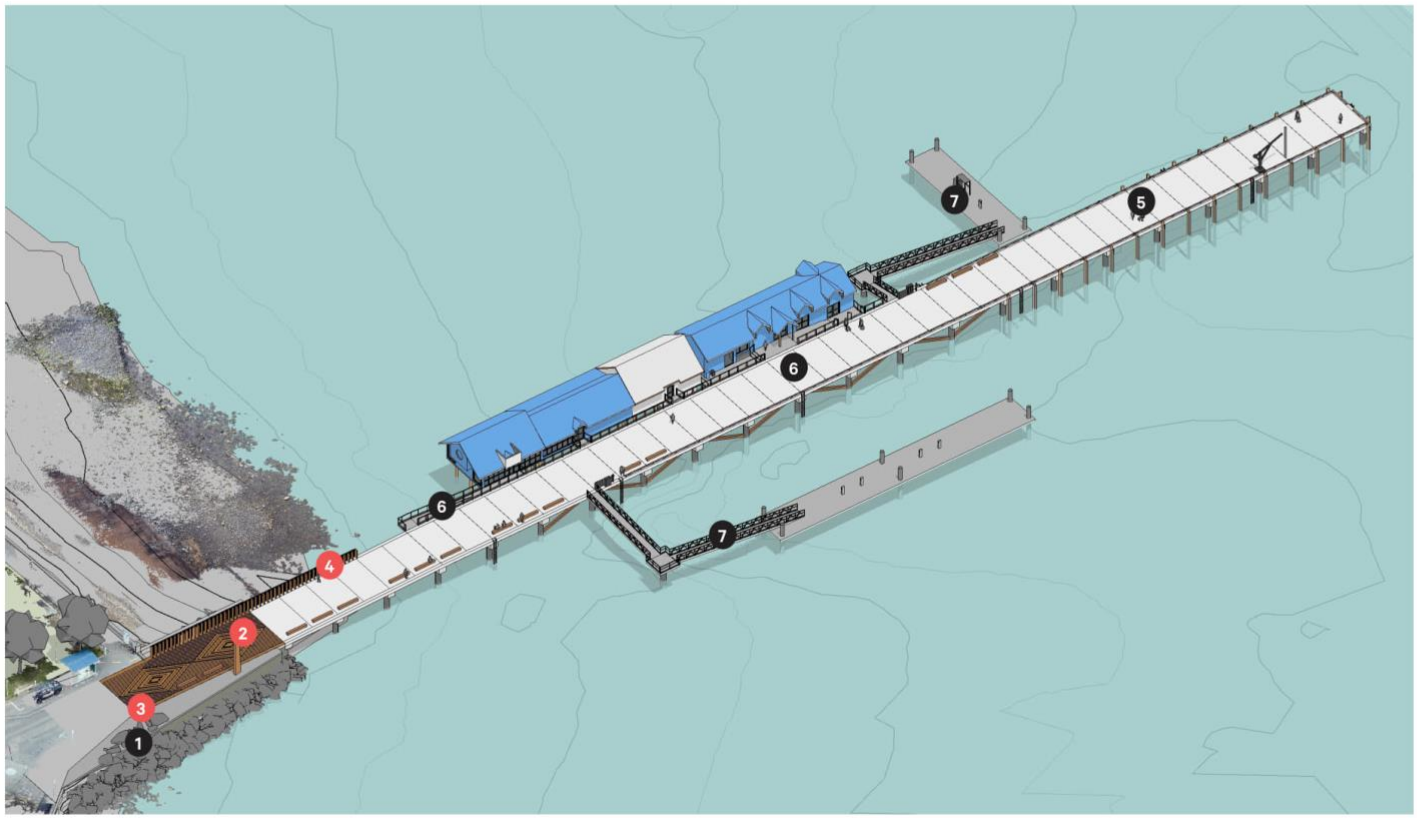
AKAROA WHARF RENEWAL

Sheet Title: typical sections

Drawn: DLP Scale: 1:300 (at A1)
Filename: 145457.31_Akaroa Wharf Renewal.rvt
Job Number: 145457.31 Sheet Number: SSK-03 Rev: B

Akaroa Wharf Concept.
Axonometric.



Legend

Fundamental design elements.

1	Rip rap rock armour—TBC
2	Surface treatment & whariki timber decking—TBC
3	Taurapa—TBC
4	Timber handrail element—TBC
5	Proposed wharf
6	Building access from proposed wharf deck level.
7	Platforms, gangways and pontoons

Notes.

— The proposed wharf is shown indicatively offset 1.5m from existing buildings. Final setout and building connections to be confirmed with cadestral survey.
— Positioning of Taurapa to be confirmed.
— Materiality under development.
— Hardwood elements incorporated into the proposed concept design.

Isthmus.

Akaroa Wharf Concept Design.
CCC.
23 May 2025.

03.

13 Attachment B

Laydown 1 at the Recreation Ground and the section of road to be closed for waterside access

Laydown 2 at the entrance to the wharf and vehicle staging area at the Beach Road boat ramp