

# Kilmun Pier – Berth Refurbishment

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## Design Statement

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## 1.0 Background

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This Design Statement has been prepared in support of the planning application for the construction of a new mooring/berthing facility at Kilmun (Kilmun Pier).

The application is for: Construction of new berth, and installation of fenders and bollards, Kilmun Pier, Kilmun, Dunoon, PA23 8SB.

The proposed new berthing structure will be constructed in the form of five tubular steel monopiles, which is a sustainable and efficient solution suitable for marine environments. This document outlines the design principles, access provisions, and justifications for the proposed structure.

The existing Kilmun Pier in Kilmun is mostly used by Western Ferries (Clyde) Limited as an overnight berth for their vessels. Additionally, vessels stay at the pier when not needed or during bad weather.

The form of the existing structure and its geometry suggest that the timber pier was never designed to take full mooring and berthing forces from the Western Ferries vessels currently mooring at the pier.

The above findings suggest that the existing structure may be overloaded by the mooring vessels and with time the structural integrity may be compromised.

Additionally, the current pier does not meet basic safety rules in terms of vessel operation and crew access.

To mitigate potential H&S issues and prevent the existing timber pier from being overloaded by the vessels, Western Ferries employed Arch Henderson to propose an alternative, budget friendly solution that will have minimum visual impact on the surroundings.

## 2.0 Current Site Description and Use

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### 2.1 Existing Structure

The site is located at Kilmun on the North shore of the Holy Loch, Dunoon, approximately 6 miles from Dunoon in Argyll and Bute.

Currently, Kilmun Pier is used by Western Ferries to tie up boats overnight or during exceptionally rough weather.

Occasionally as many as 3 vessels are moored to the pier side by side.

The vessels are berthing directly against the timber structure.

Crew access/egress the vessel to/from the pier via a 6m mobile gangway.

A previous inspection of the Kilmun Pier in 2015 showed that the timber structure was in poor condition. A number of repairs were carried out over many years by Western Ferries, however, the structure will continue to deteriorate. Additionally, the residual operational life is difficult to assess.

Further, the current pier does not meet basic safety rules in terms of vessel operation and crew access.

## 3.0 Design Concept

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### 3.1 Client Requirements

Arch Henderson has been instructed by Western Ferries (Clyde) Limited to produce a design proposal for the new mooring/berthing facility in Kilmun (Kilmun Pier).

The design criteria specified by Client were:

- The new berth has to be able to accommodate current Western Ferries vessels.
- The proposed solution has to have minimum visual and environmental impact.
- The proposed solution has to provide safe access for Western Ferries crew.

Three options have been considered, concluding that the preferred option would be to build a new berthing structure in the form of free-standing monopiles.

### 3.2 Option 1: Do Nothing – Western Ferries will continue maintaining the condition of the existing pier

The existing timber pier is approximately 195 years old. The average design life of new timber structures, constructed from treated timber, in marine environments are considered to be approximately 75years. Western Ferries took over the ownership of the pier in the late 1970's and therefore, at that time the pier age exceeded its expected design life. Since then, Western Ferries have carried out regular maintenance works to the pier, however, without full construction drawings and records of previous repairs it is very difficult to carry out any further improvement works.

In its current form, the pier does not meet basic safety rules and other requirements listed in British Standards and other Regulations (refer to: Safety in Docks. Approved Code of Practice - L148).

No safe access that meets current standards can be provided from the existing pier if a vessel is berthed directly against the timber structure.

The geometry of the existing pier (mooring length) does not meet current requirements for the proposed use of the pier.

It is not recommended to carry out any further improvements directly to the pier due to its poor structural condition.

### 3.3 Option 2: Decommission of the existing timber pier and build similar structure

The use of the following materials has been considered: timber, concrete, steel.

In all cases the proposal proved to be unsustainable. The costs of the construction were too high and the environmental impact was significant. The geometry of the structure will have to meet the new design criteria meaning the structure will be much wider. However, most importantly, in all cases the top deck level will have to be increased to meet current flood risk level (+6.02mCD excluding potential effect of wave action, funneling or local bathymetry at this location – please refer to SEPA letter from 11<sup>th</sup> September 2018, ref. no PCS/160997) and other criteria. Therefore, any structure with this increase in deck heights will dramatically affect the view.

### 3.4 Option 3: Build a new berthing structure in form of free-standing monopiles

The proposed solution is to construct a new berthing/mooring face in front of the existing timber pier. This new berthing structure will be constructed in the form of 5 tubular free-standing monopiles approx. 1.0 to 1.2m diameter. The top of the piles has been estimated as +7.35m CD, which is approximately 2m above the deck of the existing pier and only 0.5m higher than the top of the existing timber piles installed at the front face of the existing pier.

The new structure will be installed approx. 2.3m away from the existing berthing face (measured from the center of the pile) to provide suitable water depth for all Western Ferries vessels over the full tidal range without dredging. Any dredging operations in the area adjacent to the existing timber structure could affect its overall stability.

The visual impact when vessels are moored will be unchanged.

From the landside, the proposed free-standing piles will have little visual impact when a vessel is not at the berth.

Additionally, all piles will be painted black with black fenders installed to the front face of each pile.

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The two shore anchors will be replaced by two engineered mooring bollards that will be installed on the beach within the tidal zone (position shown on drawing 235014-014 Mooring Layout). Therefore, the visual impact of our proposal will be low.

To provide safe access/egress to all vessel crews, it is proposed to provide new custom built movable gangway access. The new gangway will allow crews to safely access the boats at all tides levels (to meet the requirement from Safety in Docks. Approved Code of Practice - L148).

Additional walkway will be installed at the back of steel piles to provide safe arrangement to pass the ropes and carry out necessary maintenance of the vessels. The walkway support brackets will be connected to the monopiles.

## 4.0 Option 3: Summary

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The proposed berthing structure is designed to provide safe and efficient berth for Western Ferries vessels. The use of monopiles has been selected due to their suitability for marine conditions and reduced environmental and visual impact.

The preferred solution prioritises safety, accessibility, and environmental protection, and it integrates seamlessly with the surrounding. The use of monopiles is ensuring minimal disruption to the environment while providing a durable and long-lasting solution.

Additionally, we confirm that Western Ferries are aware of their responsibilities as the pier owner and will still carry out the regular inspection, maintenance and repair works to the existing timber pier.

### 4.1 Key features of the chosen design

**Berthing Structure Layout:** The berthing structure will consist of 5 steel monopiles installed in front of the existing timber pier and are designed to accommodate Western Ferries passenger ferry vessels. The layout has been designed to reduce lateral load on the existing timber pier. A short walkway will be installed between timber pier and steel piles to provide safe arrangement to pass the ropes and carry out necessary maintenance of the vessels. The ferry crew will access/engress the vessel from the timber pier via mobile gangway. It is a cost-effective solution with minimal environmental and visual disruption.

**Materials:** The primary material for the berthing structure will be steel. Mooring fenders will be installed at the front face of each pile. Unit fenders are rubber fenders with UHMV-PE FACE PANEL.

**Safety and Accessibility:** The structure will include safety features such as guardrails, lighting, and clear access routes. The design prioritises the safe embarkation and disembarkation of personnel and cargo.

## 5.0 Access and Connectivity

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The berthing structure will be designed to provide a safe access for the crew members from the vessel to land. From Kilmun, most of crew member will travel back to Dunoon, Gourock or Glasgow.

### 5.1 Access provisions

#### **Access provisions include:**

- **Marine Access:** The berthing structure will be designed to accommodate Western Ferries vessels, with access to and from timber pier via mobile gangway.
- **Land Access:** Vehicle access to the pier is provided via the A815 road. There is no provision for vehicle access to the timber pier and, therefore, if necessary the vehicles can be parked for a very short time on the masonry pier in front of the security gate. The preferred parking location is the designated parking area located East to the pier.
- **Pedestrian Access:** The new structure will be constructed to provide shelter for the Western Ferries vessels and safe access for the crew from and to the vessel at all tide levels, however, the pier is privately owned by the Western Ferries. Access to the timber pier is via masonry structure through the locked security gate. The locked entry does not allow pedestrians to enter the pier. Therefore, there has been no allowance made to pedestrian access.

## 6.0 Considerations

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The use of monopiles significantly reduces the environmental impact of the construction process. By limiting the need for extensive dredging or piling, the project minimises disruption to the seabed and surrounding marine ecosystem. Additionally, the monopile design is expected to offer long-term sustainability, requiring minimal maintenance over time.

Environmental mitigation measures will be put in place during construction, including:

- Measures to minimize noise and vibration impact on marine life.
- Restrictions on construction during critical periods for local wildlife.
- Monitoring of water quality during construction to ensure that there is no pollution from the project.

Other factors that support choosing the monopiles structure:

- Minimal visual impact.
- Safe and efficient maritime infrastructure.
- Integration with the existing coastal environment.

The design also complies with the maritime safety standards and accessibility regulations required for public and private vessels.