



**GEORGE
LESLIE**



CASE STUDY PALNACKIE HARBOUR

PROJECT OVERVIEW

Palnackie Harbour, located on the River Urr near Castle Douglas, experienced significant deterioration of its timber harbour wall following dredging works in 2022.

With the wall showing signs of potential collapse and critical assets - including the septic tank - at risk, George Leslie was tasked with designing and delivering a robust protection solution.

EXECUTIVE SUMMARY

The project addressed structural instability at Palnackie Harbour through a combination of emergency works, sheet pile installation, and carefully planned access measures.

Temporary stabilisation was followed by permanent works involving rock anchored sheet piles driven to bedrock.

Additional site practices, such as green welfare facilities, Hush Pods, and solar powered security systems, further minimised the project's footprint while maintaining safe and effective delivery.

OUR SUSTAINABILITY ROUTE



**Nature Based
Solutions**



**Recycled
Aggregates**



**Low Carbon
Steel**



**Low Carbon
Concrete**



**Battery
Units**



HVO Fuel



**Welfare Eco
Cabins**



**Green
Energy**



PROJECT BACKGROUND

Early project investigations confirmed serious degradation of the harbour wall and evidence of land slippage between the wall and the septic tank. This is shown in the image above.

To prevent asset failure, the strategy included removing the existing wall, forming an emergency rock fill bund to allow work access, and installing a new sheet pile wall extending around the embankment of the river.

Temporary works in 2024 stabilised the failing structure, while permanent works beginning in 2026 used sheet piles driven to rock and supported by angled rock anchors. Existing harbour furniture was reinstated, and new steel ladders were installed to meet Dock & Harbour Regulations.



PROJECT SUMMARY

The Palnackie Harbour project successfully stabilised and future proofed critical infrastructure through a combination

of engineering innovation, sustainable material choices, and efficient site practices.

By integrating low carbon products, recycling strategies, and operational energy savings, the project delivered substantial environmental benefits alongside improved asset resilience.

The approach serves as a strong model for future coastal and harbour protection works across similar vulnerable locations.



SUSTAINABLE BENEFITS

Carbon emission reductions were achieved through:

- Recycling of nearly 10,000 t of aggregate, preventing 12 t CO₂e compared with landfill disposal.
- EcoSheet Pile Plus, reducing sheet pile emissions from 409 t CO₂e to 178.7 t CO₂e—over 50% lower than traditional hot rolled piles.
- HVO fuel, cutting fuel emissions from 57 t CO₂e to 0.8 t CO₂e.
- Optimised pile lengths through ground investigations, reducing waste and embodied carbon.
- Repurposing redundant steel beams into gate sections, avoiding scrap and reducing the need for additional materials.
- Green welfare facilities, Hushh Pods, and solar powered security equipment, reducing site energy consumption and generator use.

Total emissions were reduced from 479 t CO₂e to 179.5 t CO₂e.