

**DILMUNIA GRAND CANAL & MARINA (DGCM)
DILMUNIA, MANAMA, BAHRAIN**

Waterproofing of Reservoirs, Lakes and Channels

Problem

Ithmaar Development Company is developing the reclaimed island of Dilmunia on the north-eastern coast of the island of Muharraq, Kingdom of Bahrain. The development project includes the construction of a nearly 1.5 km leisure canal (Dilmunia Grand Canal), which will be the central attraction of the island's architectural design, including water activities, fountains, cascades, and waterfalls. Dilmunia canal is elevated few meters above the surrounding ground level, and any potential leaks may become visible and are highly undesirable. Therefore, the project foresees to waterproof the canal structure with various geosynthetic products, including several complementary watertight and drainage elements either installed inside and outside the peripheral walls.

Solution

The construction of the Dilmunia canal is the object of an international Tender. The tender design for the waterproofing works has been developed by the engineering firm ARTELIA by specifying the following Maccaferri products for waterproofing & drainage functions. (1) MacLine SDH 200 as the primary waterproofing layer inside the canal structure which will be retained at the upper perimeter by heat-seaming (welding) over an embedded anchor profile of 'E' locks and covered by 100 mm thick polymer reinforced concrete panels, (2) MacLine N80.1 geotextile cushion layer intended to protect the geomembrane from damage during casting of the concrete panels, (3) MacLine GCL W10 as the secondary liner designed to provide an additional watertight barrier against unexpected leakage, (4) Macdrain M120M as the drainage layer behind the concrete wall and (5) Macgrid WG 13S geogrid for ground improvement below bridge foundation structures. Maccaferri Middle East was involved in the design, supply, and construction assistance of the project.

Client: Ithmaar Development Company

Designer / Consultant: Artelia / Ansari Engineering Services

Contractor: Cebarco Bahrain S.P.C.

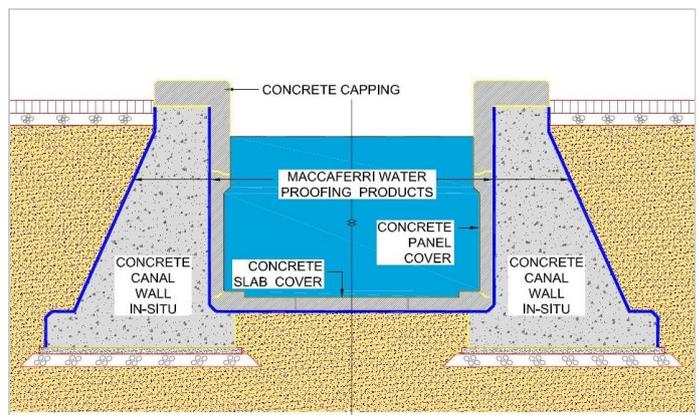
Products used (Qty.)

- MacLine Smooth	40,000 m2
- MacLine GCL / GCO	25,000 m2
- MacDrain M	7,000 m2
- MacGrid WG	8,000 M2
- MacTex N	25,000 m2

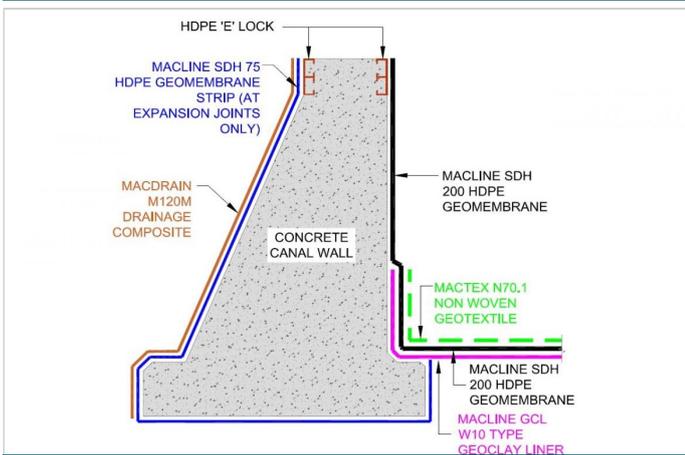
Date of construction: 04/2020 - 11/2020



Architectural rendering of the proposed Dilmunia Grand Canal & Marina Project



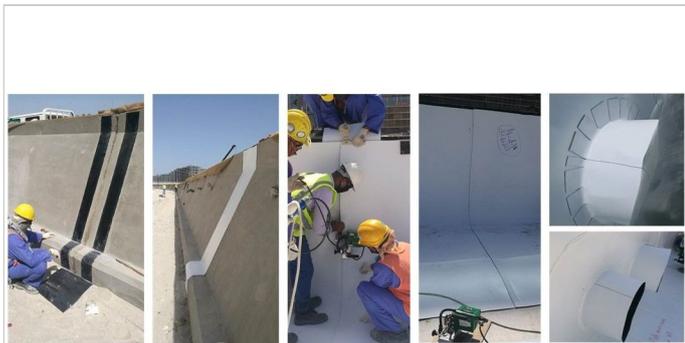
Sectional detail of water proofing schemes for DGCM project



Sectional detail showing various Maccaferri geosynthetic products



During construction: deployment of Macline geomembrane layer

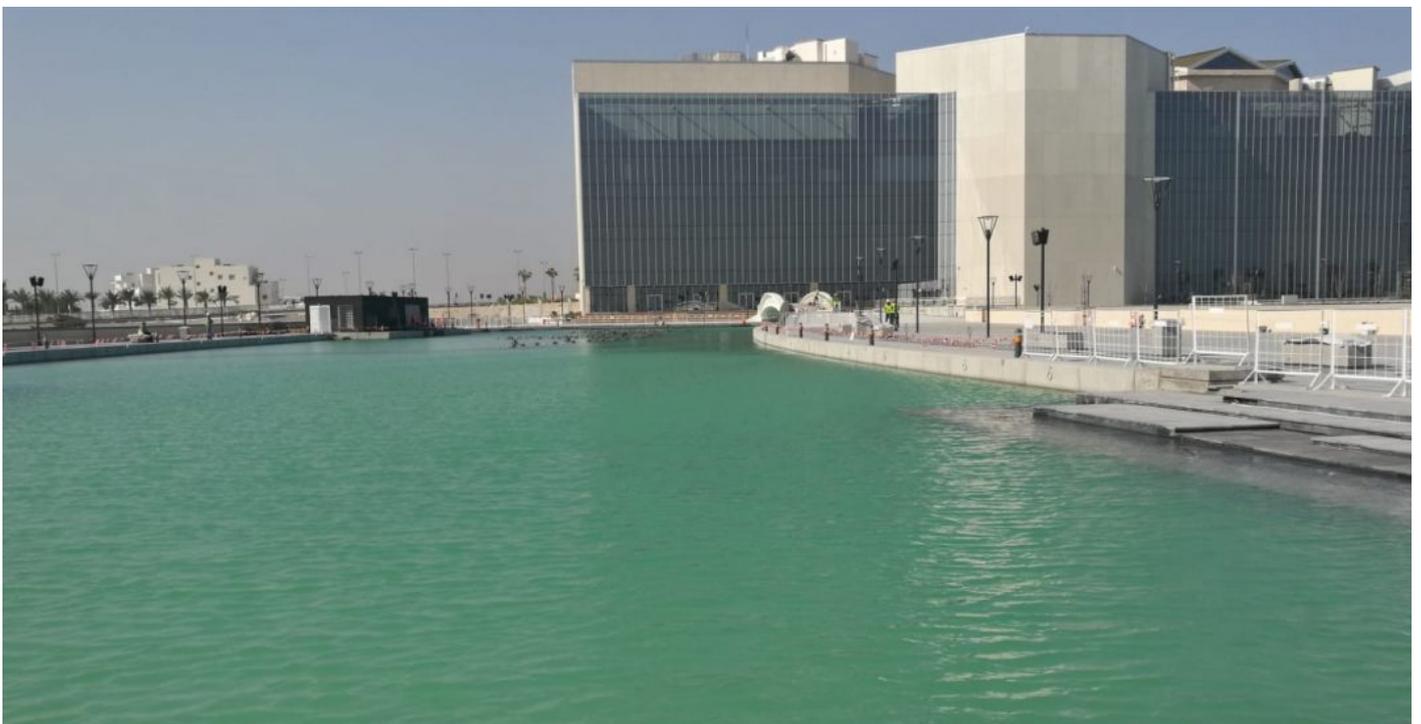


E Lock Installation At Expansion Joints Geomembrane strip welded to E Lock Fusion Welding of Geomembrane rolls Extrusion welding at pipe outlets

During construction: various phases of water proofing works



During construction: concrete cover placed before water filling



Completed Dilmunia Grand Canal lined with Maccaferri products

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