

Floating Baffle Curtains / Storage Pond Liner

Waste Water Treatment Plant Upgrade Ngaruawahia, New Zealand

Client: Spartan Construction / Waikato District Council

Date: March 2009

The Ngaruawahia Waste Water Treatment Plant receives domestic wastewater from several towns for treatment. Upgrading of the plant required that the flow of wastewater into the plant was never disrupted and that the quality of the water leaving the plant had received as much treatment as possible. The latest stage of the plant upgrade included the removal of sludge and other deposits from the sewage treatment pond. This sludge had to be dewatered and the dried residue permanently deposited in designated areas of the treatment plant's wetlands. A temporary de-watering pond was commissioned for this part of the project and Permathene supplied 3,250 m² of Permaliner 0.5mm Flexible Polypropylene for the lining of the excavation. This liner was factory fabricated in three separate panels which were welded together on-site at the time of installation. Dewatered sludge was placed in this area at the primary stage of the dewatering process.



Six new floating baffle curtain walls were fabricated by Permathene and installed in the recently de-sludged treatment pond. Installation of these baffle curtains allowed for the creation of an extended flow path through the pond thus separating the area into one facultative and four maturation zones. Baffles 1, 2, 5, and 6 were fabricated with a range of square openings which allowed for a controlled water flow throughout the four maturation zones. This work significantly improved the performance of the treatment pond and prepared the pond for future upgrades. The six baffles with a total length 730m were fabricated in standard 30m long units. The baffles had secondary skirts installed on the slope units, allowing for complete contact with the concrete wave band and therefore reducing any short circuiting of the water.

Construction of maturation zones inside the existing pond required that the baffles be connected at the correct angles. This included 3 "T" connections and one complex Cross-Connection. The baffles were connected to each other and to the shore anchors via SS high tension cable. At this stage the required shape of the maturation cells was formed. The task of creating a water tight seal of the baffles at the cross and T connections was achieved by bringing together additional flaps previously installed to the end of each unit. The cross-connections were later secured by the installation of cross-anchors (short mooring lines 4m long connected to heavy concrete weights on the pond's floor). The positions of the baffles in the pond are determined by fixed anchor points, cross anchors and wooden poles left in the ponds from previous installations and designed to accommodate the pond's water level variation. Permathene engineers provided support during the design and installation process.

The total length of the baffle curtain system is 787 meters and currently is probably the longest floating geosynthetic baffle curtain system used in wastewater applications in New Zealand. To date, Permathene Ltd have manufactured and supplied over 5 kilometres of baffle curtains to various sites in New Zealand, Australia, and the Pacific Islands.

Lagoon Barrier

Flexible Polypropylene (Permaliner®) Water Treatment Plant, Maraetai

Client: Manukau Water, New Zealand
Date: September 2000

Manukau City Council operates the Beachlands Maraetai Water Treatment Plant (WTP) in Whitford. The upgrading of the plant was undertaken in August through September 2000, which included the installation of the Lagoon Barrier Curtain. The purpose of the curtain is to separate the existing lagoon, which is approximately 60 m x 15 m, into two different biological process sections.

The lead section which receives the normal inflow and re-circulated, is intended to maintain anoxic conditions. The subsequent section will be aerated as at present. The intent is to allow for the curtain separating the two zones to be movable up and down the lagoon over a distance of approximately 8 m.

The curtain was fabricated from Permaliner FPP (Flexible Polypropylene) 1 mm membrane, which is suitable for effluent containment facilities. Permaliner is a co-extruded (triple-layered), virgin polymer based, polypropylene and has excellent tensile strength and flexibility to withstand ground settlement and loading stresses, high tear and puncture resistance, and is free from additives such as plasticisers, adhesives and lubricants. It is manufactured to food hygiene grade standards for suitability to potable water (BS 6920) and is highly UV resistant.

Permaliner FPP is resistant to a wide range of chemical agents, including the surfactants that often exacerbate environmental stress cracking in other polymer materials. The mechanical properties are virtually unaffected by prolonged exposure to a wide range of organic and inorganic agents. It is very resistant to leachate from Municipal Solid Waste (MSW) facilities.

Note: As at August 2008 the curtain had recently been decommissioned. Upon examination absolutely no deterioration had occurred to the material.



Silt Curtain

Reinforced PVC, Monofilament Geotextile Marine construction, Waiheke Island

Client: Auckland City

Date: August 2004

Kennedy's point Waiheke Island is a bay used by ferry's carrying people and vehicle's from Bucklands Beach and Auckland central to the Island. Due to the exposed nature of the bay the ferry's dock at, Auckland city planned for a new breakwater to be constructed in the bay to provide shelter to the vessel's docking at Kennedy's point, for smooth loading and unloading of people and vehicles.

The plans called for the creation of a breakwater to extend 180 m from the shore to a depth of almost 4m. The method adopted was for large armour rock to built up to a sufficient level, in this case about 2 m above high tide mark, thus providing shelter from incoming waves.

Due to the sensitive environment of Auckland's Hauraki Gulf, a popular destination for tourists, pleasure boaters and fishermen, Auckland City council was very conscious about protecting the sensitive marine ecosystem which Waiheke Island plays a major part in.

This large breakwater was made from rock placed on the sea floor to build up the structure and it was clear that this would create a lot of silt which is a potential killer for marine organisms.

It was determined that before any works could begin the entire site had to be screened by a dedicated floating silt screen, which would hang vertically stopping any silt from leaving the construction zone.

As this is one of the first projects in New Zealand that a dedicated floating silt screen had actually been specified, Permathene was approached as a leading Civil and environmental engineering supplier to offer solutions for this problem.

Permathene supplied a dedicated floating silt screen made from the highest quality products. This screen consisted of a 300mm floatation device sealed in a PVC sleeve, the silt screen itself is made from a mono-filament woven geotextile, with openings small enough to trap silt, but also allowing water to pass through the screen. The whole fence was held in place with anchor ropes tied to weights sitting on the sea floor. The screen its self extended over 3m from the surface of the water.

Monofilament is a superior fabric because typical woven fabrics that are slightly cheaper in general have a far lower flow rate, or sacrifices filtration. The monofilament traps any silt (in this case any particles larger than .4mm) and additionally allows normal flow of tides and current.

This type of screen can be manufactured in almost any lengths and floatation devices also can be modified for varying waters, ie. Lakes, rivers and open seas.



Pond Baffles

Flexible Polypropylene (Permaliner®) Retention pond

Client: NZFS Training Facility, Rotorua

Date: March 2006

Retention ponds were created at this facility for the treatment of stormwater by allowing the settling of hydrocarbons and suspended solids through a baffle system.

To maximise productivity 5 baffles, each 6.5 m x 2.2 m were specified by SKM, manufactured by Permathene Limited and installed by Ebert Construction.

The baffles were made to fit the width and height of the pond with a 300 mm square opening located 300 mm from the bottom of the pond and 500 mm from the side of the pond. The baffles were installed so that the openings were at alternate sides of the pond to maximise the length of flow path.

Every unit was fabricated from Permaliner FPP with flotation and tension wire rope at the top of the baffle and galvanised anchor chain, fitted through 50 mm pipe, inserted into welded seam at the bottom of the baffle.

Permaliner FPP has excellent UV resistance, is fully flexible, suitable for potable water (BS 6920), and has a high tensile strength, tear and puncture resistance.



Disclaimer

The information presented herein, while not guaranteed, is to the best of our knowledge true and accurate.

While every effort has been made to provide accurate and reliable information, it is up to the user of this brochure to verify all information, including designs it might be based upon, with an independent source. Application of this data must be made on the basis of responsible professional judgement.

Except when agreed to in working conditions of use, no warranty expressed or implied is made regarding the performance of any product, since the manner of use and handling is beyond our control.