Floating Wetlands

Floating Treatment Wetlands - Stormwater

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APPLICATIONS

- Stormwater Treatment
- Beautification and Landscaping
- Lake and Pond Restoration
- Lagoon Augmentation
- Fine Collodial and Particulate Heavy Metal Removal
- Algal Bloom Prevention

OVERVIEW

In wastewater applications, floating wetlands have proven efficient and low-cost enhancements to municipal wastewater treatment plants — either retrofitted to existing facilities or encompassed into the design of new constructions. Truly environmentally sound and sustainable, the SPEL Waterclean floating wetlands have a dramatic effect on:

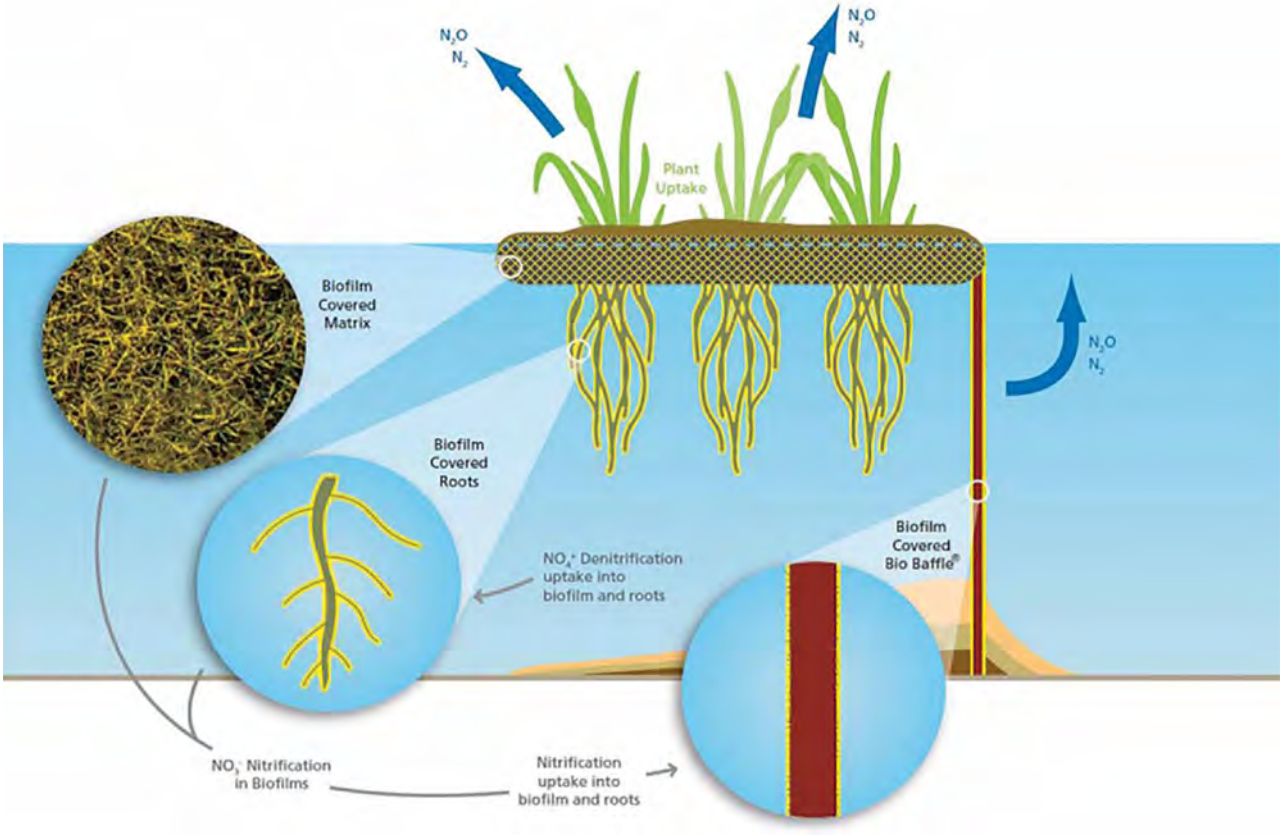
- Anaerobic digestion
- Odour mitigation
- Nitrification processes
- De-nitrification and polishing
- Bio-chemical oxygen demand
- Removal of TSS
- Reduction in faecal coliforms
- Reduction in phosphorus

In stormwater applications, the installation of floating wetlands into inlet zones or detention lagoons greatly enhances the stormwater cleaning process by removing:

- Total suspended solids
- Nutrients
- Gross pollutants
- Heavy metals
- Fine colloidal and particulates

Independently tested and validated, these systems provide high-rate performance in both average flow and storm events.

HOW IT WORKS



The floating wetlands, which can be used in any water environment requiring treatment, provide a lush and fertile base for plants and vegetation to grow. As the roots spread down through the fibrous structure of the wetlands, an extraordinarily vast activated surface area is created for microbes and bacteria to take on their role of bio-remediation - the use of micro-organisms to remove pollutants.

The microbes and bacteria, are UV sensitive and adhere to the roots and microscopic root hairs of the plants, and within the fibrous structure of the wetlands themselves, secreting sticky extracellular proteins and exist in the environs of biofilms.

It is within these biofilms which microbes and bacteria trap and digest organic matter and nutrients in stormwater, including total suspended solids, biochemical oxygen demand, nitrogen and phosphorus.

What makes SPEL Stormwater's floating treatment wetlands a unique scientific innovation, that has created a revolution within the water treatment industry, is the massive activated surface area they provide for microbes and bacteria to survive.

BENEFITS

SPEL Stormwater's Floating Treatment Wetlands are floating modules that support the establishment of wetland vegetation, and thereby allows the creation of a floating wetland environment on top of a permanent waterbody. It mimics a wetland's ability to absorb nutrient loads with only around a 1/3 of the land space required by a natural or constructed wetland. Furthermore, by having a wetland float over a water body means that land space does not have to be taken up to construct a man made wetland. And finally, the Floating Treatment Wetland becomes a virtually self sustaining system with minimal maintenance required.

MINIMAL ENVIRONMENTAL IMPACT

- Using a waste product to bio-remediate waste, our floating treatment wetlands have strong environmental credentials including:
- Satisfying stringent water quality consent requirements
- Eliminating the need for chemical dosing
- Eliminating the need for further high-impact ‘concrete and steel’ construction
- No energy used in the operation process; low energy in the manufacture process
- Zero-land use requirement
- Manufactured from recycled PET
- Using plants from eco-sourced seeds to harmonise with the natural vegetation

FLEXIBLE

Floating treatment wetlands are completely flexible and can:

- Fit any existing space or water body shape
- Operate effectively in all climate and environmental conditions
- Operate in fluctuating water levels
- Maximise retention times for treatment optimisation
- Concentrate on removal of particular pollutants through design adjustments

What this flexibility will mean for you is that, whatever your water treatment issue, the wetlands can be adapted to provide a benefit-loaded solution.

BEAUTIFICATION

Although the floating treatment wetlands are primarily a water treatment tool, they have the added bonus of being visually appealing as a floating wetland. As a water-based feature in community facilities, they can enhance the natural environment and provide a habitat for land-based and marine wildlife. They also can be used as a landscaping feature on private residential projects.

PLANTING

The plant species suitable for floating wetlands are selected according to the reserve buoyancy required for the application. Generally, terrestrial species such as wetland sedges, rushes and grasses are the best option as they develop superior root structures within the water to provide for an increased surface area. However, many other planting types are also used. Recommended planting density is three to five plants per square metre.

EFFECTIVE

The process is simple, completely natural - and highly effective. You have the assurance of an installation that has been developed to exploit the unsurpassed water cleaning properties of naturally-occurring microbes.

ZERO LAND USE

In situations where water treatment demands have outgrown existing assets, the wetlands can be retrofitted as a low-cost, zero land use alternative to building additional ponds or constructed wetlands. This eliminates the need for costly land purchase and contributes to the minimal environmental impact of the wetlands – saving you money and time-consuming confrontations over land use.

For example, local authority saved $500,000.00 when we retro-fitted floating treatment wetlands on an existing pond instead of purchasing land and constructing an alternative constructed wetland system.

In areas where irrigation schemes are used to dispose of treated water, the efficiency of our wetlands in reducing the nutrients in treated water means less land is required for the disposal fields. Again, money is saved and environmental needs met.

MODULAR BIOLOGICAL SYSTEM

The Floating treatment wetlands is a modular system therefore can be installed in stages. This proves beneficial where monetary budget constraints restrict the ability to install full systems in one financial year.

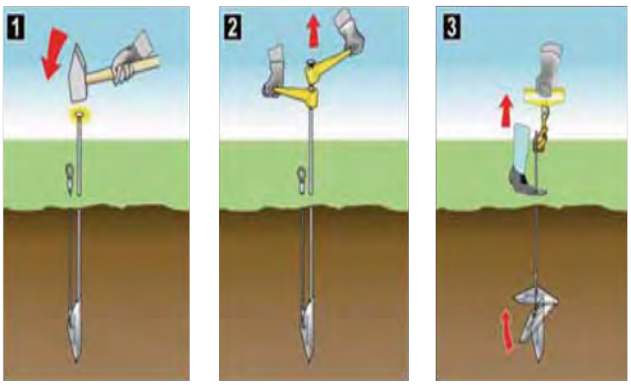
Each floating module measures approximately 4m x 2.3m each, and are joined together with nylon bolts, to create virtually any size of area.

Staging also proves beneficial where discharge consents may change in the future while a smaller system meets current demands. A simple additional modular upgrade can be retrofitted at a later stage to future proof the wastewater plant.

ANCHORING AND TETHERING

The floating treatment wetlands can be secured into position by anchoring or tethering, depending on local climate and water conditions.

The technique we use is to secure to the embankment above the maximum water level. The floating treatment covers are partially submerged which provides a “suction” effect to occur that creates a powerful anchoring mechanism, imparting the greater part of the forces needed for anchoring these systems in place.



DRIVING THE ANCHOR | REMOVING THE RODS | LOADLOCKING/ SETTING

COST SAVINGS

Floating treatment wetlands require low capital investment with minimal operating and maintenance costs, and, there are no operational energy costs. (1) NH4N requires an input of O2 to nitrify. This is often via mechanical aeration.

STORMWATER

SPEL STORMWATER'S FLOATING TREATMENT MEDIA - COMPLETE POND COVER

The floating wetlands, which can be used in any water environment requiring treatment, provide a lush and fertile base for plants and vegetation to grow. As the roots spread down through the fibrous structure of the media, an extraordinarily vast activated surface area is created for microbes and bacteria to take on their role of bio-remediation - the use of micro-organisms to remove pollutants.

The microbes and bacteria, which do not swim, and are UV sensitive, adhere to the roots and microscopic root hairs of the plants, and within the fibrous structure of the media themselves, secreting sticky extracellular proteins and exist in the environs of biofilms. It is within these biofilms which microbes and bacteria trap and digest odours and nutrients in wastewater.

What makes SPEL Stormwater's floating treatment media a unique scientific innovation, with the potential to create a revolution within the water treatment industry, is the massive activated surface area they provide for microbes and bacteria to survive.

Developed alongside leading international scientists, Waterclean Technologies™ floating treatment media represent a highly technical development that uses, and improves on, a naturally occurring phenomenon. In short, SPEL Stormwater's, modular biological technology, being active suspended media provide a colossal environment of active surface area for pollutant-digesting microbes and bacteria to bioremediate water laden with nutrients, heavy metals or suspended solids. They represent an industry breakthrough with scores of benefits that include:

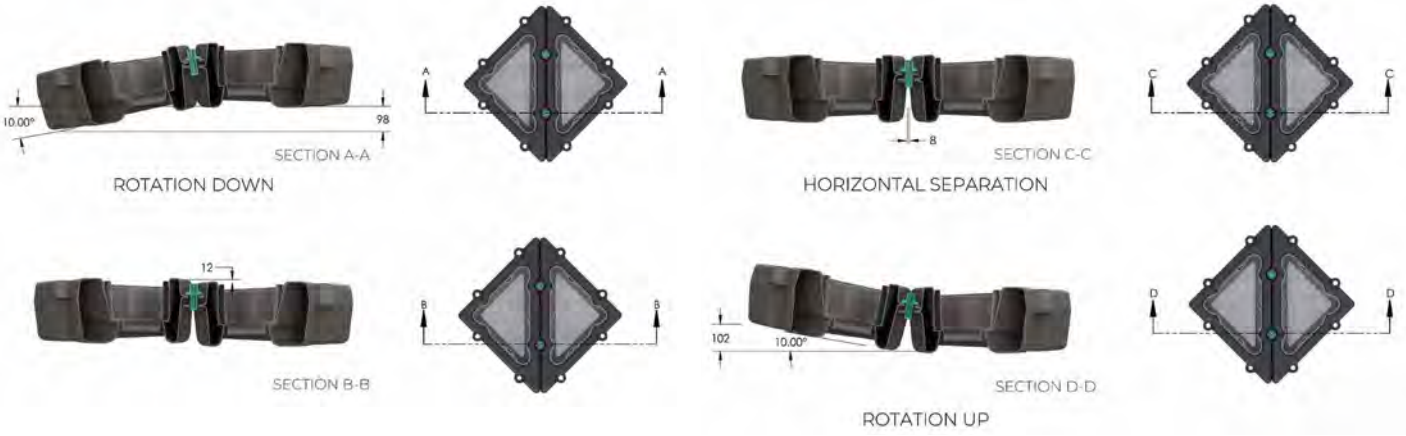
- Cost savings
- Proven effective performance
- Self-cleaning
- Minimal environmental impact
- Flexibility
- Zero land use
- Fluctuating water levels

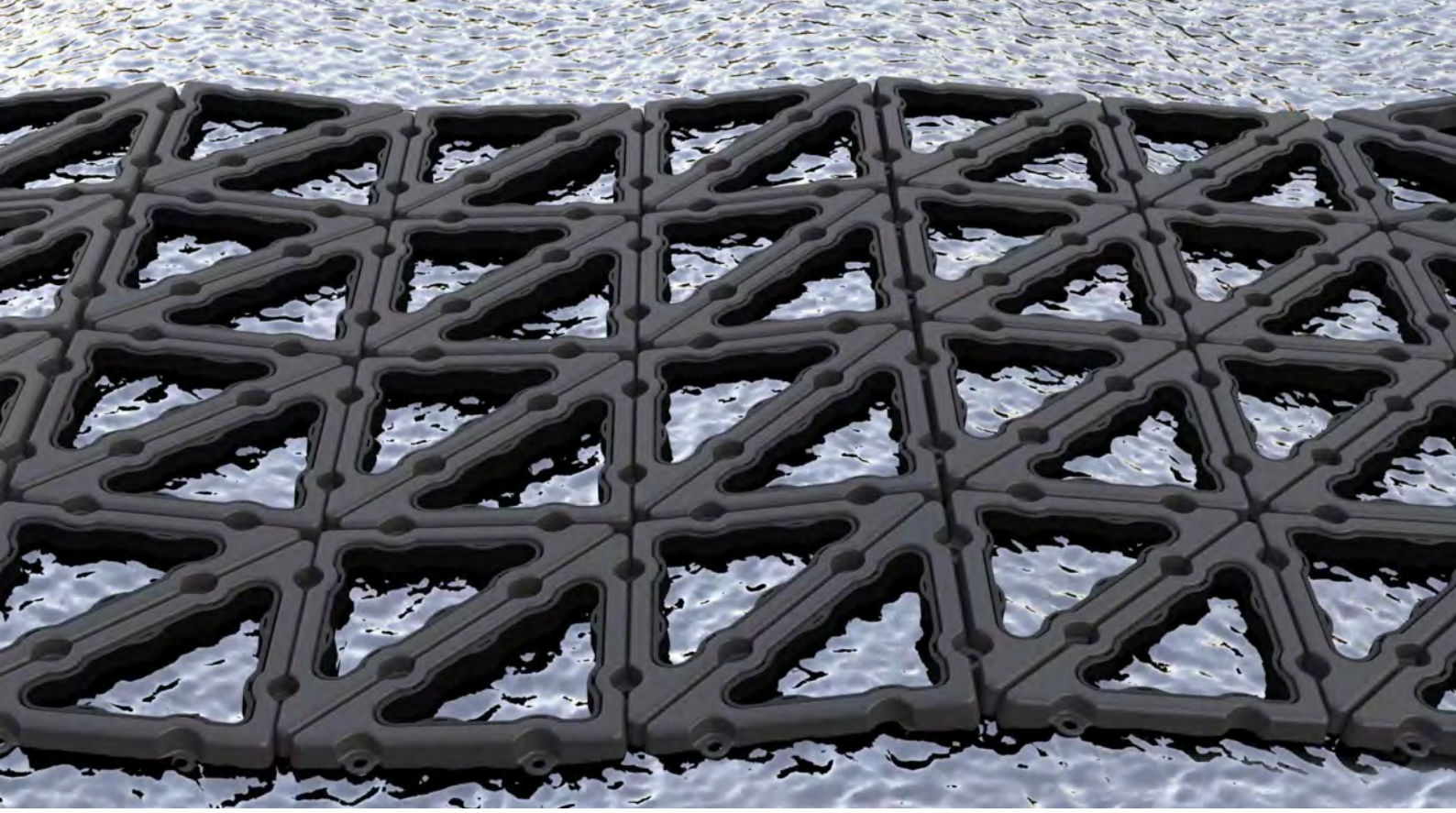
Plant species are typically a mix of wetland species from the sedge and rush families. Plant species are specifically selected for each project and can be suitable for both freshwater and brackish environments. Common options include:

- Carex
- Juncus
- Ficinia
- Phragmites
- Schoenoplectus
- Lomandra
- Baumea

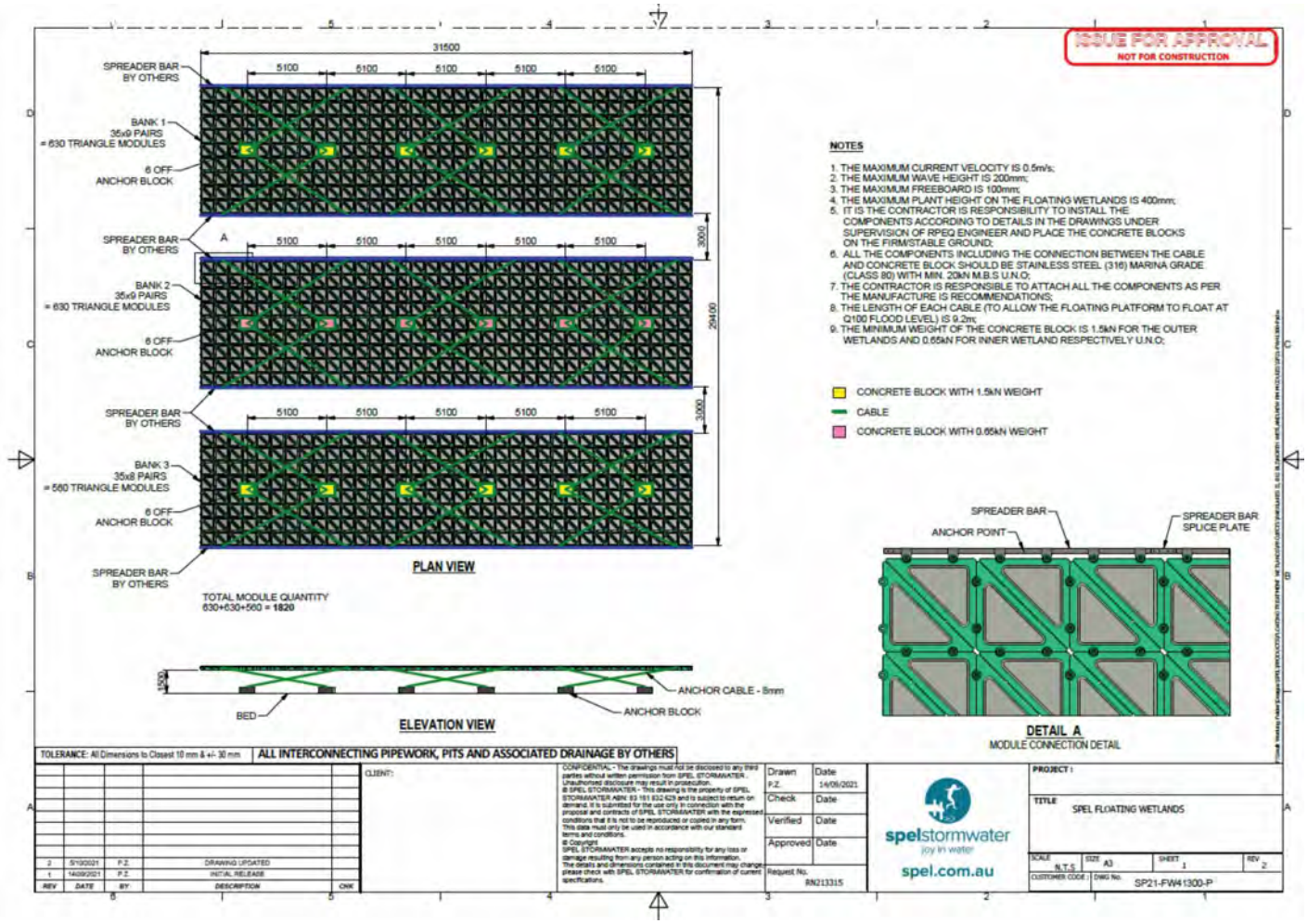
WIND & WAVE MOVEMENT MODELLING

The SPEL Floating Wetlands have been modelled and tested to be installed in areas subject to wave chop and water movement mixed with wind loads. The floating Wetlands are constructed with significant allowance for movement and flex, thus making them suitable for installations in areas exposed to boat and wave movement.





TECHNICAL DRAWINGS



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We believe clean water is a right not a privilege and we work to ensure a joy in water experience for you with your children and grandchildren.

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