

## Case Study - Stormwater Contamination Treatment Using Recycled Organics

### Concord Council, Atlantis Corporation and NSW EPA

Advanced Biofiltration Media is a specifically engineered infiltration medium that uses selected organic matter or a blend of selected organic matter and minerals such as sand and soil that are used to physically, biologically and chemically treat contaminated air, soil and water. Treatment is achieved by physically filtering sediments and contaminants, chemically binding contaminants to organic matter and biologically degrading contaminants.



Analyses of stormwater contamination from roads clearly identifies high levels of dissolved pollutants including oil, petrol, metals, nutrients and sediment that are creating a cocktail that is more toxic than untreated sewage. This contamination is spilling into our rivers, creeks and oceans causing substantial environmental damage.

Enabled by a NSW Government stormwater trust grant, the Powells Creek East Catchment Project is a public and private sector partnership (PPP) between Concord Council, Atlantis Corporation and the NSW EPA.

The Concord project demonstrates the use of Advanced Biofiltration Media with the Atlantis infiltration system in an area where the sub-soils are predominantly clay based. The grant project covers the catchment area of five streets in Concord West, Sydney, that run from George Street towards Powells Creek.



The location was selected because of the silting and pollution problems in Homebush Bay, the proximity to the Olympic site and the distributed nature of the catchment, which features a series of small parallel catchments.

The stormwater is treated at the source by the construction of a porous road shoulder consisting of grass cells and turf. The runoff filters through the grass cells and then through the Advanced Biofiltration Media that underlies this porous road shoulder. From there, the runoff is collected in drainage tanks that continue the purification process and divert the water into nearby retention tanks.

This water is then directed to a balancing tank and used to irrigate a nearby landscape area. Excess filtered runoff that can't be stored in the retention tank will either be stored in detention tanks or absorbed into the surrounding soils, if the soil permeability permits, or purified water will be discharged into Powells Creek.

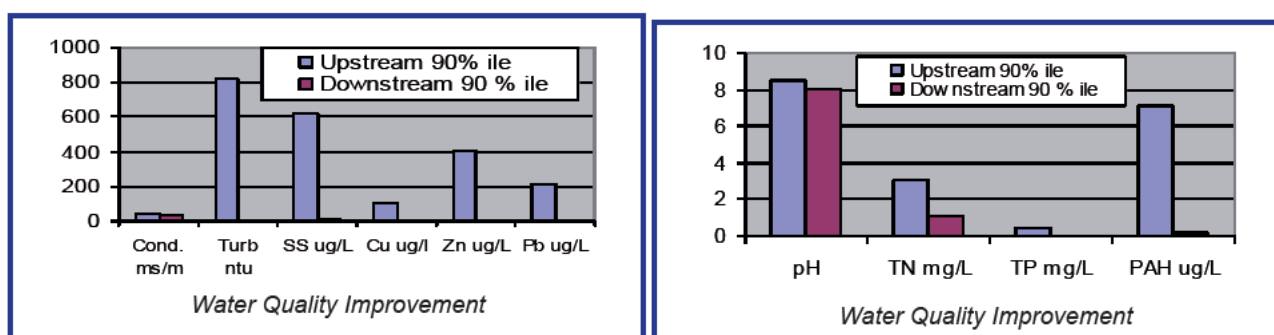
Being an infiltration project on roads in trafficable areas, many civil engineering considerations are incorporated into the design including achieving suitable compaction of the filter medium to maintain the integrity of the road surface, while maintaining optimum infiltration rates.

The system incorporates the extensive use of Advanced Biofiltration Media; a physically and biologically engineered filtration media. Three different engineered Advanced Biofiltration Media formulas are used to suit the specific soil and water conductivity requirements of the particular site. The bio-remediating Advanced Biofiltration Media contain bio-engineered naturally occurring micro-organisms that biologically degrade and remediate toxic chemicals that are the result of daily urban and industrial activities. Through this process, toxic chemicals are transformed into natural and non-toxic elements.

The toxic chemicals treated include PCBS, PAHS, Organophosphates, coal tars, pesticides and herbicides. These toxins are carcinogenic to humans and their accumulation in soils and waterways are major health and environmental concerns. Some heavy metals can also be biologically degraded using Advanced Biofiltration Media.

Councils could save through reduced maintenance and cost of stormwater systems and through the re-use of recycled water for irrigating parks and other areas. Water authorities would save through the reduced consumption of mains water.

Independent monitoring of the water quality was carried out by Australian Water Technologies. The monitoring includes testing stormwater at surface level, as well as after infiltration and storage in the retention tanks. Ten samples were collected during rainfall events over a six-month period. Analysis of the data identifies substantial water quality improvement as shown in the following charts.



## Other Findings

- Estimated annual stormwater reuse volume of 2 ML. (DEC, 2006).
- Estimated annual stormwater pollution loads reduced by 300 kg for suspended solids, 0.5 kg for total phosphorus and 4 kg for total nitrogen (DEC, 2006).

Parameter	Inflow Mean value	Outflow Mean value
Total Zinc ( $\mu\text{g/L}$ )	276	6
Total Lead ( $\mu\text{g/L}$ )	133	1
Total Copper ( $\mu\text{g/L}$ )	75	5
Total Nitrogen (mg/L)	1.97	1.46
Total Phosphorous (mg/L)	0.264	0.057
Faecal coliform (cfu/100 mL)	N/A	94 (range 1-400)
PAH ( $\mu\text{g/L}$ )	3.7	0.6
Turbidity (ntu)	448	42
Suspended solids (mg/L)	291	50

N/A: not available

Table 1. Pollutant removal from filtration device (AWT, 1999)

## Reference for the Study

- AWT (1999) Powells Creek East Catchment Stormwater Quality Scheme, Australian Water Technologies.
- <http://www.environment.nsw.gov.au/stormwater/usp/grants/s1f0099.htm>. Accessed 24 June, 2006.
- DEC (2006) Managing urban stormwater: harvesting and reuse, DEC 2006/137, ISBN 1 74137 875 3.