ROOTZONE AUSTRALIA PTY LTD

Green Technology

ACN 088 034 806

WELCOME TO ROOTZONE AUSTRALIA

We are an Australian company dedicated to the use of Green Technology to improve the Australian environment. Thankyou for taking an interest in our services. Please feel free to contact us with any queries.

GREEN TECHNOLOGY

The intelligent use of naturally occurring processes in a controlled sustainable and environmentally friendly manner to reduce energy consumption, clean up pollution of water, air and land and to conserve natural resources.

Contents

Web: rootzone.com.au • Email: rootzone@rootzone.com.au
PO Box 414, Picton, NSW 2571 • Ph: (02) 4632 7566 • Fax: (02) 4632 7344

ROOTZONE AUSTRALIA PTY LTD

Green Technology

ACN 088 034 806

ABOUT ROOTZONE AUSTRALIA

"An Australian company dedicated to the use of Green Technology to improve the Australian environment."

Constructed wetlands, reed bed filters, subsurface wetlands (all different terminologies for types of artificial wetlands) have been used for water treatment in many applications world wide for decades. They have been used for applications as diverse as sewage treatment, storm water remediation, oil contaminated water treatment, heavy metal and phosphorus reduction in all types of wastewater and for reduction of industrial sludge wastes.

Tony Towndrow

Rootzone technology has widespread applications wherever a lowtech low maintenance approach is desirable to pollution problems. For example, it would have many applications in country areas without access to conventional sewage treatment plants. Newly developed processes and media developed by Rootzone Australia allow the treatment of municipal and domestic wastes to tertiary treatment standards and significantly reduce the area requirement and hence cost of new facilities for water treatment.

The process is essentially a non user of energy relying on natural photosynthesis and biological degradation to achieve its objectives

ROOTZONE AUSTRALIA PERSONNEL

Tony Towndrow General Manager

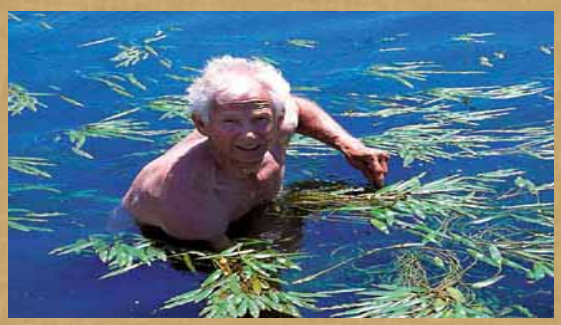
(Bsc Eng Glasgow University)

Geoff Sainty Botanist and wetlands ecology consultant

(Churchill Fellow wetlands management 1973 Dip Agr Wagga 1955) Sainty and Associates

Geoff Hunter Stormwater Consultant

(Grad Dip Env Mgt, Churchill Fellow) Hunter Environmental Services



Geoff Sainty

Web: rootzone.com.au • Email: rootzone@rootzone.com.au
PO Box 414, Picton, NSW 2571 • Ph: (02) 4632 7566 • Fax: (02) 4632 7344

ROOTZONE AUSTRALIA PTY LTD

Green Technology

ACN 088 034 806

GREEN TECHNOLOGY

The intelligent use of naturally occurring processes in a controlled sustainable and environmentally friendly manner to reduce energy consumption, clean up pollution of water, air and land and to conserve natural resources.

WHAT ARE ROOTZONE FILTERS

Rootzone filters are a type of constructed wetland commonly known as subsurface flow wetlands. In the case of Rootzone Australia they utilise a special media unique to the company which enhances the performance relative to other systems commonly using gravel media. They can be either **vertical** filters or **horizontal** filters.

HOW ROOTZONE FILTERS WORK

A reed bed is a live self cleaning biological filter. It removes disease organisms, nutrients, organic load and a range of petroleum related chemicals and other polluting compounds.

The breakdown of contaminants and the treatment of waste water is achieved by the controlled seepage of the water borne pollutants through the root-zone of plants. Organic pollutants are broken down as a food source for the extraordinary variety of micro-organisms that dwell in the soil and plants. Other contaminants such as heavy metals are fixed in humic acid and cation exchange bonds in the soil or mineral substrates in which these plants are rooted.

Above Fredenborg Denmark
Below Oman Desert

The complexity of microbial life forms and the powerful reactions in the rootzone of the plants result in an extraordinary cleansing capacity that adapts to change in a very dynamic way. Reed bed treatment systems comprise self contained engineered ecosystems that utilise particular combinations of plants, soil, bacteria and hydraulic flow systems to optimise the physical, chemical and micro-biological processes present within the rootzone.

There are two types of reed bed filter, **Vertical** and **Horizontal**. Horizontal filters are used in low solids situations and vertical filters in high solids (sludge) situations. In some applications a combination may be used.

The design of systems depends on the specific waste water or sludge characteristics and the required level of treatment. Consequently each project is custom designed according to effluent, flow rates and location. Some systems may combine with the more conventional hi-tech approach.

Web: rootzone.com.au • Email: rootzone@rootzone.com.au
PO Box 414, Picton, NSW 2571 • Ph: (02) 4632 7566 • Fax: (02) 4632 7344

ROOTZONE AUSTRALIA PTY LTD

Green Technology

ACN 088 034 806

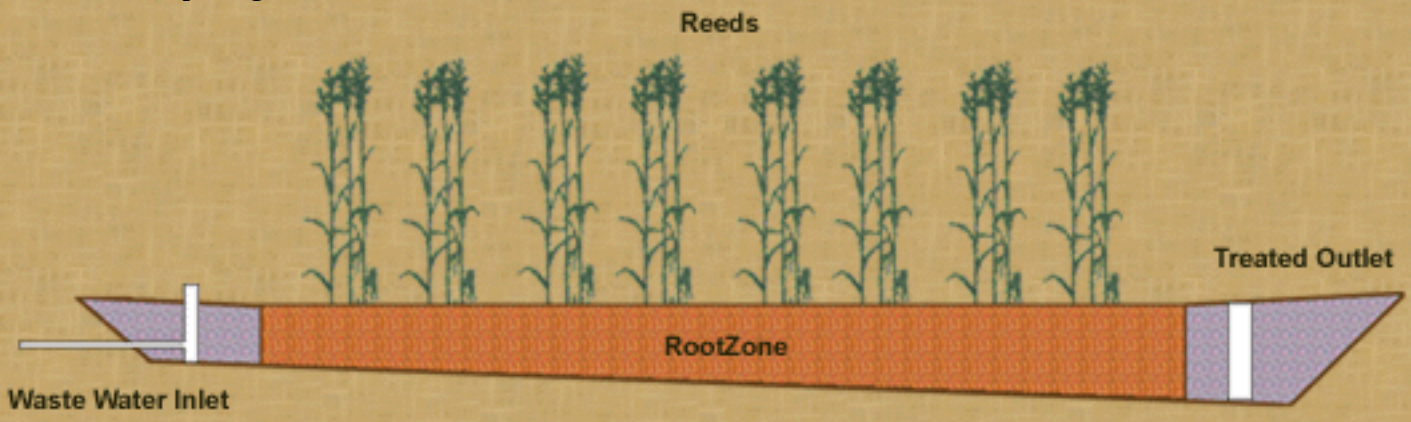
ROOTZONE HORIZONTAL FILTERS

Horizontal subsurface filters (HSF) are able to remove a wide range of contaminants from waste water. The progress of development from a haphazard natural phenomenon to a designed engineering process has continued for around 40 years now and the system enjoys worldwide recognition for it's ability to offer low capital cost, environmentally safe reduction of pollutants to low levels.

In particular wastewater from households, industries and other sources in remote areas can be treated at low cost in this way. The system is also applicable on a much larger scale. Under construction at this moment (2004) is a Rootzone facility treating municipal sewage to the highest standards for reuse as irrigation water for public parklands. The capacity of this system is planned to be 360Kl/day and will cover an area of 2500sqm.

Rootzone Filters have been constructed all over the world for such diverse purposes as wastewater from:

- Oil exploration
- Chemical laboratories
- Soap and pharmaceutical production
- Mining
- Metal plating industries
- Hospitals
- Hotels & motels
- Boarding schools
- Private houses
- Plus many more...



Rootzone Horizontal Subsurface Filter (HSF)

Each design is made to the specific requirements of the project, but standard designs have been developed for more common applications such as domestic waste water.

Web: rootzone.com.au • Email: rootzone@rootzone.com.au
PO Box 414, Picton, NSW 2571 • Ph: (02) 4632 7566 • Fax: (02) 4632 7344

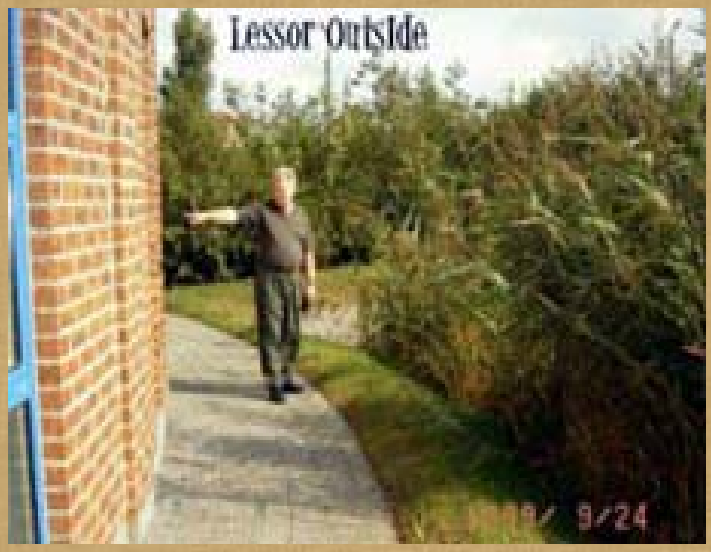
ACN 088 034 806

HORIZONTAL ROOTZONE cont.

Through the design the aim is to optimize the conditions for hydraulics and desired microbial activities, hence through an integrated process of biological and chemical activity, mechanical filtration and sorption processes to remove the desired contaminant compounds.

The same processes as those applied in conventional biological, chemical and mechanical treatment plants are also used in HSFs. The difference is that the processes are integrated in a nature based design, which at the same time delivers buffer capacity in the soil volume, allowing the purification performance to remain constant even in heavy rainfall situations.

Newly started rootzone filter at Lessor Office Systems Copenhagen, completed in 1995. The office building which has been built to the state of the art of ecological construction methods is not connected to either the mains water or the municipal sewage system.



The same view in 1999.All the effluent from the toilets, showers etc is treated in the rootzone at the right of the picture and the treated water is used to water the garden at the back of the picture.

Naturally the energy consumption with this system is negligible. The huge energy requirements for operating the aeration requirements of a conventional biological filter are replaced by the solar driven power of oxygen through the root system of the reeds. (Phragmitis Australis)

Many hundreds of such systems have been constructed worldwide in every climate from the tropics to the north of Europe.

All our systems come with performance guarantees.

Web: rootzone.com.au • Email: rootzone@rootzone.com.au
PO Box 414, Picton, NSW 2571 • Ph: (02) 4632 7566 • Fax: (02) 4632 7344

ROOTZONE AUSTRALIA PTY LTD
Green Technology

ACN 088 034 806

ROOTZONE VERTICAL FILTERS

Vertical reedbed filters have been developed over the past 40 years in Europe as a means of mineralising industrial sludges from many types of industry, in particular oil sector wastes and municipal sewage sludge. Many of these beds have been constructed worldwide. The advantages of this method over others are the low capital cost, low operating cost and the considerable reduction in volume and hence handling costs. In sludge mineralisation beds the dry matter is dewatered and mineralised so that the sludge is reduced to 2-5% of the original amount.

The residue is removed at intervals of 10-20 years. Sludge mineralisation beds utilize the evaporative and aerating capabilities of the wetland species Phragmitis Australis. The design layout is dependent on the dry matter content and volume of the applied sludge.

The bed is built over a polyethylene liner to protect the ground water. In the bottom of the bed a drainage system removes excess and returns it to the waste water treatment plant which may be a rootzone filter or another type of wastewater treatment plant.It is important that the applications are adjusted to the biological activity of the plants in order to obtain maximum volume reduction.

When mineralising organic matter 60-70% of the dry matter is converted to carbon dioxide, oxygen, free nitrogen and partly dewatered soil particles. Part of the released carbon dioxide is assimilated into plants and microbes through photosynthesis.

The reeds remove moisture from the sludge

Rootzone Vertical Reed Bed Filter

The drains remove moisture from the sludge

The sludge layer composts naturally at higher dry matter levels thus converting organic matter into water and carbon dioxide.

Web: rootzone.com.au • Email: rootzone@rootzone.com.au
PO Box 414, Picton, NSW 2571 • Ph: (02) 4632 7566 • Fax: (02) 4632 7344

ROOTZONE AUSTRALIA PTY LTD
Green Technology

ACN 088 034 806

ROOTZONE AUSTRALIA'S DOMESTIC ONSITE SEWAGE MANAGEMENT

Rootzone Australia's system is a patented variation of a system commonly known in Australia as reed bed treatment systems. Relatively unknown in Australia but in operation in large numbers in Europe for over twenty years they have the advantage of almost zero energy useage and extremely low maintenance costs. The principles are simple and readily understood the practice a little more complex.

In the original designs (1980's version) the media used was exclusively soil based but problems with hydraulic capacity coupled with output standards that were not particularly difficult to meet lead to a movement to gravel media which is hydraulically much easier to handle. However the performance of soil based systems, particularly in respect of nutrient removal is far superior and with suitable amendments the hydraulic problems have been overcome.

Rootzone Australia's system is based on an improved process flow incorporating two stages plus an option for a third stage which can be used to further improve performance if required in particularly sensitive areas. It also utilises a novel media, which largely replaces, but not eliminates the soil media. The new media, which is an integral part of the provisional patent, possesses superior qualities both hydraulically and functionally in the process.

The end result is a substantial improvement in the quality of the output while at the same time reducing the area requirement and cost. Rootzone Australia's standard design for a domestic unit has an active area of 20sqm, a total footprint of 40sqm and can handle effluent for up to 8 persons.

Typical output quality is BOD<10 N<15 P<3 suspended solids are <10 and turbidity typically 2-3NTU. The effluent is almost all of the time fully nitrified and capable of disinfection by U/V.

Lower levels could be met by more complex design but are not considered necessary for the vast majority of sites.

Web: rootzone.com.au • Email: rootzone@rootzone.com.au
PO Box 414, Picton, NSW 2571 • Ph: (02) 4632 7566 • Fax: (02) 4632 7344

ROOTZONE AUSTRALIA PTY LTD

Green Technology

ACN 088 034 806

ENVIRONMENTALLY FRIENDLY TECHNOLOGY IN WASTE WATER AND SLUDGE TREATMENT

We have the expertise to design and implement cost effective, ecological engineering solutions that protect your investment and the environment using appropriate technology for the treatment of waste water, runoff and leachates, stormwater treatment and the dewatering and mineralisation of industrial and sewage sludge.

We examine every case on an individual basis to ensure that the best solution is implemented. We take a holistic approach, looking at the source of the pollution and ways to reduce the problem as well as cost effective re-use of the output.

Our Solutions include

- An analysis of your site specific problems and proposals in the form of a feasibility study.
- Preparation of engineering and construction drawings.
- Supervision of construction and commissioning.
- Supply and planting of appropriate species of wetland plants.
- Training of project and client personnel for the commissioning, operation and maintenance of systems including the preparation and supply of manuals.
- Three year maintenance contract and a performance guarantee covering the design, dimensions and operating instructions.

Efficient and reliable treatment for a wide range of effluents and pollutants

Applications Include

- Oil Exploration
- Lubricant Manufacturing
- Petroleum & Oil Distribution
- Steel Making
- Plastics Production
- Chemical Manufacturing
- Car and Train Wash Facilities
- Municipal Sewage and Sludge
- Industrial Sludges
- Dairy Production
- Meat and Poultry Processing
- Fish Processing
- Abattoirs
- Piggeries
- Agricultural Run Off
- Resorts and Caravan Parks
- Mine Water Drainage
- Heavy Metals Removal
- Airport Run Off
- Printing and Paper Industry
- Stormwater Treatment

Web: rootzone.com.au • Email: rootzone@rootzone.com.au
PO Box 414, Picton, NSW 2571 • Ph: (02) 4632 7566 • Fax: (02) 4632 7344

ROOTZONE AUSTRALIA PTY LTD

Green Technology

ACN 088 034 806

Benefits

- Low Capital Costs
- Low Operating and maintenance costs
- No Technical expertise needed to operate
- Environmentally safe and friendly
- Wide range of applications including some that are difficult to treat by any other means

Robust and Effective Treatment

The many natural processes operating within such engineered ecosystems are dynamic and robust. They present a powerful and adaptable cleaning and recycling capacity that is difficult to reproduce mechanically and chemically. Together with the large volume of water in the bed they produce a system that has a remarkably consistent discharge quality in the face of large input fluctuations.

No Byproducts

Rootzone filter bed systems produce no noise or smells and produce no sludge or other by products with associated additional costs of disposal.

Long Lasting with Low Operating and Maintenance Costs

With little or no electrical or mechanical parts, rootzone systems are long lasting, wear free, self regulating eco-systems that are simple to operate without complex controls and chemical additives. The maintenance requirement is low and the system life is very long.

Environmentally Friendly

By investing in reed bed technology companies can not only benefit from these advantages but can also claim to be playing a role in protecting the environment and bringing human activity back into balance with nature.

Thankyou for taking an interest in our Rootzone Waste Water Management Systems
Please feel free to contact us at any time for further information.

Visit us on the web at

www.rootzone.com.au

or

www.greentechnology.biz

Web: rootzone.com.au • Email: rootzone@rootzone.com.au
PO Box 414, Picton, NSW 2571 • Ph: (02) 4632 7566 • Fax: (02) 4632 7344