



# Remove Nitrogen Ecologically with EEG's Engineered Gardens and Landscapes

## WASTEWATER LANDSCAPES™ and STORMWATER LANDSCAPES™

Nutrient pollution is becoming a major problem worldwide. While many technologies can remove pathogens and biological oxygen demand from wastewater, most of them cannot remove nutrients (nitrogen, potassium and phosphorous).

### The Problem

Nitrogen, in the form of nitrate (NO<sub>3</sub>), cannot be removed by conventional aerobic processes. Anaerobic systems have two main drawbacks: They are large and require constant chemical additives, and therefore have high capital and maintenance costs.

### The Solution

Ecological Engineering Group (EEG) has developed a unique vegetated bio-reactor, the Wastewater Landscape™.

Wastewater Landscapes (WL) are optimized subsurface-flow constructed wetlands designed to allow dry recreational uses of the garden. The WL components include lined beds filled with crushed stone or recycled glass and plants selected for function, beauty and hardiness. Supplemental carbon feeding is required during start-up, but as they mature, photosynthesis produces carbon, from atmospheric CO<sub>2</sub>, required by the de-nitrifying microbes.

### Performance Data

Performance of a system currently operating under regulated groundwater discharge permits:

Average influent Total Nitrogen	40 mg/l
Average effluent Total Nitrogen	5 mg/l
Average effluent Nitrate Nitrogen	Less than 2 mg/l

Wastewater Landscapes also achieve remarkable nitrogen loading removal rates of 2.27 kg/1000 cu ft/day or 300 kg/acre/day—versus 3.2 kg/acre/day for conventional



open-water constructed wetlands. This allows a much smaller system where land values are at a premium. EEG's landscape architects will design a Wastewater Landscape to suit clients' aesthetic needs and values.

EEG Wastewater Landscapes can be added as a polishing step to any system, from on-site septic systems to municipal wastewater plants.

Stormwater similarly can be treated to remove hydrocarbons, nutrients and heavy metals by EEG's Stormwater Landscapes™, planted with hardy evergreen shrubbery familiar to local landscapes.

Using specially engineered landscapes to treat difficult wastewater challenges provides double-duty solutions that protect the environment—beautifully.

Call today to discuss your nitrogen removal needs: 1-866-4-ECO-ENG



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