

A Drainable Limestone Bed Constructed in a Botanic Garden¹

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Abstract: A drainable limestone bed (DLB) was constructed on property that is being developed into the Pittsburgh Botanic Garden. Mine drainage discharged at a rate of up to 40 L min⁻¹ with a pH of 3.3 containing 143 mg L⁻¹ of acidity and 16 mg L⁻¹ of dissolved aluminum. A vertical-walled, concrete tank (30.5 m by 6.1 m by 1.5 m deep) was constructed and filled with 408 tonnes of limestone. A concrete tank approach was used to minimize impacts on the surrounding vegetation within a developing area of the Garden. Effluent water quality is consistently very good with a pH of 6.7, over 200 mg L⁻¹ of alkalinity and less than 1 mg L⁻¹ of aluminum. The treated water discharges into what is now called the Lotus Pond which is now stocked with trout, bass and bluegill. This pond has become a focal point in the developing PBG. Aluminum solids are flushed from the DLB (approximately weekly) and directed to a separate pond. Testing during flushing found that over 70% of the accumulated aluminum solids were removed from the DLB during each flush. The DLB has been effectively treating water for over 3.5 years and based on water quality data should not require major maintenance (cleaning the limestone) for several years.

Additional Key Words: Mine drainage, passive treatment, aluminum removal, Pittsburgh Botanic Garden, flushing effectiveness.

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