Appendix 4B-2: STA-1W Cell 5B Limerock Berm Demonstration Project

PRO STA-1 W

December 19, 2002

Mr. Frank Nearhoof, Program Administrator
Water Quality Standards and Special Projects Program
Florida Department of Environmental Protection
2600 Blair Stone Road
Twin Towers, Mail Station 3560
Tallahassee, Florida 32399-2400

Dear Mr. Nearhoof:

SUBJECT: Demonstration Project at Stormwater Treatment Area 1 West
FDEP Permit Number 503074709

In accordance with the Everglades Forever Act and Specific Condition 6 of the referenced permit, the South Florida Water Management District (District) has been evaluating many technologies designed to enhance the phosphorus removal capabilities of the STAs. One of the more promising technologies is submerged aquatic vegetation in association with a limerock berm. The District will be conducting a project to document the ability of a limerock berm to improve treatment effectiveness by improving hydraulic distribution within Cell 5 of STA-1W. A technical description of the demonstration project and schematic representation of the project is attached.

As was the case with previous supplemental technology demonstration projects located within STA-1W, this project will be conducted completely within the boundaries of the STA and should not affect off-site lands. The berm is expected to only have positive effects on the operation and water quality of the STA. During construction activities, shallower depths will be held within Cell 5 to facilitate the installation of the berm. This may result in short-term diversion of inflows via the G-300 and G-301 structures. It is anticipated that construction activities will begin in February 2003 and last about six (6) months. The District will keep a record of diversions occurring during construction and report them to the Department. Water quality monitoring as required by the referenced permit will continue throughout the course of and following completion of the project.

Should you have any questions regarding this notification, please contact Gary Goforth at Suncom 229-6280 or Ron Bearzotti at Suncom 229-6291.

Sincerely,

Sharon M. Trost, P.G., AICP, Deputy Department Director
Operations Control Department

SMT/rb

c: Temperince Morgan/DEP/Tallahassee
Mark Musaus, Manager, A.R.M. Loxahatchee National Wildlife Refuge

Attachment

LIMEROCK BERM IN CELL 5 OF STA-1W

In accordance with the Everglades Forever Act, the South Florida Water Management District (District) has been evaluating many technologies designed to enhance the phosphorus removal capabilities of the STAs. One of the more promising technologies is submerged aquatic vegetation followed by a limerock berm (SAV/LR). Investigations of SAV/LR to date have shown that limerock berms may contribute to transformation of particulate phosphorus to SRP that is subsequently removed by downstream plant communities. It is possible that a combination of vegetation types with strategically placed limerock berms could be used to maximize phosphorus reduction to the lowest levels possible. While the specific physical, chemical, and biological processes involved in these transformations remain undefined, the results to date have been promising enough to warrant full-scale implementation. Such limerock berms may also provide hydraulic benefits similar to that forecast for cells in series by redistributing the water flow across a treatment cell. Full-scale implementation is needed to evaluate the TP removal capacity of SAV/LR systems under realistic environmental conditions.

With funding received from the Florida Department of Environmental Protection, the District is preparing to construct a shallow limerock berm within the footprint of Cell 5B of STA-1W (see Figure 1). The objective of the project is to demonstrate and document the ability of a limerock berm to contribute to improved treatment effectiveness by improving hydraulic distribution within a treatment cell and by filtration and transformation of recalcitrant organic phosphorus. In addition, the project should contribute information regarding the utility of compartmentalization, created by a full-scale limerock berm, in enhancing phosphorus removal effectiveness of an STA treatment cell. Projects to date have attempted to address the benefits of improved hydraulics in terms of improved treatment performance, but these have largely consisted of correlation of treatment performance with residence time demonstrated through tracer projects.

Recognition of "non-ideal" flow characteristics, as documented by full-scale tracer projects has led to most treatment wetlands being designed with a means of evenly distributing the influent across the entire width of the wetland. Once water enters the wetland, however, flows coalesce into small rills, which then combine to create large short-circuiting channels. These flow channels typically remain intact until the water is redistributed by structural means. Both deep channels and earthen berms perpendicular to flow have been used to redistribute water in wetlands. However, neither rational design parameters nor performance benefits for these structural modifications have been rigorously characterized. Presently, each of the STAs is configured with several large cells (in some cases exceeding 2,000 acres in size) with minimal compartmentalization. This project is intended to demonstrate the benefits of improved hydraulics through compartmentalization at full scale. Cell 5B is approximately 2.5 miles in length with an area of approximately 2,300 acres.

Figure 1. STA-1W Structures & Flow*

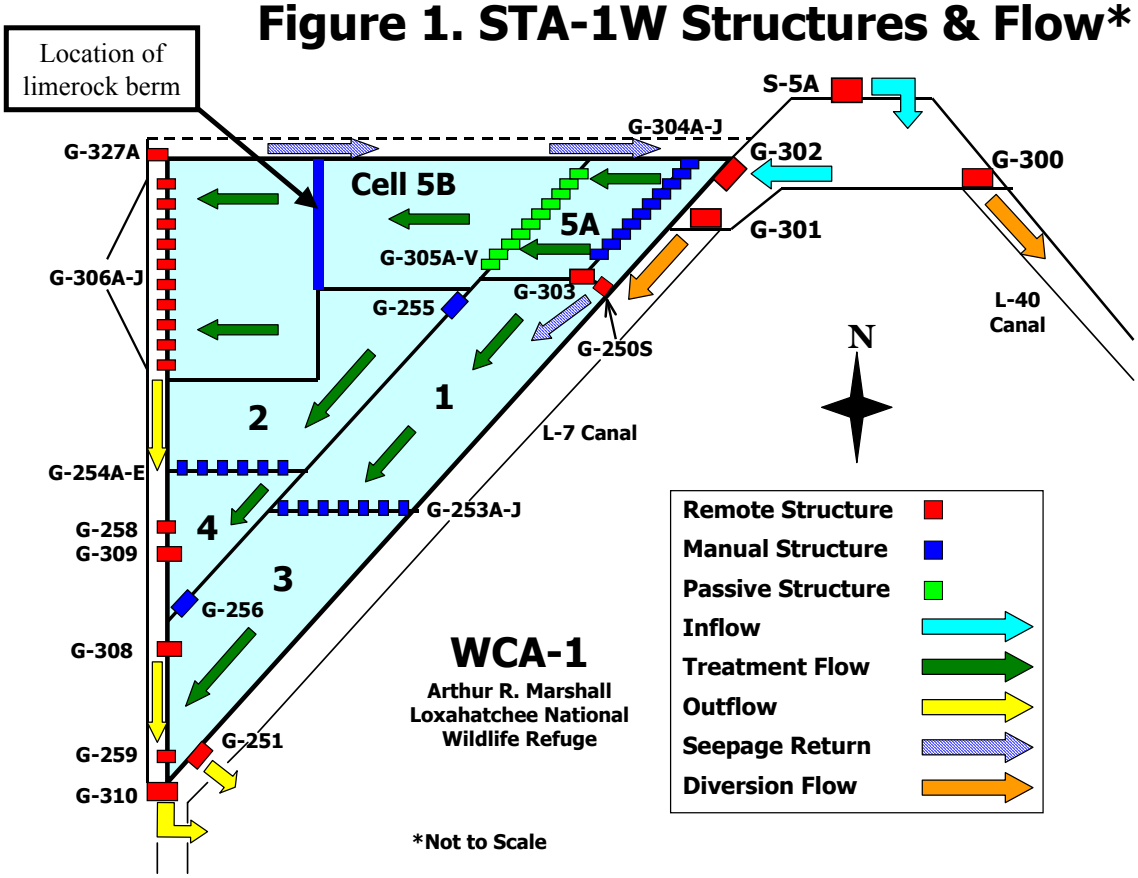

Figure 2. Generalized cross section of limerock berm

(Not to scale)