Water Quality Technical Memo Addendum

PACIFIC ADVANCED CIVIL ENGINEERING, INC.

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MEMORANDUM

DATE: **August 10, 2007**

TO: **Minta Schaefer– Impact Sciences, Inc.**

FROM: **Jonis C. Smith, P.E. – PACE**

RE: **Master's College Water Quality Technical Memo Addendum**

#8360E

The following discussion is intended to provide additional information regarding the vegetated swale BMPs and extended detention basins spillways proposed for the Masters College site.

Vegetated Swales

There is great flexibility in the design of the vegetated swales. Generally vegetated swales are lined with a fescue type grass that acts as the primary water quality treatment mechanism. However, it is not a requirement to only utilize fescue type grasses as the vegetation for the swales. There are a great many plants, ground covers, shrubs, trees, or combinations thereof that will provide effective BMP treatment in a vegetated swale. Vegetated swales are open, shallow channels with vegetation covering the side slopes and bottom that collect and slowly convey runoff flow to downstream discharge points. They are designed to treat runoff through filtering by the vegetation in the channel, filtering through a subsoil matrix, and/or infiltration into the underlying soils. Swales can be natural or manmade. They trap particulate pollutants (suspended solids and trace metals), promote infiltration, and reduce the flow velocity of stormwater runoff. Vegetated swales can serve as part of a stormwater drainage system and can replace curbs, gutters and storm sewer systems. If properly designed, vegetated, and operated, swales can serve as an aesthetic, potentially inexpensive urban development or roadway drainage conveyance measure with significant collateral water quality benefits. The vegetated swales can contain features that partially obstruct flow such as berms, large decorative boulders/rocks, tree trunks, light standards, etc. These partial obstructions in many cases would be a benefit to the treatment capacity of the vegetated swale by causing a backwater or pooling affect in the swale cross section. This would cause the flow velocity in the swale to be reduced and allow for additional pollutants to fall out of suspension and greater static head for absorption or percolation into the soil matrix. The obstructive elements and swale should be designed to allow for flows to bypass the object without overflowing the top of bank of the swale system. Figure-01 on the attached document shows a typical Parking Lot Vegetated Swale configuration with fescue type grass as the vegetation and utilizing trees and/or light standards as partial obstructions to the flowline of the swale. This configuration would prove to be effective in the treatment of typical parking lot storm runoff pollutants (heavy metals, debris, hydrocarbons, etc.)

Basin Spillways

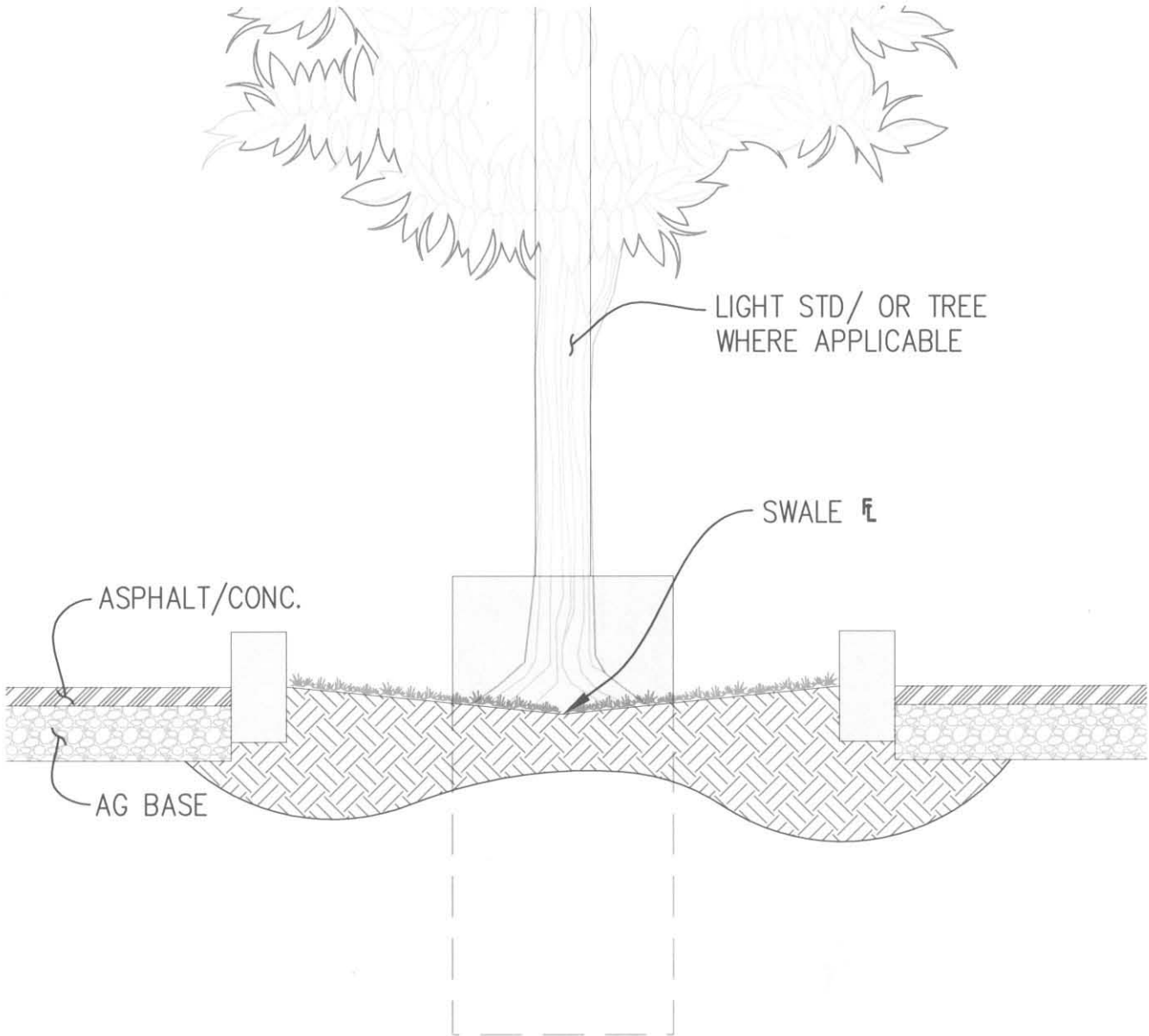
Each Extended Detention BMP Basin proposed as a part of the Masters College Water Quality management plans must include an emergency overflow spillway. The spillway can take one of many different forms. Some of the typical emergency spillways are 1) trapezoidal overside berm spillway, 2) secondary riser spillway, 3) chutes and drop inlets. Each of these spillways have their application advantages and disadvantages. However, the basic function to convey or discharge the maximum peak flowrate out of the basin with little or no damage to the basin and to prevent overtopping of the basin remains similar for each. Spillways can be imperceptible depressions in the basin embankment with or without armoring or they can be hard lined with obvious limits. The linings and construction materials can very for each basin spillway depending on many factors. The basins shown in the Masters College BMP basin configurations were shown as overside berm spillways. These could be replaced with different type of spillway that would meet the same design requirements of the spillways selected for this preliminary study. Photos of the typical basin spillways discussed in this document are shown below.

Figure-2 Typical concrete lined trapezoidal overside spillway

Figure-3 Typical soft lined (TRM) trapezoidal overside spillway

Figure-4 Chute / Drop Inlet type spillway set in the slope of a basin.

Figure-5 Chute / Drop Inlet type spillway set in the slope of a basin.



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SCALE	NTS
DESIGNED	J.S.
DRAWN	E.N.
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MASTERS COLLEGE

PARKING LOT
VEGETATED SWALE

FIGURE
01