Dear Mr. Livingston,

We are offering these comments on the New Statewide Stormwater Quality Rule and the Handbook that was posted on your site in March. We have focused our comments on the "big picture" rather than on the details since we understand that many of the details such as the performance of specific best management practices (BMP's) are still being researched. We understand the background of the proposed rule making and we recognize the need to reduce nutrients in Florida's surface waters. We do not think the approach that is applied in the draft rule and handbook is the best means to accomplish that goal. The draft handbook is based upon pollutant loadings that probably have some validity at a watershed or neighborhood scale but aren't particularly relevant to design at the site level as we will explain further.

The fundamental premise within the draft manual is that "land use" defines the concentrations of pollutants in the stormwater runoff. This proposed approach to regulation of nutrient discharges is flawed. By your department's own admission at the Orlando public meeting and in past correspondence addressed to the Tampa Bay Estuary Program, the principal source(s) of nitrogen has not been definitively identified (and in fact there are contradictory studies within the literature). Without detailed knowledge of the source of the nitrogen it isn't possible to produce a manual that address the problem in a focused and cost effective manner. BMP's are most effective in removing pollutants when applied to sources with high concentrations. Therefore it is important to know which site surfaces (rooftops, pavements, or landscaped areas) produce the highest pollutant concentrations in order to apply the "treatment train" BMP's selectively for greatest benefit.

We have been directed to use the draft manual by SWFWMD staff in order to demonstrate "net improvement" on recent environmental resource permit applications. In this process we have become aware of some of the shortcomings of the draft manual. For example a drainage subbasin within a given site comprised of 10% green space and 90% rooftop produces exactly the same nutrient concentrations as one where the percentages are reversed. That doesn’t pass the common sense test since it is obvious that the green space and rooftop would not produce identical water quality.

There are numerous other ways of demonstrating the fallacy of the "land use determines pollutant concentration" approach taken in the draft handbook. The rainfall that runs off of a tile roof in a commercial development is assigned a different pollutant concentration than runoff from the identical tile roof material in a multifamily residential development. Similarly, the concentration of nutrients in the rainfall deposited on lake surfaces is assigned the value of the proposed "land use" of the respective site. Obviously the atmospheric concentrations of nutrients within a given geographic area will be the same for any land use since atmospheric conditions are consistent across property lines. The concentrations within the rainfall will not differ with the "land use" which is typically defined by the use of floor space within the buildings.

The obvious solution is to start over and set aside the flawed assumption that "land use" defines stormwater runoff quality. A system that assigns stormwater quality to respective surfaces would help design firms such as ours take measures to both minimize the pollutant concentrations generated and to apply BMP's selectively to target runoff from the surfaces producing the greater portion of the respective pollutant. For example, one of the Low Impact Design techniques that is advocated in the literature is to allow roof downspouts to spill out onto the lawn surface rather than to be hard piped to a site storm sewer system (which in our regulatory environment would typically outfall to a "wet pond" on the site). If lawns are found to be the principal source of nutrient concentration in stormwater this practice may not make sense since nutrients from the lawn areas might be more frequently "flushed" into the adjacent paved areas if the roof downspouts are directed into lawn areas. A better design might be to depress the lawn areas to infiltrate a greater fraction of the rainfall falling on the lawn footprint itself. There is no rational means to make these fundamental design judgments if the broad brush of "land use" is the only prediction of pollutant concentrations.

An analogy might be in order to further explain this point. When we are tasked with estimating the peak runoff rate of stormwater runoff from a proposed development site we typically utilize the methodology from Technical Release 55 (TR-55) to estimate the hydrologic characteristic of respective surfaces and soil types. A curve number (CN) appropriate for each respective existing surface is assigned. These CN's are then "weighted" by area to produce an appropriate overall "composite" or "weighted" CN for a site. This weighted CN is then used in the calculation of existing site runoff. The net effect is that a grassed site may produce a peak runoff of one cubic foot per second per acre while a largely paved site may produce four cubic feet per second per acre. If we were to address the allowable rate of site runoff with the same broad brush that is being proposed for regulation of nutrients we would just use one number to determine the allowable rate of runoff for a respective "land use" without regard to the respective predevelopment impervious site coverages. A multifamily site might be assigned 3.5 cubic feet per second per acre no matter whether it is 30% impervious or 70% impervious. Of course we don't do that since we know that high rate and volume of runoff is attributable to impervious surfaces so we take the "weighted" CN approach. A similar approach could be developed to address the generation and removal of pollutants (as a means to correct for the obvious flaws we noted above).

The "land use determines water quality" approach is extremely fatalistic in that it relies on the fundamental assumption that there is nothing the designer can do to prevent the stormwater from becoming polluted to the concentration levels listed for the various land uses. So a designer would not see any benefit from covering all the vehicular parking areas even though common sense would suggest that the covered parking scenario would produce less pollution with regard to most if not all parameters. Under the proposed draft manual, the concentrations of pollutants in the runoff would be the same whether parking is covered or not since the "land use" determines the concentrations.

In fact the manual as written could penalize a designer for measures taken to prevent water from becoming polluted. Since the standard in the manual is an 85% reduction of the pollutants generated, the necessary investment in BMP's would actually increase if a numeric analysis determines the stormwater being produced from a specific site is of lower pollutant concentration than the values listed in the manual for the respective land use. If the 85% reduction is to be achieved based upon the "untreated" concentration produced, it would be necessary to include more BMP's to achieve the 85% removal since the efficiency of any respective BMP is reduced when the influent flow has lower pollutant concentrations.

The "land use determines water quality" approach also does not relate well to Low Impact Development (LID). Under LID the distinction between the stormwater source area that requires downstream treatment and the BMP that provides treatment is thoroughly blurred since BMP's such as pervious pavement, green roofs and bioswales can easily comprise a majority of the site area (leaving little of the site to be identified as the source). The classic regulatory approach of routing a source area through a BMP or several BMP's in order to "clean up" a source area just doesn't fit with LID. The numerous LID elements distributed throughout the site serve as both the source area and the BMP.

Any regulatory approach that is designed to reduce nitrogen in the receiving water should start with the concentrations found in rainwater. Computational techniques should be developed that increase or decrease this atmospheric value depending on the surfaces encountered or BMP's applied prior to discharge from the site. Another alternative would be to simply regulate the volume of runoff and make the assumption that the minor differences in concentrations based on land use that are reflected in such literature searches as that produced by Harper do not warrant all these calculations. In addition the relatively small number of sites that comprised the overall sampling and the sometimes counterintuitive values for the respective "land uses" support a simplification.

A new regulatory approach and mentality must replace the old. Stormwater rules have for many years required an efficient conveyance system (with required minimum levels of service expressed as maximum depths of ponding) designed to drain stormwater to the "bottom of the hill" where all the treatment and attenuation is performed in a terminal wet pond. Even ponds provided along the way have been commonly discounted as being of little or no water quality value due to the issue of downstream

"commingling" also sometimes referred to as "cascading lakes". If LID is to flourish this paradigm must be replaced.

In the course of performing numeric nitrogen loading calculations we have noted that both the 85% reduction and the "native vegetative community" standards will greatly reduce the area of sites that can be developed for the intended uses. In other words the areas that will need to be set aside for stormwater treatment will be vastly greater than under current ERP rules. This will have the effect of reducing density, promoting sprawl, and increasing development costs (or some combination thereof). Other areas of development regulation do not take the philosophical approach that is proposed in the manual, which is to roll back the impact of development to the native vegetative community pollutant loadings in locations of water quality impairment.

For example the traffic generated by an existing site is typically viewed as an entitlement when redevelopment is proposed. The redeveloper is responsible for mitigating the impact of additional traffic that is proposed but not for the traffic currently generated. This is true even if the adjacent roadway system is above capacity (which would correlate to the designation of an impairment in the stormwater field). The same is true for potable water use in most jurisdictions. Impact fees are paid only on the proposed increase in water consumption. Existing usage is viewed as an entitlement since it is an existing legal use. This is the case even though a reduction in traffic and potable water consumption would be desirable from an environmental perspective.

The proposed rule and handbook, by requiring such a demanding "retrofit" to prehistoric conditions, imposes the highest conceivable standard for stormwater within areas of impairment. That approach can be expected to stifle the rate of redevelopment and "lock in" current levels of pollutant discharges to a greater extent than would be the case if a more pragmatic approach were taken. For example in Sarasota we have numerous decaying urban properties that are ripe for redevelopment. Redevelopment of these properties is not feasible under our economic conditions even prior to adoption of the proposed rule. It is entirely conceivable that progress on stormwater quality will actually be slowed by the proposed rule due to an adverse impact on the rate of redevelopment.

Redevelopment is highly attractive from many environmental and economic development perspectives. These include reduced demands on public infrastructure when viewed on a per capita basis. Compact form of development is the foundation of new urbanism, green building, LEED Neighborhood Development, walkable communities, context sensitive streets, and a host of other forward looking standards and movements. The accommodations made for redevelopment in the handbook are far too weak. When one considers the total benefits of redevelopment (including an enhanced tax base that can finance such items as retrofit of public roadway runoff) a better standard may be the simple "net improvement" standard that has been the policy of the Southwest Florida Water Management District since October of 2008.

Case Studies;

We calculated the required retention volume for a case study project under various development scenarios. The case study project we used was a typical single family residential project in a nutrient impaired WBID (Water Body Identification Number), and in meteorological zone 4 (Sarasota County) with a 30% DCIA and a non-DCIA CN of 85. The draft handbook requires nutrient discharge be limited to that which would have discharged from the site under the "native vegetative community" condition. We noted that there is a big difference in the Natural Vegetative Areal Loading Rates for TP and TN for Group 1 or Group 2 (table 3.2). If the pre-developed project area is deemed to be in Group 1 for TN it basically renders a site undevelopable. Both scenarios result in much less developable area than under current ERP rules.

The first scenario we calculated assumed the project was in Group 2 for both TN and TP. This scenario required an annual reduction removal of approximately 89.5%. Assuming a wet detention pond with a

200-day residence time this scenario requires an 81.5% efficient dry retention pond. Using Appendix E in the draft handbook a dry retention pond capable of retaining and recovering 1.30" over the 40-acre basin area is required. The required 1.30" of retention is approximately 190,000 cubic feet of storage. This would require approximately a 9-acre dry retention pond assuming a 6" depth or approximately a 13-acre dry retention pond assuming a 4" depth. Actual retention depth would be determined pursuant to groundwater mounding calculations.

The second scenario we calculated assumed the project was in Group 1 for both TN and TP. This scenario required an annual reduction removal of approximately 98.6%. Assuming a wet detention pond with a 200-day residence time this scenario requires a 97.6% efficient dry retention pond. Using Appendix E in the draft handbook a dry retention pond capable of retaining and recovering approximately 4.00" over the 40-acre basin area is required. The required 4.00" of retention is approximately 600,000 cubic feet of storage. This will require approximately a 28-acre dry retention pond assuming a 6" depth or approximately a 40-acre dry retention pond assuming a 4" depth. In other words the project site is virtually consumed by the stormwater management requirements.

The typical geologic condition within our area limit the depth of storage in the dry retention ponds if they are to recover in 72 hours. We used the 6" and 4" of retention depths in the dry retention ponds based on our experience with drawdown software and pond geometries. These calculations demonstrate that the "set aside" stormwater management areas will be extensive under the handbook. As we noted above this should be reconsidered due to the collateral negative impacts to land use densities.

A thorough vetting of the draft manual through case studies is needed and such an effort is beyond the scope of this brief summary. An economic impact analysis and study of potential unintended consequences is also recommended.

Please note that these comments are principally mine (the case studies were performed by Scott McKenna) although our engineering staff have discussed these matters at length and we share many of these concerns. Of course my comments in all likelihood do not represent a consensus. I'm sure you can relate to a diversity of view points having been involved in this rule making. We will continue to contribute based on our years of practice in this area.

Thank you for the opportunity to comment. We would appreciate the opportunity to go over our comments in more detail.

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