**Section 373.APPENDIX D Model Limitations**

The Modified Streeter-Phelps Equation used in this Part should not be construed as a precise predictive model but rather as a means of demonstrating adequate receiving stream assimilative capacity under estimated worst-case conditions. Even for a general application of this type, there are inherent limitations to the model that will preclude its utilization in some instances.

The modified Streeter-Phelps Equation constitutes a steady state, one dimensional model and as such is limited in its application to free flowing stream systems that can be reasonably well represented as steady state, one dimensional systems. Once mixing of the wastewater discharge and natural stream flow is accomplished, there should be minimal vertical or lateral variation (throughout a given stream cross section) of key factors such as waste concentration, temperature, and carbonaceous and nitrogenous bacteria population density. In most free flowing streams in Illinois (even with predominantly pool/riffle morphology) this should not be a limitation. However, lakes, ponds, stream segments impounded by man-made structures or natural impediments, streams with unstable channel characteristics, swamps and marshes are all examples of systems that may not be successfully modeled with the Modified Streeter-Phelps Equation. Likewise, systems with wide variations in temperature, flowrate or organic loading may not reach a steady state condition conducive to model application. The applicant should be aware of these limitations when applying the model to a particular situation.