Continuous analysis of stormwater quality control ponds with derived probability models

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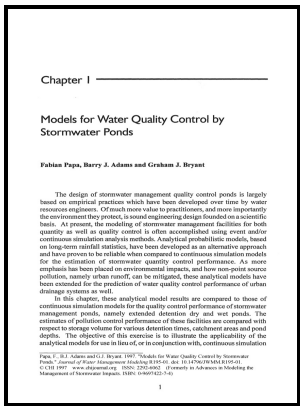

Chapter 1

Models for Water Quality Control by Stormwater Ponds

Fabian Papa, Barry J. Adams and Graham J. Bryant

The design of stormwater management quality control ponds is largely based on empirical practices which have been developed over time by water resources engineers. Of much more value to practitioners, and more importantly the environment they protect, is sound engineering design founded on a scientific basis. At present, the modeling of stormwater management facilities for both quantity as well as quality control is often accomplished using event and/or continuous simulation analysis methods. Analytical probabilistic models, based on long-term rainfall statistics, have been developed as an alternative approach and have proven to be reliable when compared to continuous simulation models for the estimation of stormwater quantity control performance. As more emphasis has been placed on environmental impacts, and how non-point source pollution, namely urban runoff, can be mitigated, these analytical models have been extended for the prediction of water quality control performance of urban drainage systems as well.

In this chapter, these analytical model results are compared to those of continuous simulation models for the quality control performance of stormwater management ponds, namely extended detention dry and wet ponds. The estimates of pollution control performance of these facilities are compared with respect to storage volume for various detention times, catchment areas and pond depths. The objective of this exercise is to illustrate the applicability of the analytical models for use in lieu of, or in conjunction with, continuous simulation

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Why discretize continuous models?

Data types include nitrogen sources and loads for coastal watersheds and estuaries, including atmospheric deposition, point source loads and nonpoint source loads as well as response endpoints, such as seagrass and chlorophyll a.

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This reduced frequency of observed first flushes in areas most likely to have first flushes is probably associated with the varying rain conditions during the different events, including composite samples that did not represent the complete runoff duration. It allows users to represent combinations of green infrastructure practices to determine their effectiveness in managing runoff. This model also calculates cancer risks posed by carcinogenic species.

Yiping Guo

These estimates are calculated using available data such as dietary consumption surveys; human activity from the Consolidated Human Activity Database CHAD ; and observed or modeled levels in food, water, air, and on surfaces like counters and floors. Part of the Mimico Creek basin crosses the Etobicoke boundary with a neighbouring municipality the City of Mississauga where the data standards are not the same as in Etobicoke or the new City of Toronto.

4 Monitoring and Modeling

Optimization of a Stormwater Quality Management Pond System. An off-shore flow balancing system Aquafor, 1994 requires specific environmental conditions in the receiving waters of the watershed. It requires the use of very small volumes of organic solvent and very small quantities of pure analytes, thereby minimizing potential hazards to both the analyst and the environment as compared to the use of large volumes of organic solvents in conventional liquid-liquid extractions.

Optimization of a Stormwater Quality Management Pond System

Metals were higher when time-based compositing was used in residential and commercial land-use areas. This is due to the medians underrepresenting the larger concentrations that are expected to occur.

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