
Modeling Low Impact Development Alternatives with SWMM

Lewis A. Rossman

The U.S. Environmental Protection Agency's Office of Water is actively promoting the use of low impact development (LID) practices to help protect and restore water quality in urban and developing areas. Such practices support the concepts of green infrastructure and sustainability by managing stormwater close to its source so as to mimic a site's predevelopment hydrology. Computational tools are needed to objectively evaluate the hydrologic benefits of proposed LID controls. The Storm Water Management Model (SWMM) is one such tool that provides an attractive framework for modeling the long term performance of LID controls. However the latest version of SWMM (Rossman, 2008) has only a limited capability to rigorously model LID alternatives (Huber et al., 2006).

This chapter describes how SWMM's runoff engine and graphical user interface were extended to explicitly model specific types of LID controls, such as permeable pavement, bio-retention areas (e.g., rain gardens and street planters), rain barrels, infiltration trenches, and vegetative swales (see Figure 11.1). Each of these controls is represented as a unique LID object with its own set of properties. These objects can be placed within standard SWMM subcatchment areas in replicate fashion. Or they can occupy their own unique subcatchments that can be linked together to form a cascading sequence of LID controls. Time-dependent water balance models are used to describe the hydrologic performance of each individual LID unit. Several examples are used to illustrate how this approach was implemented within SWMM 5.

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Computer-Aided Modelling of Stormwater Systems Bartosz Szeląg, Adam Kiczko, Grzegorz Łagód, Marek Sokáč, Yvetta Velísková, Cecilia Bruni, Francesco Fatone, 2025-11-26 Computer Aided Modelling of Stormwater Systems deals with the construction of probabilistic models of rainfall and their use in the sizing of retention tanks The book discusses methods of sensitivity and uncertainty analysis of hydrodynamic models of urban catchments as well as proprietary calculation algorithms for the sizing of retention tanks considering the uncertainty of calibrated parameters and the variability of outflow hydrographs from the catchment and shape parameters This is important from the point of view of contemporary hydrology of urban catchments because it is the reliability of the identified parameters and their appropriate selection that determines the developed hydrodynamic model of the catchment so that it finds a practical application in sewage network management Also included are innovative graphical and analytical methods of tanks sizing whereby the shapes of hydrographs of the outflow from the catchment area are considered which is omitted in most of the methods used Hybrid models which are a combination of graphical and analytical methods with probabilistic models of rainfall are also presented which makes it possible to shorten the calculation time Finally the ability to implement computational algorithms in the field of sensitivity and uncertainty analysis can also be used when analysing catchments with implemented green infrastructure facilities Computer Aided Modelling of Stormwater Systems is aimed at doctoral students research workers and engineers as an introduction to modern methods of modelling stormwater and combined sewer networks together with the objects located on it such as retention tanks The Open Access version of this book available at <http://www.taylorfrancis.com> has been made available under a Creative Commons Attribution Non Commercial No Derivatives CC BY NC ND 4.0 license

New Trends in Urban Drainage Modelling Giorgio Mannina, 2018-08-31 This book addresses the latest research advances innovations and applications in the field of urban drainage and water management as presented by leading researchers scientists and practitioners from around the world at the 11th International Conference on Urban Drainage Modelling UDM held in Palermo Italy from 23 to 26 September 2018 The conference was promoted and organized by the University of Palermo Italy and the International Working Group on Data and Models with the support of four of the world's leading organizations in the water sector the International Water Association IWA International Association for Hydro Environment Engineering and Research IAHR Environmental Water Resources Institute EWRI ASCE and the International Environmental Modelling and Software Society iEMSs The topics covered are highly diverse and include drainage and impact mitigation water quality rainfall in urban areas urban hydrologic and hydraulic processes tools techniques and analysis in urban drainage modelling modelling interactions and integrated systems transport and sewer processes incl micropollutants and pathogens and water management and climate change The conference's primary goal is to offer a forum for promoting discussions amongst scientists and professionals on the interrelationships between the entire water cycle environment and

society *Engineering Geology for a Habitable Earth: IAEG XIV Congress 2023 Proceedings, Chengdu, China* Sijing Wang, Runqiu Huang, Rafiq Azzam, Vassilis P. Marinou, 2024-08-27 This book collects the selected papers of the XIV Congress of the International Association for Engineering Geology and the Environment held in Chengdu Sichuan China from September 21st to 27th 2023 with the theme of Engineering Geology for a Habitable Earth The meeting proceedings analyses the dynamic role of engineering geology in our changing world The congress is expected to enhance the interdisciplinary research development of international engineering geology and the environment and contribute to the advancement of major projects ecological progress and habitable earth with in depth discussion in the area of engineering geology and global climate change geological hazard assessment and prevention geotechnical properties of rock and soil mass engineering geology and the environmental issues concerning marine transportation urban and ecological environment protection engineering geology and resilience engineering construction intelligent engineering geology and new theories methods and techniques in engineering geology Urban Drainage Modeling Robert W. Brashear, Ć Maksimović, 2001 This collection contains 91 papers presented at a specialty symposium on urban drainage modeling at the World Water and Environmental Resources Congress held in Orlando Florida May 20-24 2001 **Individual Lot On-site Stormwater Detention** Darrien Yau Seng Mah, Johnny Ong King Ngu, 2017 *Watershed Management* Michael A. Ports, David W. Renetzky, 2004 This collection contains more than 25 papers by invited speakers presented at the Third International Conference on Watershed Management held at National Taiwan University Taipei Taiwan December 11-14 2001 Handbook of Applied Hydrology, Second Edition Vijay P. Singh, 2016-03-07 Fully Updated Hydrology Principles Methods and Applications Thoroughly revised for the first time in 50 years this industry standard resource features chapter contributions from a who's who of international hydrology experts Compiled by a colleague of the late Dr Chow Chow's Handbook of Applied Hydrology Second Edition covers scientific and engineering fundamentals and presents all new methods processes and technologies Complete details are provided for the full range of ecosystems and models Advanced chapters look to the future of hydrology including climate change impacts extraterrestrial water social hydrology and water security Chow's Handbook of Applied Hydrology Second Edition covers The Fundamentals of Hydrology Data Collection and Processing Hydrology Methods Hydrologic Processes and Modeling Sediment and Pollutant Transport Hydrometeorologic and Hydrologic Extremes Systems Hydrology Hydrology of Large River and Lake Basins Applications and Design The Future of Hydrology **Methodology for Evaluating the Impact and Abatement of Combined Sewer Overflows**, 1980 *Water Resources Journal*, 2000 *California Nonpoint Source Encyclopedia*, 2005 *Draft Environmental Impact Report: Environmental impacts and mitigation measures, and alternatives* EIP Associates, 1996 **Safety Science Abstracts**, 1975 Water Pollution Research in Canada, 1976 Includes the proceedings of the Canadian Symposium on Water Pollution Research and additional related papers submitted to but not presented at the Symposium vols for 1977-1979 incorporate papers presented at the newly founded Eastern

Division Symposium Selected Water Resources Abstracts ,1991 Water Research ,1975 Government Reports
Announcements & Index ,1988 Low-impact Development ,2000 **Applying Low Impact Development Strategies to**
High Density Residential Area Tiantian Fan,2015 plans with different spatial pattern in the present study a high density
residential area in Miami is chosen as the study site and four scenarios including predevelopment scenario existing scenario
and two Low Impact development scenarios with different spatial pattern are simulated by using Storm Water Management
Model SWMM **EPA Publications Bibliography** ,1983 **Government Reports Annual Index** ,1981

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