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Modified models for better prediction of infiltration rates in trapezoidal permeable stormwater channels

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In stormwater management, it is important to accurately quantify the infiltration rates to solve urban runoff-related problems. This study proposes a method to improve estimates of the infiltration rate in permeable stormwater channels. As part of the analysis, five infiltration models were evaluated: the Kostiakov, Horton, modified Kostiakov, Philip and SCS (Soil Conservation Service) models. Infiltration tests with various initial water levels were performed on channel models with differing base width and side slopes. The results show that the addition of three parameters that describe the trapezoidal crosssectional area, i.e. the depth, side slope and base width, in the infiltration models yielded better estimates of the infiltration rate. A comparison of the infiltration capacity values obtained from the models after the three parameters were added with those that were experimentally obtained, shows that the improved modified Kostiakov model is the most suitable model to predict infiltration rates in trapezoidal permeable stormwater channels.