

APPLICABILITY OF URBAN STREETS AS TEMPORARLY FLOOD WAYS

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ABSTRACT

Climate change coupled with urbanization and its increasing impervious surfaces have caused major challenges for the water sector worldwide. In Norway an ageing infrastructure with already insufficient drainage capacities result in large amounts of runoff during high intensity rainfall events causing frequent floods in urban areas. Due to limited available space to handle the future projected increase in stormwater, there is a need to utilize already occupied space for stormwater management, such as roads and streets, during extreme events. Limited research has been done on the design and applicability of urban streets as temporarily flood ways diverting stormwater to the nearest recipient. This paper will study the benefits and limitations of adapting urban streets as safe flood ways to route stormwater by modelling the effect of different street design. The study uses a case from Bergen, a city on the west coast of Norway, where steep hillsides and a wet coastal climate makes it prone to flash flooding. Urban streets in Norway are required to secure universal design for accessibility while fulfilling functional design criteria for traffic safety. Streets as flood ways will require additional hydraulic performance criteria in addition to flood safety and hazard management for the public. This paper investigates the functional performance criteria for urban streets to fulfil all the above criteria. The resulting performance criteria are presented as a generalized framework to evaluate the applicability of streets as urban flood ways, including the impact of flood risk and hazard management of controlled flooding. The framework can be used to evaluate the applicability of multifunctional streets used as urban flood ways and can be adapted by municipalities as a decision support tool in urban planning and local stormwater management.

Keywords: Climate Change; Flood Ways; Hydrological Modelling; Stormwater Management; Urban Drainage; Urban Flood.