

Role of Detention and Retention Basins in Stormwater Management and Environmental Protection

Miodrag Jovanović

University of Belgrade, Faculty of Civil Engineering, Serbia

ABSTRACT: The key role of detention and retention basins in stormwater management, sedimentation/pollution control, and environmental protection, is evaluated through best management practice design recommendations. An overview of the engineering approach to stormwater routing and analysis of basins' sediment trapping efficiency is given. Design topics such as: stormwater treatment efficiency, control structures, release impacts, vegetation and landscape, maintenance, legal and social implications of basin construction, are discussed. Finally, two illustrative case studies are presented – one pertaining to urban stormwater management by a system of detention basins, and the other, pertaining to a retention basin with the primary role to provide environmental, ambient stream corridor preservation.

8.1 INTRODUCTION

Detention and retention basins are most efficient means for stormwater management. Traditionally, such basins were designed as flood control reservoirs. However, presently they acquire an additional role, that of water quality treatment and environmental protection facilities. As this new role is becoming more important with rapid urbanization, which demands higher drainage capacities and cause unfavourable environmental impacts, the traditional design techniques for detention/retention basins need to be reassessed in order to meet both the old and the new objectives.

For the purpose of easier communication, a terminological distinction is made between “detention basins” and “retention basins”. (In literature, term “basins” is often substituted by “ponds”, implying small urban facilities.)

By definition, detention basins are facilities which temporarily store stormwater runoff and subsequently release water at a slower rate than it is collected by the drainage system. There is very little infiltration of the stored stormwater. Such facilities are designed with the goals of controlling peak discharge rates and providing