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Chapter 8

DESIGN OF DRAINAGE CONVEYANCES

I. INTRODUCTION

A typical urban drainage system has two separate and distinct components, the major and the minor systems. Storm sewers, a part of the minor system, often have been the only **planned** portion of these drainage works. When their capacity is exceeded, the excess often flows overland, causing damage and losses. The purpose of the major drainage system is to accommodate the runoff that exceeds the capacity of the minor system.

The storm drainage system uses the energy available from the difference between its upstream and downstream elevations, or the energy added by pumps. The total available energy normally is used to maintain proper flow velocities, including sufficient velocities to insure a self-cleansing system, with minimum head loss. The design of storm drainage systems therefore involves the balancing of hydraulic losses, which must be kept within the limits of available energy, with the need for adequate energy to maintain self-cleansing velocities. The wider the variations in the rates of flow, the more difficult it is to meet both requirements (ASCE 1969).

This chapter focuses on the design of conveyance facilities common to the major and minor systems, including storm sewers, streets, open channels, culverts, and bridges. Details on their hydraulic design are presented in Chapter 6, and one should be completely familiar with that Chapter (and with Chapter 5, Hydrology and Introduction to Water Quality) before proceeding with any design. All of the facilities described closely interrelate, and major and minor system planning and design should be conducted concurrently.

The designer should treat the design effort as an iterative process involving the developer, regulators, planners and landscape architects, the general project civil engineer, and others (National Association of