

11.1 Overview

11.1.1 Introduction

This chapter provides guidance for the design of a storm sewer system. Most aspects of storm drain design such as system planning, pavement drainage, gutter flow calculations, inlet spacing, pipe sizing and hydraulic grade line calculations are included in this chapter.

The design of a drainage system must address the needs of the traveling public as well as those of the local community through which it passes. The drainage system for a roadway traversing an urbanized region is more complex than for roadways traversing sparsely settled rural areas. This is often due to:

- the wide roadway sections, flat grades, both in longitudinal and transverse directions, shallow watercourses, absence of side channels
- the more costly property damages which may occur from ponding of water or from flow of water through built-up areas
- the fact that the roadway section must carry traffic, but also act as a channel to convey the water to a disposal point. Unless proper precautions are taken, this flow of water along the roadway will interfere with or possibly halt the passage of highway traffic

11.1.2 Inadequate Drainage

The most serious effects of an inadequate roadway drainage system are:

- damage to surrounding or adjacent property, resulting from water overflowing the roadway section and entering such property
- risk and delay to traffic caused by excessive ponding in sags or excessive spread along the roadway
- weakening of base and subgrade due to saturation from frequent ponding of long duration and erosion of pavement edges

11.1.3 System Planning

System planning prior to commencing the design of a storm drain system is essential. The basics required are discussed in Section 11.4 and include the general design approach, type of data required, information on initiating a cooperative agreement with a municipality, the importance of a preliminary sketch and some special considerations.

11.1.4 Costs

The cost of drainage is neither incidental nor minor on most roads. Careful attention to requirements for adequate drainage and protection of the highway from stormwater in all phases of location and design will prove to be effective in reducing costs in both construction and maintenance. Unless drainage is properly accommodated, maintenance costs will be unduly high.