

7.1 Introduction

7.1.1 Purpose

The purpose of this chapter is to establish Department practice, specify design criteria, review design philosophy, and outline channel design procedures.

Hydraulic design associated with natural channels and roadway ditches is a process which selects and evaluates alternatives according to established criteria. These criteria are the standards established by the Connecticut Department of Transportation to insure that a highway facility meets its intended purpose without endangering the structural integrity of the facility itself and without undue adverse effects on the environment or the public welfare.

7.1.2 Definitions

- Open channels are a **natural** or **artificial** conveyance for water in which:
 - the water surface is exposed to the atmosphere
 - the gravity force component in the direction of motion is the driving force

There are **various types of open channels** encountered by the designer of transportation facilities:

- natural channel
- roadside channel or ditch
- drainage ditch or swale

- **Natural watercourse channels** are:
 - dynamic channels with their size and shape determined by natural forces
 - usually but not always are compound in cross section with a main channel for conveying low flows and a floodplain to transport flood flows
 - shaped geomorphologically by the long term history of sediment load and water discharge which they experience

- **Artificial channels** include roadside channels, drainage ditches and swales which:
 - have regular geometric cross sections (although this is not always the case for overbank areas) and
 - are unlined, or lined with artificial or natural material to protect against erosion

While the principles of open channel flow are the same regardless of the channel type, stream channels and artificial channels (primarily roadside channels) will be treated separately in this chapter as needed.

7.1.3 Significance

Channel analysis is necessary for the design of transportation drainage systems in order to assess:

- potential flooding caused by changes in water surface profiles
- disturbance of the river system upstream or downstream of the highway right-of-way
- changes in lateral flow distributions
- changes in velocity or direction of flow
- need for conveyance and disposal of excess runoff
- need for channel lining to prevent erosion