

A5.MAIN ROADS REQUIREMENTS

A5.1. Open channels and ditches

Open channels are a drainage feature in which water flows with a free surface. Open channels are generally classified as those that occur naturally, are manmade, or improved natural channels. Manmade channels, or artificial channels, used on most roadway projects, include Interceptor ditch, diversion channel, wadi channelization, roadside or median ditch, outfall ditch or canal and Low-flow ditch

This section provides specific requirements and criteria related to channel design analysis procedures and documentation. For a more complete discussion of practical channel hydraulics for road projects, refer to Chapter 4 of the FHWA publication HDS 4. For designs of larger outfall channels, the Design Engineer shall refer to the FHWA publication HDS No. 6 or the American Association of State Highway Transportation Officials (AASHTO) Highway Drainage Guidelines.

A5.1.1 Catchment Delineation

Determining the size of the drainage area that contributes to the flow at the site of the drainage structure is a basic step in a hydrologic analysis, regardless of the method used to evaluate design flows. Drainage area, expressed in hectares or square kilometres, is frequently determined from field surveys, topographic maps, or aerial photographs. Catchment areas include all of the area that will contribute runoff to the point of interest such as open channel or cross drains and are delineated on a drainage map to support the design calculations as part of a design review submittal for all development phases of a project . Drainage maps shall include the following items:

- Drainage basin and sub-basin (catchment areas) identification;
- Discharge area delineations indicating flow paths and outfalls to receiving waters;
- Metrologic features of the catchments;
- Basin and catchment area size determinations;
- Existing drainage facilities, such as storm drains, inlets, cross culverts, and outfalls;
- Environmentally sensitive areas;
- Proposed solutions and alternatives layout plans; and
- Tentative details for main drain facilities.

A5.1.1.1. Areal-reduction factor

Over a drainage catchment area, the point rainfall will vary and the magnitude of this variation depends on the size of the catchment area due to variations in the storm as it moves through the area. Predicting this average rainfall depth for the whole area from the point rainfall is done by means of applying an A_{rf} . This factor is multiplied by the point rainfall depth or intensity when determining the runoff volume or flow rate.

A_{rf} are determined using a statistical analysis of long-term precipitation records and comparing results between the various recording stations within the region. When the Engineer lacks longer term precipitation data for the emirate's interior recording stations to make this determination, an estimated A_{rf} based on storm rainfall records and statistical calculations for East Africa (refer to Transport and Road Research Laboratory Report 623, Prediction of storm rainfall in East Africa) can be used as follows: