Stormwater Network Sizing, Runoff Storage and Exceedance Routes Training Course

22 – 26 February 2027
Geneva

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Programme Summary

Stormwater network sizing, runoff storage and exceedance routes is the subject of this one-week training course for senior drainage engineers, municipal infrastructure leads and project managers, ending in a catchment drainage review pack. Many drainage studies size pipes for the design storm and leave storage, maintenance and flood routes unchecked. The programme moves from rainfall and runoff to network sizing, storage design, exceedance routing and review of a complete drainage study. Mars Training Centre UK delivers this programme on stormwater network sizing to mixed-organisation cohorts.

The Business Case

Cities, ports, industrial estates and road authorities carry the cost when a drainage design fails in a storm: flooded property, closed roads and costly retrofits. Leaders who can test a design before approval, and who understand where water goes when the network is full, avoid oversized pipes on one side and unprotected buildings on the other.

- Flood Damage Exposure: Falls when exceedance routes and floor levels are checked before approval.
- Capital Cost: Declines when pipes and storage are sized from tested flows, not safety margins.
- Maintenance Burden: Reduces when access and inspection needs are designed in early.

Principles and Evidence Base

- Rational Method: Estimates peak flow from rainfall intensity, area and surface cover, applied in Session 1 to small catchments.
- Hydrograph Methods: Describe flow over time for larger catchments, applied in Session 2 to check network capacity.
- The SuDS Manual CIRIA C753: Frames drainage around water quantity, water quality, amenity and biodiversity, applied in Session 3 to storage and source control choices.
- Design for Exceedance: Plans safe overland routes for flows beyond pipe capacity, applied in Session 4 to flood risk screening.

Intended Participants

- Drainage and civil engineers who prepare or check stormwater designs.
- Infrastructure and roads leaders who approve drainage studies and accept completed networks.
- Project managers who coordinate designers, contractors and utilities on drainage packages.
- Asset and maintenance managers who inherit networks and storage facilities.

Typical settings include municipalities, transport authorities, industrial developments and real estate programmes.

Learning Outcomes

1. Participants will be able to estimate peak runoff for a catchment from rainfall data and surface cover.
2. Participants will be able to evaluate pipe and culvert capacity against a design storm.
3. Participants will be able to construct storage volumes and outflow controls for a drainage scheme.
4. Participants will be able to diagnose flood paths and residual risk when a network is exceeded.
5. Participants will be able to prioritise defects found in a submitted drainage study.
6. Participants will be able to justify a drainage review decision to an owner or approving authority.

Programme Structure

Day 1: Rainfall, Catchments and Runoff Estimation

How much water reaches the network in a design storm?

- Intensity-Duration-Frequency Curves
- Design Storm Selection Sheet
- Catchment Area and Surface Cover Table
- Rational Method Peak Flow Worksheet
- Climate Change Allowance Register

Day 2: Stormwater Network Sizing and Hydraulic Checks

Does each pipe and culvert carry its design flow?

- Pipe and Culvert Sizing Schedule
- Inlet and Gully Spacing Check
- Hydrograph Method for Larger Catchments
- Surcharge and Velocity Limits Table
- Network Layout Review Checklist

Day 3: Runoff Storage and Source Control

Where should runoff be held, and how much storage is needed?

- Detention and Retention Storage Volumes
- Outflow Control Sizing
- SuDS Manual Four-Pillar Matrix
- Infiltration and Treatment Options Screen
- Maintenance Access and Inspection Plan

Day 4: Exceedance Routes and Flood Risk

Where does water go when the network is overwhelmed?

- Design for Exceedance Principles
- Overland Flow Route Map
- Flood Depth and Hazard Screening
- Property Threshold Level Check
- Residual Risk Register

Day 5: Catchment Drainage Review Pack

Do the earlier checks join into a pack that an owner can approve?

- Re-running the Session 1 Peak Flow Worksheet
- Testing the Session 2 Sizing Schedule
- Reconciling the Session 3 Storage Volumes
- Checking the Session 4 Overland Flow Route Map
- Completing the Catchment Drainage Review Pack

Methodology

The programme uses a data workshop built on one prepared catchment with rainfall records, a pipe schedule, levels and a submitted design. Participants calculate flows by hand, test results against the submitted figures, then defend their findings to peers acting as the approving owner.

- Suggested activity: Recalculating the peak flow for one outfall and comparing it with the designer's figure.
- Suggested activity: Sketching the overland route for a storm larger than the pipe design and marking exposed buildings.
- Suggested activity: Reducing a storage tank volume by adjusting the outflow control and recording the trade-off.

Capstone Output

Each participant completes a catchment drainage review pack. It holds a runoff estimate, a network capacity check, a storage volume statement, an exceedance route map and a defect list ranked by risk. At work it supports design approval, tender clarification or a handover decision on a drainage package.

Frequently Asked Questions

Is stormwater network sizing training suitable for leaders who do not calculate drainage themselves?

Yes. Stormwater network sizing is taught through prepared catchment data and templates. The programme assumes responsibility for approving or managing drainage work, with basic familiarity with plans, but no earlier hydraulic calculation.

Which methods does stormwater network sizing rest on in this programme?

Stormwater network sizing rests on the Rational Method, hydrograph methods, the SuDS Manual CIRIA C753 and design for exceedance, each applied to one prepared catchment.

How is the review pack from stormwater network sizing used at work?

You use the catchment drainage review pack to question a submitted design, agree storage and exceedance requirements with designers, and record decisions before approval or handover.

How does stormwater network sizing differ from a programme on road design?

Stormwater network sizing concentrates on runoff, pipes, storage and flood routes across a catchment, while a road design programme concentrates on alignment, junctions, pavement and traffic safety.