

Reference	NR/L3/CIV/005/2A
Issue	1
Publication date	4th December 2010
Compliance date	5th March 2011

Railway Drainage Systems Manual

Part 2A: General design requirements

Reference	NR/L3/CIV/005/2A
Issue	1
Publication date	4 th December 2010
Compliance date	5 th March 2011

Contents

1	Purpose	3
2	Scope	3
3	Remediation	3
4	Design of Drainage Systems generally	4
4.1	Philosophy	4
4.2	Track renewal work	4
4.3	Installation	5
4.4	Hydraulic performance	7
4.5	Weather capability	8
4.6	Outfalls	9
4.7	Maintenance	9
4.8	Degraded performance	10
4.9	Access for installation	10
5	Environmental considerations	11
6	Technical Approval	11
7	Product Approval	11
8	Drainage database	11

Reference	NR/L3/CIV/005/2A
Issue	1
Publication date	4 th December 2010
Compliance date	5 th March 2011

1 Purpose

The purpose of this Part of the Manual is to define the principles and general design requirements for Drainage Systems.

2 Scope

This Part of the Manual applies to the design of new Drainage Systems and remediated Drainage Systems.

3 Remediation

Remediation, in conjunction with appropriate Maintenance, shall be undertaken to enable a Drainage System to function from its source(s) through to its Outfall.

A Drainage System shall be renewed where (a) changes in adjacent land use or railway characteristics render the current System inadequate, (b) blockages cannot be cleared, and (c) Maintenance has or will become inefficient or uneconomic.

The aim of Remediation of Track Drainage shall be one or more of the following;

- to achieve or extend the service life of the Track Support System,
- to improve the performance of the Track Support System,
- to reduce the volume and/or cost of maintenance of the Track Support System

The timing of the Remediation of Track Drainage shall be considered with reference to any proposed renewal of the Track Support System to identify the best value option.

The occasional presence of standing or flowing water in a cess does not necessarily justify the need for Remediation, but where this occurs regularly investigation of the cause(s) shall be undertaken and, where practicable, rectified.

The necessity for Remediation could be justified through records of:

- Maintenance of the Drainage System;
- Inspection of the Drainage System;
- track geometry quality, and track maintenance;

Reference	NR/L3/CIV/005/2A
Issue	1
Publication date	4 th December 2010
Compliance date	5 th March 2011

- Failures of Earthwork and/or other structures.

Renewal of Drainage Systems should be considered where train delays, safety and/or environmental risks are unacceptable and other measures have failed.

4 Design of Drainage Systems generally

4.1 Philosophy

Drains shall be designed to fall to an identified Outfall.

The design of a Drainage System shall take account of whole life costs.

The design of a Drainage System shall consider;

- the form of construction of the System and its components;
- the risk to the System, railway operations and Outside Parties should the design capacity of the System be exceeded or the System become blocked;
- Maintenance of the System (see **4.6**).

For the System as a whole, consideration should be given to:

- the length of Carrier Drains and Collector Drains;
- separate Systems for different sources of water, such as groundwater and surface water;
- the self-cleansing flow for Channel Drains and pipes;
- spatial constraints, such as Bridges and Tunnels.

4.2 Track renewal work

Track renewal and works to the track sub-structure should include Remediation of the Track Drainage where it is not functioning as intended.

When track renewal involving ballast replacement is proposed, the existing track bed should be assessed in accordance with [NR/SP/TRK/9039](#): *Formation treatments*.

Where reasonably practicable, track renewals work shall facilitate Inspection of Track Drainage - including raising Catchpits clear of the ballast and fitting covers to them.