

A68 Pathhead to Tynehead Junction Improvement Scheme

Figure 13.11

Water Quality Prediction

Proposed Road Configuration

04/10/2007

Salters Burn Cakemuir Burn

	µg/l	3.0	3.0
E.O.S. Level - copper		3.0	3.0
E.O.S. Level - zinc	µg/l	15.0	15.0
Area of road (A)	ha	2.16	1.17
Runoff Coefficient (R)		0.5	0.5
Rainfall Depth (D)	mm/d	13	13
Q_{95}	m ³ /s	0.0066	0.0310
C_B - copper - upstream	kg/m ³	0.0015	0.0015
C_B - zinc - upstream	kg/m ³	0.0075	0.0075

Data from S.E.P.A.
Data from S.E.P.A.
13m wide road *
Section A.3.ii, Annex 1, Part 10, DMRB Vol. 11.
Figure A.1, Annex 1, Part 10, DMRB Vol. 11.
Data from S.E.P.A. on Salters & Cakemuir Burn
Based on Leader Water Data of same river quality
Based on Leader Water Data of same river quality

Runoff Volume (V_H)	m ³ /day	140.3	76.1
Q_{95} (V_R)	m ³ /day	570.2	2678.4

Runoff Volume = $(A \times R \times D / 1000) \times 10000$
95 percentile flow m ³ /day ($Q_{95} \times 3600$ seconds x 24hrs)

Dilution		4.1	35.2
AA DT	veh/day	12,800	12,800

(V_R / V_H) - Section A3 (iv), Annex 1, HA 216/06.
From Stage 3 Traffic & Economic Assessment - Design Year (2024) Flows

Build up rate - Copper	kg/ha/yr	0.3	0.3
Build up rate - Zinc	kg/ha/yr	1.0	1.0

Table B.1, Annex 1, Part 10, DMRB Vol. 11.
Table B.1, Annex 1, Part 10, DMRB Vol. 11.

M_{Cu}	kg/5day	0.0089	0.0048
C_R - soluble copper	kg/m ³	0.0137	0.0032
C_R - soluble copper	µg/l	13.7	3.2

Five day Pollutant build-up Copper
$CR = \{(C_B \times V_R) + (1000 \times M)\} / (V_R \times V_H)$
Down stream river concentration of copper in micrograms per litre µg/l

M_{Zn}	kg/5day	0.030	0.016
Cr - zinc	kg/m ³	0.048	0.013
Cr - zinc	µg/l	47.6	13.1

Five day Pollutant build-up Zinc
$CR = \{(C_B \times V_R) + (1000 \times M)\} / (V_R \times V_H)$
Down stream river concentration of zinc in micrograms per litre µg/l

* Area of road drained into Salters Burn = $\{(Ch0 + 40 \text{ to } Ch17 + 00) \times 13.0m\} / 10,000m^2$

* Area of road drained into Cakemuir Burn = $\{(Ch17 + 00 \text{ to } Ch26 + 00) \times 13.0m\} / 10,000m^2$