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Drainage Design

Surface water

Hydraulic Design based on the Modified Rational Method

Data

Total site area 1410m²

Impermeable area 775m²

Rainfall data for 30mins duration

$C_v = 0.75$

$C_R = 1.30$

ARF = 1.00

Imp Area [ha] = 0.0775

$r = 0.22$

M5-60 = 20mm

T = 1 yr

$Z_1 = 0.72$

M5-30 = 14.40mm

Z_2 for M1 = 0.62

M10 = 1.24

M50 = 1.70

M1-30 = $0.62 \times 14.40 = 8.92\text{mm}$

M10-30 = $1.24 \times 14.40 = 17.85\text{mm}$

M50-30 = $1.70 \times 14.40 = 24.48\text{mm}$

Average $I_5 = 8.92/0.5 = 17.84\text{mm/hr}$

$17.85/0.5 = 35.70\text{mm/hr}$

$24.48/0.5 = 48.96\text{mm/hr}$

Design flow [M1] = $1.67 \times 17.84 \times 0.0775 = 1.45\text{l/s}$

[M10] = $3.33 \times 35.70 \times 0.0775 = 5.77\text{l/s}$

[M50] = $4.52 \times 48.96 \times 0.0775 = 10.66\text{l/s}$

Pipework Roughness value k_s should be 0.6mm