

PERCOLATION TEST 18, 19, 20th March 2022

AG: 1 Foxborough Grove

Planning Ref: SD218/0432¹³²

Triak hole / soakpit excavated 16/3/22 1400 x 1100 x 1350 deep.

Estimated F.L. of house S.W. 100 ϕ drain (new) 0.35 below G.L.

Storage Depth = 1m. = Effective Depth

Soakage: for 24 hrs. 18-19th March. Water Level at 0.35m below G.L.
and trial hole emptied

Percolation/permeability: Trial hole filled to 0.35m. below G.L. 19/3/22

After 135mins water level fell from 0.6m below G.L.

i.e. 75% Effective Depth to 1.1m below G.L.

So $t_{75-25} = 135$ mins.

For 1400 x 1100 x 1.0m E.D.:-

$$V_{P75-25} = 0.5 \times 1.4 \times 1.1 = 0.77 \text{ m}^3 \quad a_{\text{sub}} = (1.4 + 1.1)^2 = 5 \text{ m}^2$$

$$a_{550} = \frac{5}{2} = 2.5 \text{ m}^2 \quad a_{P50} = (1.4 + 1.1)^2 + (1.4 \times 1.1) = 6.54 \text{ m}^2$$

$$f = \frac{V_{P75-25}}{a_{P50} \times t_{75-25}} = \frac{0.77}{6.54 \times 135 \times 60} = 1.45 \times 10^{-5}$$

Contributing Area - nett new roof

$$\text{Side Extension: } 5.7 \times 2 \times 4.2 \text{ (max width)} = 45.6 \text{ m}^2$$

$$\text{Rear Extension: } 3.9 \times 2 \times 2.7 = 21.06 \text{ m}^2$$

$$66.66 \text{ m}^2 \quad 66.66$$

$$\text{Less replaced roof Kitchen } 2.09 \times 2 \times 2.7$$

$$- 10.32$$

$$56.63 \text{ m}^2$$

BRE 365

$$r = 0.36$$

Use Return Period 10 yrs and durations 10, 60, 240 mins

ie. M10-10, M10-60 and M10-240

$$\text{Table 1} \quad 10 \text{ min } Z_1 = 0.51 \quad 60 \text{ min } Z_1 = 1.0 \quad 240 \text{ min } Z_1 = 1.48$$

$$\text{MS-10} = \text{MS-60} \times Z_1 = 20 \times 0.51 = 10.2 \text{ mm} =$$

$$\text{MS-60} = 20 \text{ mm - standard used } (Z_1 = 1.0) = 20 \text{ mm} =$$

$$\text{MS-240} = \text{MS-60} \times Z_1 = 20 \times 1.48 = 29.6 \text{ mm} =$$

| Inflow to Percolation Trial Hole | Area | I = Inflow m ³ |
|----------------------------------|-------|---------------------------|
| M10-10 = 10.2 x 1.22 = 12.44 mm | 56.63 | 0.702 |
| M10-60 = 20 x 1.24 = 24.8 mm | 56.63 | 1.404 |
| M10-240 = 29.6 x 1.22 = 35.22 mm | 56.63 | 2.045 |

as from Table 2 - Z₂ values

$$Z_2 \text{ for } 10.2 \text{ mm (say } 10 \text{ mm)} = 1.22$$

$$Z_2 \text{ for } 20 \text{ mm} = 1.24$$

$$Z_2 \text{ for } 29.6 \text{ mm (say } 30 \text{ mm)} = 1.22$$

and using $I = A m^2 \times R \text{ metres}$.

$$\text{Outflow from Percolation Trial Hole} = a_{ss0} \times f \times D = 0$$

$$\text{M10-10 } 2.5 \times 1.45 \times 10^{-5} \times 10 \times 60 = 0.0022 \text{ m}^3$$

$$\text{M10-60 } 2.5 \times 1.45 \times 10^{-5} \times 60 \times 60 = 0.0131 \text{ m}^3$$

$$\text{M10-240 } 2.5 \times 1.45 \times 10^{-5} \times 240 \times 60 = 0.05 \text{ m}^3$$

$$S = I - O$$

| m ³ | M10-10 | M10-60 | M10-240 |
|----------------|--------|--------|---------|
| I | 0.702 | 1.404 | 2.045 |
| O | 0.0022 | 0.131 | 0.05 |
| S | 0.7 | 1.273 | 1.95 |

Area required $\geq 1.95 \text{ m}^2$ with 1.0 m Effective Depth.

Gravel modules are 0.8 m x 0.8 m x 0.32 m deep

$$3 \times 0.8 = 2.4 \times 0.8 \text{ (one unit wide)} = 1.92 \text{ m}^2 \text{ might suffice}$$

However design is for 4 modules long = 3.2 m by 0.8 m wide = 2.46 m² OK

Each module stores 205ℓ. 3 modules below incoming S.W drain I.L.

$$\text{Total effective storage} = 12 \times 0.205 = 24.6 \text{ m}^3$$

B. Clark

Signed B. CLARK B.E. C. Eng MIBI