

## DRAINAGE PROPOSALS FOR PROPOSED RESIDENTIAL DEVELOPMENT AT

Rear of 192 to 200 High Road, Weston

### DESIGN OF PERMEABLE PAVING IN PARKING / DRIVEWAY AREAS

#### Introduction

The proposed surfacing to the driveway and car parking areas in the proposed development is block paving manufactured by Marshalls. Rainwater falling on this surfacing will percolate through the blocks into the sub-base and soakaway into the sub grade.

#### Construction of Block Paving Areas.

The construction of the car parking area will be designed following the methodology in the Interpave publication "Design of Concrete Block Pavements". Referring to page 15 as all of the surface water will percolate into the sub-grade then the system will be defined as "System A".

#### Initial Design

Referring to pages 35 and 36, and assuming traffic category 3, small car parks subject to car, light van and motorcycle access the following construction is recommended. 60mm thick concrete blockwork 50mm thick laying course Minimum 225mm sub-base CGA or Type 3 (with 30% voids)

#### Design of Sub-base for infiltration

The hydraulic design of the required depth of the sub-base will initially be calculated using the method shown on page 47 of the Interpave design.

Using method on page 47 (Interpave).

M5-60 = 20,  $r = 0.4$ , 1 in 100 year rainfall + 30%, then using the table with an infiltration rate =  $1 \times 10^{-5}$  gives a minimum recommended depth of subbase of 105mm for a car parking area. The Soil Infiltration Rate calculated from the percolation tests is  $2.1 \times 10^{-5}$  m/sec it can be seen that the proposed construction above is satisfactory. Therefore the following construction is recommended: 60mm thick concrete blockwork 50mm thick laying course Minimum 225mm sub-base CGA or Type 3 (with 30% voids)

#### 3.1 SYSTEM A – TOTAL INFILTRATION

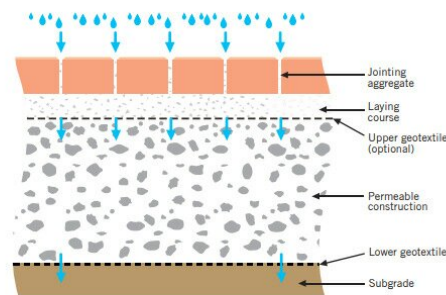


Figure 5: System A - total infiltration

System A can be used in situations where it is possible and allowable to discharge all the collected water into the subgrade. This system (Figure 5) allows all water falling onto the pavement to infiltrate down through the joints or voids between the paving units, passing through the constructed layers below and eventually into the subgrade. Some retention of the water may occur temporarily in the underlying permeable construction allowing for initial storage before it eventually passes through.

System A is sometimes known as 'Zero Discharge', as no water from the CBPP is discharged into the next stage of the management train or the sewer system,

eliminating the need for pipes and gulleys, resulting in cost savings.

### **Soakaway Design for roof areas.**

We have split the roof into front and rear areas.

The design is for M100 plus 30%.

#### **Plot 1.**

Front  $153\text{sq.m} \times 1.15 = 178\text{sq.m} = 13\text{m long, } 1\text{m wide, } 0.8\text{m deep (2 crates deep)}$

Rear  $106\text{sq.m} \times 1.15 = 122\text{sq.m} = 9\text{m long, } 1\text{m wide, } 0.8\text{m deep (2 crates deep)}$

#### **Plot 2**

Front  $126 \times 1.15 = 145\text{sq.m} = 11\text{m long, } 1\text{m wide, } 0.8\text{m deep (2 crates deep)}$

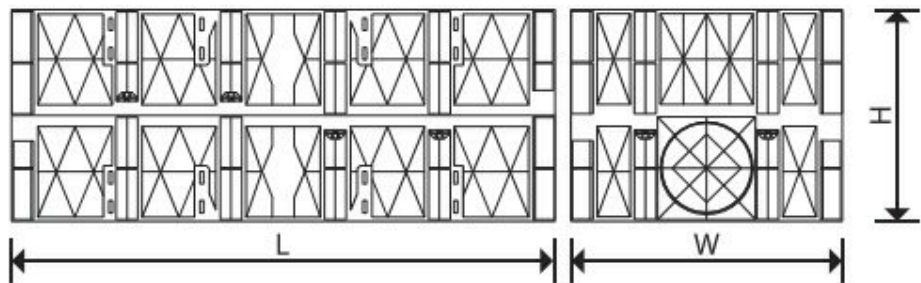
Rear  $94\text{sq.m} \times 1.15 = 108\text{sq.m} = 8\text{m long, } 1\text{m wide, } 0.8\text{m deep (2 crates deep)}$

#### **Plot 3**

Front  $153\text{sq.m} \times 1.15 = 178\text{sq.m} = 13\text{m long, } 1\text{m wide, } 0.8\text{m deep (2 crates deep)}$

Rear  $94\text{sq.m} \times 1.15 = 108\text{sq.m} = 8\text{m long, } 1\text{m wide, } 0.8\text{m deep (2 crates deep)}$

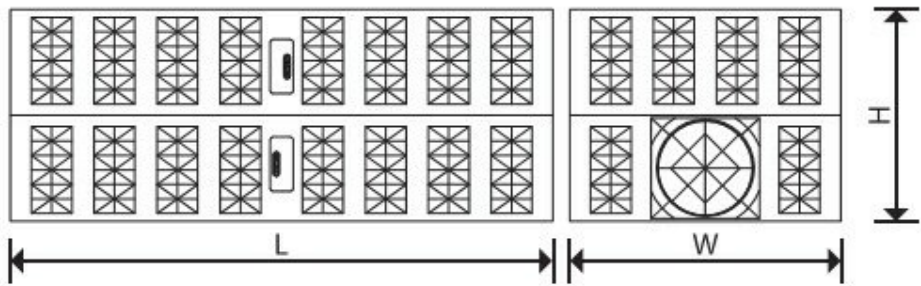
Aquacell Eco to be used in garden areas.



Material: Reformulated polypropylene

| Nominal<br>size (mm) | Part<br>number | Dimensions (mm) |     |      |
|----------------------|----------------|-----------------|-----|------|
|                      |                | W               | H   | L    |
| 160                  | 6LB025         | 500             | 400 | 1000 |

Aquacell Core R to be used under road and driveway

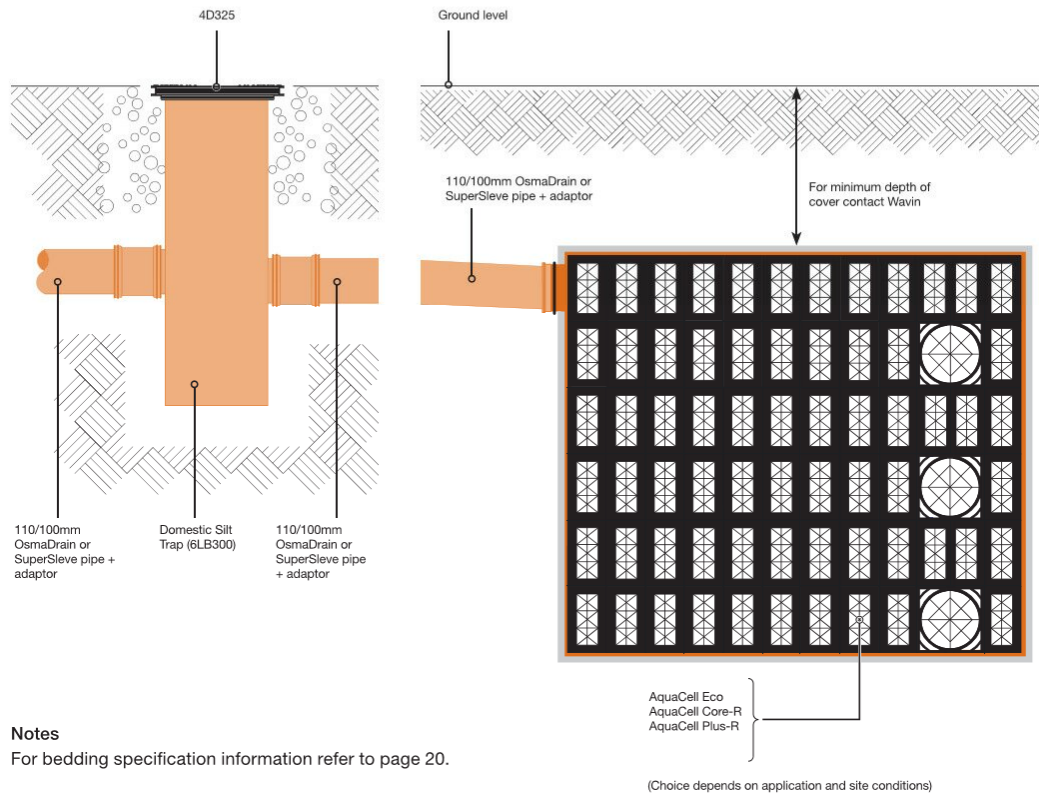


| Nominal<br>size (mm) | Part<br>number | Dimensions (mm) |     |      |
|----------------------|----------------|-----------------|-----|------|
|                      |                | W               | H   | L    |
| 160                  | 6LB150         | 500             | 400 | 1000 |

The soakaway to be installed with a silt trap.

## Soakaway with Silt Trap

### Soakaway or storage tank – with Silt Trap



#### Notes

For bedding specification information refer to page 20.

The silt trap can be used in conjunction with a soakaway (as shown) or a storage tank.

#### Minimum cover to the top of the soakaway:

ECO – 0.3m in gardens

CORE-R – Min 0.6m under roads (suitable for vehicles to 9 tonnes)

#### Installation

Installation shall be fully in accordance with the manufacturers instructions.

**Foul water drainage.**

There is an Anglian Water sewer that crosses the site. A single connection will be made into the existing sewer. This will be done in accordance with the sewer connection detail to be agreed with Anglian Water.

The sewer connection will be in plot 1 and is shown on drawing P102 and P105

# Soakaway/water storage capacity design using BRE Digest 365 as reference

Enter figures in the pale blue boxes. The results are in the dark blue boxes. Final result in lilac box

Date: 09.07.2021

Project: Rear of 192 to 200 Main Road Weston

$$\text{Soil Infiltration rate } (f) = \frac{V_{p75-25}}{a_{p50} \times t_{p75-25}}$$

$V_{p75-25}$  is the effective storage volume of water in the trial pit between 75% & 25% effective depth

$a_{p50}$  is the internal surface area of the trial pit up to 50% effective depth and including the base area

$t_{p75-25}$  is the time for the water level to fall from 75% to 25% effective depth

|                                                                            |   |                     |
|----------------------------------------------------------------------------|---|---------------------|
| Storage volume of water in the trial pit between 75% & 25% effective depth |   |                     |
| Trial Pit Dimensions                                                       | L | 0.3 m               |
|                                                                            | W | 0.3 m               |
| Effective storage depth                                                    | d | 0.3 m               |
| $V_{p75-25}$                                                               |   | 0.01 m <sup>3</sup> |

|                                                                                              |   |                     |
|----------------------------------------------------------------------------------------------|---|---------------------|
| Internal surface area of the trial pit up to 50% effective depth and including the base area |   |                     |
| Soakage Trial Pit Dimensions                                                                 | L | 0.3 m               |
|                                                                                              | W | 0.3 m               |
| Effective storage depth                                                                      | d | 0.3 m               |
| $a_{p50}$                                                                                    |   | 0.27 m <sup>2</sup> |

|                                                               |  |            |
|---------------------------------------------------------------|--|------------|
| Time in minutes for outflow between 75% & 25% effective depth |  |            |
| $t_{p75-25}$                                                  |  | 39 minutes |

From test, infiltration rate (f) 0.000021

Area to be drained (m<sup>2</sup>) (A) 108 m<sup>2</sup>

## Calculating design rainfall (R)

r value (Peterborough = 0.40)

Free volume (% voids)

0.4 (note z1 values change with r value)  
V<sub>f</sub> 95 %

### Soakaway size

Depth below discharge level (effective depth)

Area of sides of whole soakaway

50% Internal surface area (excluding base)

Storage Volume of soakaway (l x w x d x V<sub>f</sub>)

l 8 m  
w 1 m  
d 0.8 m  
14.4 m<sup>2</sup>  
(a<sub>s50</sub>) 7.2 m<sup>2</sup>  
6.08 m<sup>3</sup> (must equal or exceed S)

| Duration<br>"D" | Rainfall<br>(mm) | r value | Z1 value | M5 Design<br>rainfall (mm) | Z2 value | M100 Design<br>rainfall (mm)<br>(M5 x Z2)<br>R | Inflow (I)<br>(m <sup>3</sup> )<br>(A x R) | Outflow (O)<br>(m <sup>3</sup> )<br>(a <sub>s50</sub> ) x f x D | Storage (S)<br>(m <sup>3</sup> )<br>(I - O) |
|-----------------|------------------|---------|----------|----------------------------|----------|------------------------------------------------|--------------------------------------------|-----------------------------------------------------------------|---------------------------------------------|
| 10              | 20               | 0.4     | 0.52     | 10.40                      | 1.91     | 19.9                                           | 2.789                                      | 0.09                                                            | 2.70                                        |
| 15              | 20               | 0.4     | 0.63     | 12.60                      | 1.95     | 24.6                                           | 3.450                                      | 0.14                                                            | 3.31                                        |
| 30              | 20               | 0.4     | 0.80     | 16.00                      | 2.00     | 32.0                                           | 4.493                                      | 0.28                                                            | 4.22                                        |
| 60              | 20               | 0.4     | 1.00     | 20.00                      | 2.03     | 40.6                                           | 5.700                                      | 0.55                                                            | 5.15                                        |
| 120             | 20               | 0.4     | 1.21     | 24.20                      | 2.01     | 48.6                                           | 6.829                                      | 1.11                                                            | 5.72                                        |
| 240             | 20               | 0.4     | 1.46     | 29.20                      | 1.97     | 57.5                                           | 8.076                                      | 2.22                                                            | 5.86                                        |
| 360             | 20               | 0.4     | 1.62     | 32.40                      | 1.94     | 62.9                                           | 8.825                                      | 3.32                                                            | 5.50                                        |
| 600             | 20               | 0.4     | 1.82     | 36.40                      | 1.90     | 69.2                                           | 9.710                                      | 5.54                                                            | 4.17                                        |
| 1440            | 20               | 0.4     | 2.28     | 45.60                      | 1.81     | 82.5                                           | 11.588                                     | 13.29                                                           | -1.70                                       |

Check on time of emptying half storage volume (should be less than 24 hours)

$$(t_{s50}) = (S \times 0.5) / (a_{s50} \times f)$$

= 5.5 hours to empty half storage volume

# Soakaway/water storage capacity design using BRE Digest 365 as reference

Enter figures in the pale blue boxes. The results are in the dark blue boxes. Final result in lilac box

Date: 09.07.2021

Project: Rear of 192 to 200 Main Road Weston

$$\text{Soil Infiltration rate } (f) = \frac{V_{p75-25}}{a_{p50} \times t_{p75-25}}$$

$V_{p75-25}$  is the effective storage volume of water in the trial pit between 75% & 25% effective depth

$a_{p50}$  is the internal surface area of the trial pit up to 50% effective depth and including the base area

$t_{p75-25}$  is the time for the water level to fall from 75% to 25% effective depth

|                                                                            |   |                     |
|----------------------------------------------------------------------------|---|---------------------|
| Storage volume of water in the trial pit between 75% & 25% effective depth |   |                     |
| Trial Pit Dimensions                                                       | L | 0.3 m               |
|                                                                            | W | 0.3 m               |
| Effective storage depth                                                    | d | 0.3 m               |
| $V_{p75-25}$                                                               |   | 0.01 m <sup>3</sup> |

|                                                                                              |   |                     |
|----------------------------------------------------------------------------------------------|---|---------------------|
| Internal surface area of the trial pit up to 50% effective depth and including the base area |   |                     |
| Soakage Trial Pit Dimensions                                                                 | L | 0.3 m               |
|                                                                                              | W | 0.3 m               |
| Effective storage depth                                                                      | d | 0.3 m               |
| $a_{p50}$                                                                                    |   | 0.27 m <sup>2</sup> |

|                                                               |  |            |
|---------------------------------------------------------------|--|------------|
| Time in minutes for outflow between 75% & 25% effective depth |  |            |
| $t_{p75-25}$                                                  |  | 39 minutes |

From test, infiltration rate (f) 0.000021

Area to be drained (m<sup>2</sup>) (A) 122 m<sup>2</sup>

## Calculating design rainfall (R)

r value (Peterborough = 0.40)

Free volume (% voids)

|       |     |                                      |
|-------|-----|--------------------------------------|
|       | 0.4 | (note z1 values change with r value) |
| $V_f$ | 95  | %                                    |

## Soakaway size

Depth below discharge level (effective depth)

Area of sides of whole soakaway

50% Internal surface area (excluding base)

Storage Volume of soakaway (l x w x d x  $V_f$ )

|               |      |                                         |
|---------------|------|-----------------------------------------|
|               | 9    | m                                       |
|               | 1    | m                                       |
|               | 0.8  | m                                       |
|               | 16   | m <sup>2</sup>                          |
| ( $a_{s50}$ ) | 8    | m <sup>2</sup>                          |
|               | 6.84 | m <sup>3</sup> (must equal or exceed S) |

| Duration<br>"D" | Rainfall<br>(mm) | r value | Z1 value | M5 Design<br>rainfall (mm) | Z2 value | M100 Design<br>rainfall (mm)<br>(M5 x Z2)<br>R | Inflow (I)<br>(m <sup>3</sup> )<br>(A x R) | Outflow (O)<br>(m <sup>3</sup> )<br>( $a_{s50}$ ) x f x D | Storage (S)<br>(m <sup>3</sup> )<br>(I - O) |
|-----------------|------------------|---------|----------|----------------------------|----------|------------------------------------------------|--------------------------------------------|-----------------------------------------------------------|---------------------------------------------|
| 10              | 20               | 0.4     | 0.52     | 10.40                      | 1.91     | 19.9                                           | 3.150                                      | 0.10                                                      | 3.05                                        |
| 15              | 20               | 0.4     | 0.63     | 12.60                      | 1.95     | 24.6                                           | 3.897                                      | 0.15                                                      | 3.74                                        |
| 30              | 20               | 0.4     | 0.80     | 16.00                      | 2.00     | 32.0                                           | 5.075                                      | 0.31                                                      | 4.77                                        |
| 60              | 20               | 0.4     | 1.00     | 20.00                      | 2.03     | 40.6                                           | 6.439                                      | 0.62                                                      | 5.82                                        |
| 120             | 20               | 0.4     | 1.21     | 24.20                      | 2.01     | 48.6                                           | 7.715                                      | 1.23                                                      | 6.48                                        |
| 240             | 20               | 0.4     | 1.46     | 29.20                      | 1.97     | 57.5                                           | 9.123                                      | 2.46                                                      | 6.66                                        |
| 360             | 20               | 0.4     | 1.62     | 32.40                      | 1.94     | 62.9                                           | 9.969                                      | 3.69                                                      | 6.28                                        |
| 600             | 20               | 0.4     | 1.82     | 36.40                      | 1.90     | 69.2                                           | 10.969                                     | 6.15                                                      | 4.81                                        |
| 1440            | 20               | 0.4     | 2.28     | 45.60                      | 1.81     | 82.5                                           | 13.090                                     | 14.77                                                     | -1.68                                       |

Check on time of emptying half storage volume (should be less than 24 hours)

$$(t_{s50}) = (S \times 0.5) / (a_{s50} \times f)$$

= 5.6 hours to empty half storage volume

# Soakaway/water storage capacity design using BRE Digest 365 as reference

Enter figures in the pale blue boxes. The results are in the dark blue boxes. Final result in lilac box

Date: 09.07.2021

Project: Rear of 192 to 200 Main Road Weston

$$\text{Soil Infiltration rate } (f) = \frac{V_{p75-25}}{a_{p50} \times t_{p75-25}}$$

$V_{p75-25}$  is the effective storage volume of water in the trial pit between 75% & 25% effective depth

$a_{p50}$  is the internal surface area of the trial pit up to 50% effective depth and including the base area

$t_{p75-25}$  is the time for the water level to fall from 75% to 25% effective depth

|                                                                            |   |                     |
|----------------------------------------------------------------------------|---|---------------------|
| Storage volume of water in the trial pit between 75% & 25% effective depth |   |                     |
| Trial Pit Dimensions                                                       | L | 0.3 m               |
|                                                                            | W | 0.3 m               |
| Effective storage depth                                                    | d | 0.3 m               |
| $V_{p75-25}$                                                               |   | 0.01 m <sup>3</sup> |

|                                                                                              |   |                     |
|----------------------------------------------------------------------------------------------|---|---------------------|
| Internal surface area of the trial pit up to 50% effective depth and including the base area |   |                     |
| Soakage Trial Pit Dimensions                                                                 | L | 0.3 m               |
|                                                                                              | W | 0.3 m               |
| Effective storage depth                                                                      | d | 0.3 m               |
| $a_{p50}$                                                                                    |   | 0.27 m <sup>2</sup> |

|                                                               |  |            |
|---------------------------------------------------------------|--|------------|
| Time in minutes for outflow between 75% & 25% effective depth |  |            |
| $t_{p75-25}$                                                  |  | 39 minutes |

From test, infiltration rate (f) 0.000021

Area to be drained (m<sup>2</sup>) (A) 145 m<sup>2</sup>

## Calculating design rainfall (R)

r value (Peterborough = 0.40)

Free volume (% voids)

|                                                 |               |      |                                         |
|-------------------------------------------------|---------------|------|-----------------------------------------|
|                                                 | $V_f$         | 0.4  | (note z1 values change with r value)    |
|                                                 | $V_f$         | 95   | %                                       |
| Soakaway size                                   | I             | 11   | m                                       |
|                                                 | w             | 1    | m                                       |
| Depth below discharge level (effective depth)   | d             | 0.8  | m                                       |
| Area of sides of whole soakaway                 |               | 19.2 | m <sup>2</sup>                          |
| 50% Internal surface area (excluding base)      | ( $a_{s50}$ ) | 9.6  | m <sup>2</sup>                          |
| Storage Volume of soakaway (I x w x d x $V_f$ ) |               | 8.36 | m <sup>3</sup> (must equal or exceed S) |

| Duration<br>"D" | Rainfall<br>(mm) | r value | Z1 value | M5 Design<br>rainfall (mm) | Z2 value | M100 Design<br>rainfall (mm)<br>(M5 x Z2) | Inflow (I)<br>(m <sup>3</sup> )<br>(A x R) | Outflow (O)<br>(m <sup>3</sup> )<br>( $a_{s50}$ ) x f x D | Storage (S)<br>(m <sup>3</sup> )<br>(I - O) |
|-----------------|------------------|---------|----------|----------------------------|----------|-------------------------------------------|--------------------------------------------|-----------------------------------------------------------|---------------------------------------------|
| R               |                  |         |          |                            |          |                                           |                                            |                                                           |                                             |
| 10              | 20               | 0.4     | 0.52     | 10.40                      | 1.91     | 19.9                                      | 3.744                                      | 0.12                                                      | 3.62                                        |
| 15              | 20               | 0.4     | 0.63     | 12.60                      | 1.95     | 24.6                                      | 4.631                                      | 0.18                                                      | 4.45                                        |
| 30              | 20               | 0.4     | 0.80     | 16.00                      | 2.00     | 32.0                                      | 6.032                                      | 0.37                                                      | 5.66                                        |
| 60              | 20               | 0.4     | 1.00     | 20.00                      | 2.03     | 40.6                                      | 7.653                                      | 0.74                                                      | 6.91                                        |
| 120             | 20               | 0.4     | 1.21     | 24.20                      | 2.01     | 48.6                                      | 9.169                                      | 1.48                                                      | 7.69                                        |
| 240             | 20               | 0.4     | 1.46     | 29.20                      | 1.97     | 57.5                                      | 10.843                                     | 2.95                                                      | 7.89                                        |
| 360             | 20               | 0.4     | 1.62     | 32.40                      | 1.94     | 62.9                                      | 11.848                                     | 4.43                                                      | 7.42                                        |
| 600             | 20               | 0.4     | 1.82     | 36.40                      | 1.90     | 69.2                                      | 13.037                                     | 7.38                                                      | 5.65                                        |
| 1440            | 20               | 0.4     | 2.28     | 45.60                      | 1.81     | 82.5                                      | 15.558                                     | 17.72                                                     | -2.17                                       |

Check on time of emptying half storage volume (should be less than 24 hours)

$$(t_{s50}) = (S \times 0.5) / (a_{s50} \times f)$$

= 5.7 hours to empty half storage volume

# Soakaway/water storage capacity design using BRE Digest 365 as reference

Enter figures in the pale blue boxes. The results are in the dark blue boxes. Final result in lilac box

Date: 09.07.2021

Project: Rear of 192 to 200 Main Road Weston

$$\text{Soil Infiltration rate } (f) = \frac{V_{p75-25}}{a_{p50} \times t_{p75-25}}$$

$V_{p75-25}$  is the effective storage volume of water in the trial pit between 75% & 25% effective depth

$a_{p50}$  is the internal surface area of the trial pit up to 50% effective depth and including the base area

$t_{p75-25}$  is the time for the water level to fall from 75% to 25% effective depth

|                                                                            |   |                     |
|----------------------------------------------------------------------------|---|---------------------|
| Storage volume of water in the trial pit between 75% & 25% effective depth |   |                     |
| Trial Pit Dimensions                                                       | L | 0.3 m               |
|                                                                            | W | 0.3 m               |
| Effective storage depth                                                    | d | 0.3 m               |
| $V_{p75-25}$                                                               |   | 0.01 m <sup>3</sup> |

|                                                                                              |   |                     |
|----------------------------------------------------------------------------------------------|---|---------------------|
| Internal surface area of the trial pit up to 50% effective depth and including the base area |   |                     |
| Soakage Trial Pit Dimensions                                                                 | L | 0.3 m               |
|                                                                                              | W | 0.3 m               |
| Effective storage depth                                                                      | d | 0.3 m               |
| $a_{p50}$                                                                                    |   | 0.27 m <sup>2</sup> |

|                                                               |  |            |
|---------------------------------------------------------------|--|------------|
| Time in minutes for outflow between 75% & 25% effective depth |  |            |
| $t_{p75-25}$                                                  |  | 39 minutes |

From test, infiltration rate (f) 0.000021

Area to be drained (m<sup>2</sup>) (A) 178 m<sup>2</sup>

## Calculating design rainfall (R)

r value (Peterborough = 0.40)

Free volume (% voids)

|       |     |                                      |
|-------|-----|--------------------------------------|
|       | 0.4 | (note z1 values change with r value) |
| $V_f$ | 95  | %                                    |

## Soakaway size

Depth below discharge level (effective depth)

Area of sides of whole soakaway

50% Internal surface area (excluding base)

Storage Volume of soakaway (l x w x d x  $V_f$ )

|               |      |                                         |
|---------------|------|-----------------------------------------|
|               | 13   | m                                       |
|               | 1    | m                                       |
|               | 0.8  | m                                       |
|               | 22.4 | m <sup>2</sup>                          |
| ( $a_{s50}$ ) | 11.2 | m <sup>2</sup>                          |
|               | 9.88 | m <sup>3</sup> (must equal or exceed S) |

| Duration<br>"D" | Rainfall<br>(mm) | r value | Z1 value | M5 Design<br>rainfall (mm) | Z2 value | M100 Design<br>rainfall (mm)<br>(M5 x Z2) | Inflow (I)<br>(m <sup>3</sup> )<br>(A x R) | Outflow (O)<br>(m <sup>3</sup> )<br>( $a_{s50}$ ) x f x D) | Storage (S)<br>(m <sup>3</sup> )<br>(I - O) |
|-----------------|------------------|---------|----------|----------------------------|----------|-------------------------------------------|--------------------------------------------|------------------------------------------------------------|---------------------------------------------|
| R               |                  |         |          |                            |          |                                           |                                            |                                                            |                                             |
| 10              | 20               | 0.4     | 0.52     | 10.40                      | 1.91     | 19.9                                      | 4.597                                      | 0.14                                                       | 4.45                                        |
| 15              | 20               | 0.4     | 0.63     | 12.60                      | 1.95     | 24.6                                      | 5.685                                      | 0.22                                                       | 5.47                                        |
| 30              | 20               | 0.4     | 0.80     | 16.00                      | 2.00     | 32.0                                      | 7.405                                      | 0.43                                                       | 6.97                                        |
| 60              | 20               | 0.4     | 1.00     | 20.00                      | 2.03     | 40.6                                      | 9.395                                      | 0.86                                                       | 8.53                                        |
| 120             | 20               | 0.4     | 1.21     | 24.20                      | 2.01     | 48.6                                      | 11.256                                     | 1.72                                                       | 9.53                                        |
| 240             | 20               | 0.4     | 1.46     | 29.20                      | 1.97     | 57.5                                      | 13.311                                     | 3.45                                                       | 9.86                                        |
| 360             | 20               | 0.4     | 1.62     | 32.40                      | 1.94     | 62.9                                      | 14.545                                     | 5.17                                                       | 9.38                                        |
| 600             | 20               | 0.4     | 1.82     | 36.40                      | 1.90     | 69.2                                      | 16.004                                     | 8.62                                                       | 7.39                                        |
| 1440            | 20               | 0.4     | 2.28     | 45.60                      | 1.81     | 82.5                                      | 19.099                                     | 20.68                                                      | -1.58                                       |

Check on time of emptying half storage volume (should be less than 24 hours)

$$(t_{s50}) = (S \times 0.5) / (a_{s50} \times f)$$

= 5.7 hours to empty half storage volume