

MasterDrain
HY 8.31

HAMILL DAVIES LIMITED

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Job No.
14-2260

Sheet no. **1**

Date **09/01/17**

Project **Ranelagh Road**

Title **BREEAM SUR1 calculations for HAVANT**

By
B.H.

Checked

Reviewed

Data:-

Hydrology:-

Location = HAVANT

Long reference = 471106

M5-60 (mm) = 19

r = 0.35

Hyd. area = 7

Hydrograph = Summer

WRAP = 3

Grid reference = SU7106

SAAR (mm/yr) = 750

Soil = 0.37

Hyd. zone = 7

Area = Scotland and N. Ireland

Site values used in design:-

Total site area = 2.1160 ha

Pre-dev area drained = 0.5700 ha

Imperm runoff factor = 98%

Climate change factor = 30%

Post-dev area drained = 1.0060 ha

Perm runoff factor = 20%

Area to soakaways = 0.0000 ha

Perv. area to SUDS = 0.0000 ha

Area to other SUDS = 0.0000 ha

Post-dev flow to drain = 0.00 l/s

Calculations:-

Revised Post-dev Imperm. area = 1.006 ha

Equiv. Post-dev Imperm. area = 0.986 ha

Equiv. Post-dev Perm. area = 0.222 ha

Total Pre-dev equiv. area ha = 0.868 ha

Total Post-dev equiv. area ha = 1.208 ha

100 yr 6 hour mean intensity = 9.85mm/hr

Results:-

Pre-dev peakflow runoff (l/s) (m³/s)

R.P.	15	30	60	120	240	360	480	600	Max	CCF	Final	R.P.
1	299.0	198.9	125.7	78.9	49.0	37.6	30.6	26.1	299.0	30	388.7	1
30	658.7	431.2	269.7	164.8	99.4	73.7	59.5	50.4	658.7	30	856.4	30
100	858.8	561.5	349.0	211.4	126.3	93.1	74.9	63.2	858.8	30	1.12	100

Post-dev peakflow runoff (l/s)

R.P.	15	30	60	120	240	360	480	600	Max	CCF	Final	R.P.
1	416.2	276.8	174.9	109.8	68.1	52.4	42.6	36.3	416.2	30	541.1	1
30	916.9	600.1	375.4	229.3	138.3	102.5	82.8	70.1	916.9	30	1.19	30
100	1.20	781.6	485.7	294.3	175.8	129.6	104.3	88.0	1.20	30	1.55	100

100 year 6 hour (x Climate Change Factor) storm gives:-

Pre-dev volume m³ = 667.0m³

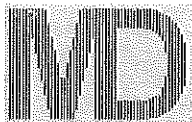
Post-dev volume m³ = 928.4m³

Post-dev volume to drain (no SUDS) = 928.4m³

$Q_{BAR(rural)} = 6.590 \text{ l/s}$ or 3.114 l/s/ha or 0.007 cumecs - from IoH 124.

The rainfall rates are calculated using the location specific values above in accordance with the Wallingford procedure.

Also flows can be rate



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		Sheet no. 2	
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Data summary.

Use the data below for the SUR1 form

Site areas:-

Total site area = 2.1160 ha ; 21160.0 m² [3A]
 Pre-development impermeable area = 0.5700 ha [3B]
 Pre-development permeable area = 1.5460 ha
 Post-development impermeable area = 1.0060 ha [3C]
 Post-development permeable area = 1.1100 ha

Peak runoff:-

Pre-development 1 year storm (15min) = 299.0 l/s [6A]
 Pre-development 100 year storm (15min) = 858.8 l/s [6C]
 Post-development 1 year storm (15min) = 416.2 l/s [6B]
 Post-development 100 year storm (15min) = 1.20 l/s [6D]

Greenfield runoff:-

$Q_{BAR(rural)} = 6.590 \text{ l/s}$ or 3.114 l/s/ha or 0.007 cumecs - from IoH 124.

Climate change factor:-

CCF = 30%

Volumes:-

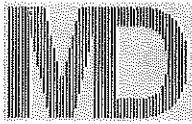
Pre-development 100 yr/6hr storm [12A] = 667.0m³
 Post-development 100 yr/6hr storm (add. volume with no SUDS) [12B] = 928.4m³
 Post-development 100 yr/6hr storm (add. volume with SUDS) = 928.4m³
 Post-development add. predicted volume (No SUDS) [12C] = 261.4m³

You may also require

Data relating to the infiltration test calculations (if applicable)
 Evidence to show runoff reduction (if applicable)
 Information on calculation methods (if applicable see next sheet)

Note

Numbers in square brackets relate to the
 Nov. 2010 v1.1 / issued 11/02/10 copy of SUR1



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Definitions and methods

Hydrology

The hydrological constants are derived from the Wallingford maps. They are used to calculate location specific rainfall figures.

Site values and factors

Areas of the site should be entered in hectares (10000 m²). If the Pre-development site is a green field, this box is blank.

Climate Change Factor is initially set at 20% - this may be changed as required.

Greenfield runoff is calculated using the method described in IoH 124.

Runoff factors

The impermeable runoff factor is initially set at 98%

The permeable runoff factor is initially set at 20%

Note: the CCF and the runoff factors may be changed by the user to suit the development

The areas draining to soakaways and other SUDS are entered in the appropriate box (in hectares)

Calculations

The post-development area is reduced by subtracting the areas that drain to soakaways or other SUDS, to give a revised figure.

All areas are then multiplied by the appropriate runoff factor to give an equivalent area with 100% runoff.

These are then summated.

This gives a total pre-development equivalent area, and a similar figure for the post-development area.

The 'Post-dev volume to drain (no SUDS)' gives the total runoff to drain if no SUDS were used.

Results

The pre- and post-development areas are subjected to 1,30 and 100 year return period storms with a duration of 15 to 600 minutes.

The Revised Post-dev Imperm. area is the area (in ha) that is not going to SUDS x impervious runoff factor.

The runoff rates are calculated for the chosen hydrograph (Summer or Winter) as l/s. Figures in red indicate m³/s. The peak value is measured, multiplied by the CCF and the total maximum rate is shown.

The pre- and post-development volumes for a 100 year / 6 hour storm are calculated from the area under the hydrograph curve.

Post-dev volume (i.e. excess above SUDS) is that volume produced by the drained area that does not go to SUDS.

Qbar(rural) is calculated in accordance with the procedure laid down in IoH 124