

Appendix D

Preliminary Drainage Calculations

CONTRACT Cowdale Quarry, Buxton

JOB NO P9362



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DESIGNED BY SDH

DATE 09/07/2010
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P1

Surface water calculations

1.1 Cowdale Quarry, Buxton

Total Site Area = 17.8 ha (100% greenfield)

Phase 1 site area = 10.1 ha

Phase 1 Impermeable Area = 6.74 ha

Hard Paved Impermeable area (excluding roofs) = 5.22ha

Roof Areas (Clean Water Only) = 1.52ha

1.2 Hydrological Characteristics (From the FEH / Wallingford maps)

M5-60 = 20.0

SAAR = 1325mm

r = 0.28

WRAP = 1

SOIL = 0.15

UCWI = 138

1.3 loH Report 124 Method for determining existing discharge rates

Development Site Area = 10.1 ha or 0.101 km

CWI = 125

SAAR = 1325 mm/year

SOIL = 0.15

1.3.1 QBAR estimation for small rural catchments

QBAR rural = 0.00108 AREA^{0.89} SAAR^{1.17} SOIL^{1.17}

QBAR rural = 0.00108 x 0.101^{0.89} x 1325^{1.17} x 0.15^{1.17}

QBAR rural = 0.0102 cumecs

QBAR rural = 10.2 l/s

1.3.2 Discharge rates

QBAR URBAN + 5% = 1.05 x 10.2 = 10.71 l/s

Proposed rates: (minus 20%)

Q2 = 10.7 x 0.8 = 8.5 l/s

Q2 = 6.8 l/s

Q5 = 10.7 x 1.25 = 13 l/s

Q5 = 10.4 l/s

Q10 = 10.7 x 1.4 = 15 l/s

Q10 = 12.0 l/s

Q25 = 10.7 x 1.65 = 17.6 l/s

Q25 = 14.1 l/s

Q50 = 10.7 x 1.8 = 19 l/s

Q50 = 15.2 l/s

Q100 = 10.7 x 2.1 = 22.5 l/s

Q100 = 18 l/s

Q500 = 10.7 x 2.7 = 29 l/s

Q1000 = 10.7 x 3.05 = 32.6 l/s

(The multipliers are taken from R&D technical report W5-074/A/TR1/ Rev C - Figure 1.2, Peak growth curves of UK)

1.4 Storage Estimate

Using the impermeable area(excluding roof areas) contributing to the system (no infiltration)

Quick Storage Estimate

Variables

Region: England & Wales

Return Period (years): 100

Map: M5-60 (mm)

Phase R: 0.28

Cv (Summer): 0.750

Cv (Winter): 0.640

Impermeable Area (ha): 5.22

Maximum Allowable Discharge (l/s): 10

Infl Coefficient (m/hr):

Safety Factor: 2

Climate Change %: 20

Apply

Done Help

Quick Storage Estimate

Variables Result Design Overview 2D Overview 3D Vt

Global Variables require approximate storage of between 2000 m³ and 5000 m³

These values are estimates only and should not be used for design purposes.

Done Help

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Roof Areas contributing to soakaways (no offsite connection)

Quick Storage Estimate

Variables	Result	Design	Overview 2D	Overview 3D	Vi
Region: England & Wales	Cv (Summer)	0.750			
Return Period (years): 100	Cv (Winter)	0.940			
Map: BS-60 (mm): 20	Impermeable Area (ha)	1.52			
Rainfall: 0.28	Maximum Allowable Discharge (l/s)	18			
	Infiltration Coefficient (m/hr)	0.4			
	Safety Factor	2			
	Climate Change %	25			
	Apply				

Done Help

Quick Storage Estimate

Global Variables require approximate storage of between 727 m³ and 1149 m³.

With infiltration storage is reduced to between 126 m³ and 613 m³.

These values are estimates only and should not be used for design purposes.

Done Help