GEO-ENVIRONMENTAL CONSULTING ENGINEERS

bEk Enviro Ltd
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01254 377622
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Our Ref: BEK/18385/181218/1/OCCE-RevA

18 December 2018

FAO Stuart O'Callaghan
O'Callaghan Civil Engineering
Showley Fold
Showley Road
Clayton-Le-Dale
Blackburn
Lancashire
BB1 9DR

Dear Stuart,

Drainage Statement/Strategy – Land opposite Woodfield Garage, Longsight Road, Clayton-le-Dale

BEK Enviro (BEK) has been instructed by O'Callaghan Civil Engineering to provide a Drainage Strategy/Statement for a planning application for proposed office and workshop with storage yard at Land opposite Woodfield Garage, Longsight Road, Clayton-le-Dale.

The drainage strategy/statement will include information on the existing drainage, information on the intended surface water drainage, discharge points and discharge rates, a sketch layout plan, and indicative attenuation requirements

Drainage Statement/Strategy

The proposed development is for the construction of an office and workshop, storage yard and new access road and this drainage statement/strategy will include the following information:

- Expected lifetime of development
- Information on existing drainage on site
- Information on intended surface water drainage
- Discharge point
- Discharge Rate
- Indicative Drainage Layout Plan
  - SUDS
  - Sewer
  - Drains
  - Watercourses
  - Exceedance Routes, where applicable
- Pre-development discharge rates for:
  - 1 in 1 year
  - 1 in 2.2 year (Qbar)
  - 1 in 30 year
  - 1 in 100 year plus climate change
- Indicative Attenuation Requirements
- Details of any pollution prevention measures or water quality treatments, where applicable.

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Lifetime of Development

The proposed development is classified as commercial development therefore the development is anticipated to have a lifespan approximating 85 years as such 20% and 40% shall be added to indicative attenuation requirements taking into account the lifetime of the development.

Existing Site Drainage

The existing site is comprised of a grassed agricultural field with trees surrounding the site.

Correspondence with United Utilities and anecdotal information from the applicant indicates that there are no United Utilities sewers within the vicinity of the site however there is a stone culvert of approximately 150 mm x 200 m which flows from the south-east of the site towards the north-west through the site.

Furthermore there is another watercourse which runs parallel to the culverted watercourse through the site located some 30 m west of the site adjacent to a residential property known as Green Pastures. The watercourse is culverted beneath the A59 within a stone culvert of approximately 450 mm x 600 mm. A pond is located to the east of the site with an outlet from the pond comprised of a 75 mm diameter pipe which also flows towards the north-west towards A59.

Proposed Surface Water Drainage

In accordance with the NPPF and the Non-Statutory Technical Standards for SUDS: Practice Guidance the discharge of surface water shall comply with the drainage hierarchy detailed within the National Planning Policy Framework, Planning Practice Guidance and within Building Regulations Part H and specifies the following methods in order of preference:

- Infiltration via soakaway or other suitable infiltration device
- Discharge to watercourse
- Discharge to public sewer

<u>Infiltration</u>

Soilscapes Viewer maps and BGS Borehole Logs indicate that the site is underlain by superficial deposits of boulder clay as shown within the figure below:

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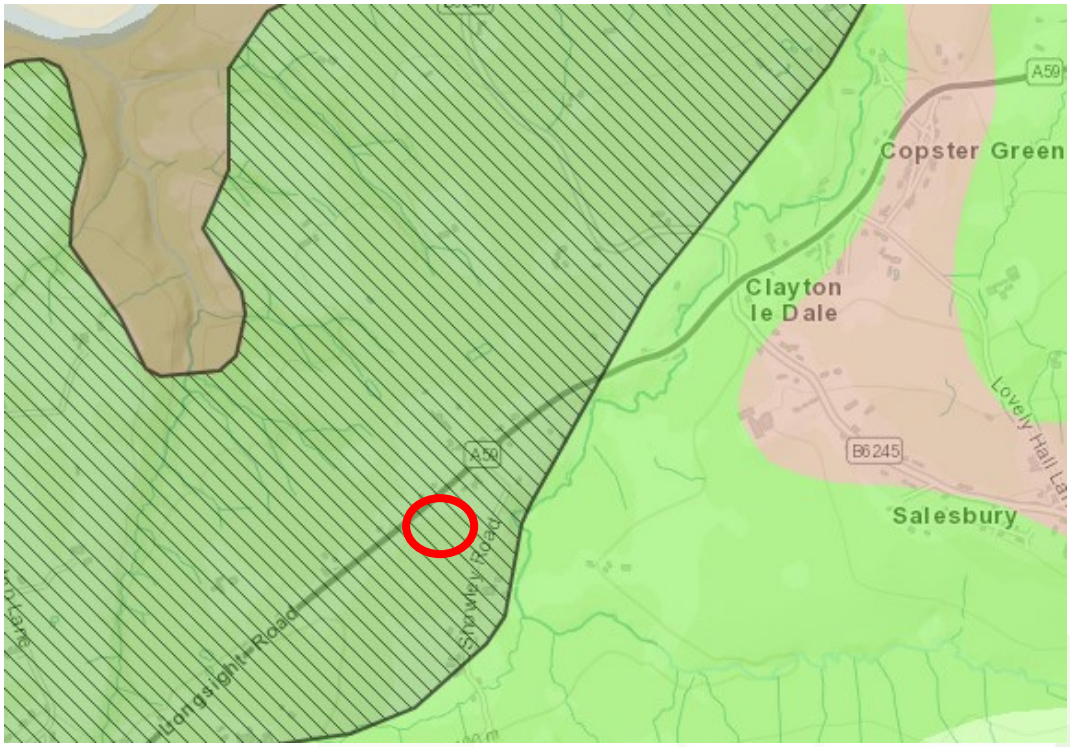
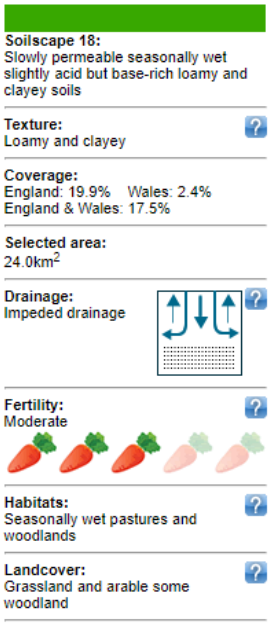


Figure 1: Soilscapes Viewer Map

Key



The soilscapes viewer map indicates that the site is situated on slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils. These types of soils would generally be unsuitable for the dissipation of surface water via infiltration.

Due to the clayey soils beneath the site, the use of soakaways is considered to be unviable and therefore in accordance with the drainage hierarchy, discharge of surface water into watercourse should be investigated.

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Discharge to Watercourse

The nearest watercourse to the site is a culverted watercourse which flows through the centre of the site from the south-east towards the north-west. It is proposed that surface water is discharged into the culverted watercourse.

A formal application to discharge surface water and treated waste from foul into the watercourses local to the development site may be required to be undertaken through Lancashire County Council i.e. the Lead Local Flood Authority for the area.

Discharge Point

It is proposed that a new connection is constructed and surface water from the site is connected to the stone culvert of approximately 150 mm x 200 mm which flows through the centre of the site. The discharge point is included within the Indicative Drainage Design within Annex B of this report.

Discharge Rate

The total area within the development boundary approximates 7,663 m^2 and is not considered to be positively drained. As such the HR Wallingford Greenfield Runoff Estimate has been used to estimate greenfield runoff rates from the existing site. The results have been tabulated below for the 1 in 1 year, 1 in 2.2 year (Qbar), 1 in 30 year and 1 in 100 year return periods:

Return Period	Q_{bar}	Peak Flow Rate Site (l/s)
1 in 1 year	6.5	5.66
1 in 30 year		11.05
1 in 100 year		13.52

***Table 1**: Existing Surface Water Runoff (0.7663 Hectare)*

Flows in excess of this should be attenuated within the boundary of the development prior to discharge. Furthermore it is noted that the discharge rates calculated are preliminary at this stage and will need to be revised prior to the completion of a detailed drainage design for the site.

Indicative Drainage Plan

An indicative drainage plan is included within Annex B of this report.

Runoff Rates

Pre-development runoff rates have been calculated within Table 1 of this report and indicates that the 1 in 1 year, 1 in 2.2 year, 1 in 30 year and 1 in 100 year return periods are 5.66 l/s, 6.50 l/s, 11.05 l/s and 13.52 l/s respectively.

Following development it is estimated from current development plans the impermeable area of the site will increase to 6,822 m^2 which equates to 89 % of the total site area comprised of the new road and car parking and storage areas and the roof of the proposed industrial unit.

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Attenuation Requirements

Using the Surface Water Storage Requirement module of HR Wallingford indicative attenuation volumes for the 1 in 100 year event have been calculated. An additional 20% and 40% has been added to peak rainfall intensities to assess the impact of climate change over the lifetime of the development.

Return Period	Indicative Attenuation Volumes (m^3)		
	No Climate Change	20% Climate Change	40% Climate Change
1 in 100 year	262	381	500

Table 2: Indicative Attenuation Volumes (0.6822 Hectares Impermeable)

This represents a worst case scenario and may need to be revised following the production of detailed plans and the detailed design stage. It is considered that a geocellular tank of 26 m x 26 m and a depth of 0.8 m at 95% porosity would be sufficient to attenuate flows on site for the 1 in 100 year plus 40% climate change rainfall event prior to discharge.

Alternatively, a mixture of attenuation and SUDS structures such as oversized pipes, permeable paving and attenuation storage tanks could be utilised within the site to attenuate surface water prior to discharge.

It is noted that the current proposed site plans indicate that geocellular storage crates could be located beneath the storage areas of the site.

Pollution Measures

It is not considered that any specific pollution measures or water quality treatments are required. Water quality treatments such as petrol interceptors are usually only required for car parks over 50 spaces or larger than 800 m^2 in area as such petrol interceptors are unlikely to be required. Current development plans indicate that there will be 17no car/van parking spaces at the site.

Foul Drainage

It is recognised that there are no United Utilities sewers within the vicinity of the site therefore it is proposed that a package treatment plant is used for the discharge of foul from the site.

I trust the above is satisfactory. Should you require anything further please do not hesitate to contact the undersigned.

Yours sincerely

D. Emmott

DAVID EMMOTT
BSc (Hons) MSc AMIEnvSc

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Annex A – Development Plans
Annex B – Indicative Drainage Design
Annex C – Greenfield Runoff Rates
Annex D – Indicative Attenuation Requirements

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ANNEX A

Development Plans

N

1:500 Scale

0 10 20 30m

Wood Field Farm

Garage

Hard Standing

Pond

Office and Workshop

Grass

3no. Staff Parking Spaces

6no. Staff Parking Spaces

5no. Van Parking Spaces

Cycle Store (5no. Cycles)

2.4m x 215m Visibility Splay

Hedgerow within clients ownership to be relocated / trimmed back to maintain visibility splay required

10m

2.4m

Grass verge

Post and rail fence

New Entrance

R20000mm

7.3m

Hedge

Gates

Open tarmac road to follow the existing field level

New Access Road

1.8m high solid acoustic fence

Proposed hedging to be incorporated into existing tree line and shrubbery

Existing trees to be retained

Approximate route of stone culvert

Storage Yard
(Tarmac / concrete hardstanding)

Paladin fence to site boundary

1.8m high noise attenuation bund

Any existing trees to be retained where possible

Route of public footpath

97.128 97.182 97.308 97.490 97.612 97.640 97.778 97.966 97.865 97.918 98.048 98.000 98.214 98.524 98.659 98.139 98.190 98.009 98.361 98.066 97.815 97.882 97.685 97.677 98.089 97.693 98.294 97.747 97.662 98.558 98.413 99.096 98.764

REVISIONS:

Rev A - Drawing amended following comments from transport consultant. 27/11/18 LFG

Rev B - Route of public footpath added and boundary amended. 4/12/18 LFG

Rev C - Route of public footpath amended. 10/12/18 LFG

Client
Mr S O'Callaghan

Job Title
Land Adjacent to Woodfield Garage
Longsight Road
Clayton le Dale
Blackburn

Drawing Title
Proposed Site Plan

Scale	Date	Drawn
1:500 @ A2	Nov 2018	LFG

SUNDERLAND PEACOCK ARCHITECTS
SUNDERLAND PEACOCK & ASSOCIATES LTD.
HAZELMERE, PIMLICO ROAD, CLITHEROE
LANCASHIRE, BB7 2AG
T 01200 423178 F 01200 427328
E info@sunderlandpeacock.com
www.sunderlandpeacock.com

5365 - 05 c

Proposed Site Plan
Scale 1:500

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ANNEX B

Indicative Drainage Design

Pond

1.8m high solid acoustic fence

3no. Staff Parking Spaces

Proposed hedging to be incorporated into existing tree line and shrubbery

97.747

98.294

98.413

Open to follow existing

98.662

98.558

Existing trees to be retained

Grass

Office and Workshop

3no. Staff Parking Spaces

6no. Staff Parking Spaces

5no. Van Parking Spaces

Cycle Store (6no. Cycles)

1.8m high solid acoustic fence

1.8m high solid acoustic fence

Gates

Proposed hedging to be incorporated into existing tree line and shrubbery

Approximate route of stone culvert

PTP

99.096

Storage Yard

(Tarmac / concrete hardstanding)

Geocellular Storage 26m x 26m x 0.8m

Storage Yard

(Tarmac / concrete hardstanding)

Paladin fence to site boundary

Any existing trees to be retained where possible

Outfall into stone culvert

Hydrobrake or similar flow control unit restricting discharge to greenfield runoff rates

w tree line

Paladin fence to site boundary

1.8m high noise attenuation bund

Proposed hedging

Any existing trees to be retained where possible

Gate

1.8m high noise attenuation bund

Paladin fence to site boundary

Any existing trees to be retained where possible

Route of public footpath

LEGEND

PROPOSED SURFACE WATER DRAIN

PROPOSED SURFACE WATER MANHOLE

PROPOSED FOUL DRAIN

PROPOSED FOUL MANHOLE

REV	DESCRIPTION	DATE	BY

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Email: mbuckley@bekenviro.co.uk

Web: www.bekenviro.co.uk

CLIENT.

O'CALLAGHAN CIVIL ENGINEERING

JOB TITLE.

LONGSIGHT ROAD, CLAYTON-LE-DALE

DRAWING TITLE.

INDICATIVE DRAINAGE PLAN

SCALE @ A3.	DRAWN BY.	APPROVED BY.	DATE.
NTS	D.E.	M.B.	18/12/18

DRAWING No.	REV.
18385-5	-

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ANNEX C

Greenfield Runoff Rates

HR Wallingford
Working with water

Greenfield runoff estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by:	David Emmott
Site name:	Longsight Road
Site location:	Clayton-le-Dale

This is an estimation of the greenfield runoff rate limits that are needed to meet normal best practice criteria in line with Environment Agency guidance "Preliminary rainfall runoff management for developments", W5-074/A/TR1/1 rev. E (2012) and the SuDS Manual, C753 (Ciria, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Site coordinates

Latitude:	53.79091° N
Longitude:	2.51611° W

Reference:	6336762
Date:	2018-12-03T14:29:54

Methodology	IH124

Site characteristics

Total site area (ha)	0.7763

Methodology

Qbar estimation method	Calculate from SPR and SAAR
SPR estimation method	Calculate from SOIL type

	Default	Edited
SOIL type	4	4
HOST class	---	---
SPR/SPRHOST	0.47	0.47

Hydrological characteristics

	Default	Edited
SAAR (mm)	1121	1121
Hydrological region	10	10
Growth curve factor: 1 year	0.87	0.87
Growth curve factor: 30 year	1.7	1.7
Growth curve factor: 100 year	2.08	2.08

Notes:

(1) Is Q_{BAR} < 2.0 l/s/ha?

(2) Are flow rates < 5.0 l/s?

(3) Is SPR/SPRHOST ≤ 0.3?

Greenfield runoff rates

	Default	Edited
Qbar (l/s)	6.5	6.5
1 in 1 year (l/s)	5.66	5.66
1 in 30 years (l/s)	11.05	11.05
1 in 100 years (l/s)	13.52	13.52

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ANNEX D

Indicative Attenuation Requirements

HR Wallingford
Working with water

Surface water storage requirements for sites

www.uksuds.com | Storage estimation tool

Calculated by:	David Emmott
Site name:	Longsight Road
Site location:	Clayton-le-Dale

This is an estimation of the storage volume requirements that are needed to meet normal best practice criteria in line with Environment Agency guidance "Preliminary rainfall runoff management for developments", W5-074/A/TR1/1 rev. E (2012) and the SuDS Manual, C753 (Ciria, 2015). It is not to be used for detailed design of drainage systems. It is recommended that hydraulic modelling software is used to calculate volume requirements and design details before finalising the drainage scheme.

Site coordinates

Latitude:	53.79091° N
Longitude:	2.51611° W

Reference:	6336848
Date:	2018-12-03T14:42:03

Methodology	IH124

Site characteristics

Total site area (ha)	0.7663
Significant public open space (ha)	0.0841
Area positively drained (ha)	0.6822
Pervious area contribution (%)	30
Impermeable area (ha)	0.6822
Percentage of drained area that is impermeable (%)	100
Impervious area drained via infiltration (ha)	0
Return period for infiltration system design (year)	10
Impervious area drained to rainwater harvesting systems (ha)	0
Return period for rainwater harvesting system design (year)	10
Compliance factor for rainwater harvesting system design (%)	66
Net site area for storage volume design (ha)	0.68
Net impermeable area for storage volume design (ha)	0.68

* Where rainwater harvesting or infiltration has been used for managing surface water runoff such that the effective impermeable area is less than 50 % of the 'area positively drained', the 'net site area' and the estimates of Qbar and other flow rates will have been reduced accordingly.

Design criteria

Volume control approach	Use long term storage

	Default	Edited
Climate change allowance factor	1.0	1.0
Urban creep allowance factor	1.1	1.1
Interception rainfall depth (mm)	5	5
Minimum flow rate (l/s)	5	5

Qbar estimation method	Calculate from SPR and SAAR
SPR estimation method	Calculate from SOIL type

	Default	Edited
Qbar total site area (l/s)	6.42	--
SOIL type	4	4
HOST class	N/A	N/A
SPR	0.47	0.47

Hydrology

	Default	Edited
SAAR (mm)	1121	1121
M5-60 Rainfall Depth (mm)	20	20
'r' Ratio M5-60/M5-2 day	0.3	0.3
Rainfall 100 yrs 6 hrs	70	
Rainfall 100 yrs 12 hrs	99.96	
FEH/FSR conversion factor	1.19	1.19
Hydrological region	10	
Growth curve factor: 1 year	0.87	0.87
Growth curve factor: 10 year	1.38	1.38
Growth curve factor: 30 year	1.7	1.7
Growth curve factor: 100 year	2.08	2.08

Site discharge rates

	Default	Edited
Qbar total site area (l/s)	6.42	6.42
Qbar net site area (l/s)	5.71	5.71
1 in 1 year (l/s)	5	5
1 in 30 years (l/s)	9.7	9.7
1 in 100 years (l/s)	11.9	11.9

Estimated storage volumes

	Default	Edited
Interception storage (m^3)	27	27
Attenuation storage (m^3)	262	262
Long term storage (m^3)	137	137
Treatment storage (m^3)	82	82
Total storage *(excluding treatment)* (m^3)	426	426

HR Wallingford
Working with water

Surface water storage requirements for sites

www.uksuds.com | Storage estimation tool

Calculated by:	David Emmott
Site name:	Longsight Road
Site location:	Clayton-le-Dale

This is an estimation of the storage volume requirements that are needed to meet normal best practice criteria in line with Environment Agency guidance "Preliminary rainfall runoff management for developments", W5-074/A/TR1/1 rev. E (2012) and the SuDS Manual, C753 (Ciria, 2015). It is not to be used for detailed design of drainage systems. It is recommended that hydraulic modelling software is used to calculate volume requirements and design details before finalising the drainage scheme.

Site coordinates

Latitude:	53.79091° N
Longitude:	2.51611° W

Reference:	6336848
Date:	2018-12-03T14:42:58

Methodology	IH124

Site characteristics

Total site area (ha)	0.7663
Significant public open space (ha)	0.0841
Area positively drained (ha)	0.6822
Pervious area contribution (%)	30
Impermeable area (ha)	0.6822
Percentage of drained area that is impermeable (%)	100
Impervious area drained via infiltration (ha)	0
Return period for infiltration system design (year)	10
Impervious area drained to rainwater harvesting systems (ha)	0
Return period for rainwater harvesting system design (year)	10
Compliance factor for rainwater harvesting system design (%)	66
Net site area for storage volume design (ha)	0.68
Net impermeable area for storage volume design (ha)	0.68

* Where rainwater harvesting or infiltration has been used for managing surface water runoff such that the effective impermeable area is less than 50 % of the 'area positively drained', the 'net site area' and the estimates of Qbar and other flow rates will have been reduced accordingly.

Design criteria

Volume control approach	Use long term storage

	Default	Edited
Climate change allowance factor	1.2	1.2
Urban creep allowance factor	1.1	1.1
Interception rainfall depth (mm)	5	5
Minimum flow rate (l/s)	5	5

Qbar estimation method	Calculate from SPR and SAAR
SPR estimation method	Calculate from SOIL type

	Default	Edited
Qbar total site area (l/s)	6.42	--
SOIL type	4	4
HOST class	N/A	N/A
SPR	0.47	0.47

Hydrology

	Default	Edited
SAAR (mm)	1121	1121
M5-60 Rainfall Depth (mm)	20	20
'r' Ratio M5-60/M5-2 day	0.3	0.3
Rainfall 100 yrs 6 hrs	70	
Rainfall 100 yrs 12 hrs	99.96	
FEH/FSR conversion factor	1.19	1.19
Hydrological region	10	
Growth curve factor: 1 year	0.87	0.87
Growth curve factor: 10 year	1.38	1.38
Growth curve factor: 30 year	1.7	1.7
Growth curve factor: 100 year	2.08	2.08

Site discharge rates

	Default	Edited
Qbar total site area (l/s)	6.42	6.42
Qbar net site area (l/s)	5.71	5.71
1 in 1 year (l/s)	5	5
1 in 30 years (l/s)	9.7	9.7
1 in 100 years (l/s)	11.9	11.9

Estimated storage volumes

	Default	Edited
Interception storage (m^3)	27	27
Attenuation storage (m^3)	381	381
Long term storage (m^3)	137	137
Treatment storage (m^3)	82	82
Total storage *(excluding treatment)* (m^3)	545	545

HR Wallingford
Working with water

Surface water storage requirements for sites

www.uksuds.com | Storage estimation tool

Calculated by:	David Emmott
Site name:	Longsight Road
Site location:	Clayton-le-Dale

This is an estimation of the storage volume requirements that are needed to meet normal best practice criteria in line with Environment Agency guidance "Preliminary rainfall runoff management for developments", W5-074/A/TR1/1 rev. E (2012) and the SuDS Manual, C753 (Ciria, 2015). It is not to be used for detailed design of drainage systems. It is recommended that hydraulic modelling software is used to calculate volume requirements and design details before finalising the drainage scheme.

Site coordinates

Latitude:	53.79091° N
Longitude:	2.51611° W

Reference:	6336848
Date:	2018-12-03T14:43:51

Methodology	IH124

Site characteristics

Total site area (ha)	0.7663
Significant public open space (ha)	0.0841
Area positively drained (ha)	0.6822
Pervious area contribution (%)	30
Impermeable area (ha)	0.6822
Percentage of drained area that is impermeable (%)	100
Impervious area drained via infiltration (ha)	0
Return period for infiltration system design (year)	10
Impervious area drained to rainwater harvesting systems (ha)	0
Return period for rainwater harvesting system design (year)	10
Compliance factor for rainwater harvesting system design (%)	66
Net site area for storage volume design (ha)	0.68
Net impermeable area for storage volume design (ha)	0.68

* Where rainwater harvesting or infiltration has been used for managing surface water runoff such that the effective impermeable area is less than 50 % of the 'area positively drained', the 'net site area' and the estimates of Qbar and other flow rates will have been reduced accordingly.

Design criteria

Volume control approach	Use long term storage

	Default	Edited
Climate change allowance factor	1.4	1.4
Urban creep allowance factor	1.1	1.1
Interception rainfall depth (mm)	5	5
Minimum flow rate (l/s)	5	5

Qbar estimation method	Calculate from SPR and SAAR
SPR estimation method	Calculate from SOIL type

	Default	Edited
Qbar total site area (l/s)	6.42	--
SOIL type	4	4
HOST class	N/A	N/A
SPR	0.47	0.47

Hydrology

	Default	Edited
SAAR (mm)	1121	1121
M5-60 Rainfall Depth (mm)	20	20
'r' Ratio M5-60/M5-2 day	0.3	0.3
Rainfall 100 yrs 6 hrs	70	
Rainfall 100 yrs 12 hrs	99.96	
FEH/FSR conversion factor	1.19	1.19
Hydrological region	10	
Growth curve factor: 1 year	0.87	0.87
Growth curve factor: 10 year	1.38	1.38
Growth curve factor: 30 year	1.7	1.7
Growth curve factor: 100 year	2.08	2.08

Site discharge rates

	Default	Edited
Qbar total site area (l/s)	6.42	6.42
Qbar net site area (l/s)	5.71	5.71
1 in 1 year (l/s)	5	5
1 in 30 years (l/s)	9.7	9.7
1 in 100 years (l/s)	11.9	11.9

Estimated storage volumes

	Default	Edited
Interception storage (m^3)	27	27
Attenuation storage (m^3)	500	500
Long term storage (m^3)	137	137
Treatment storage (m^3)	82	82
Total storage *(excluding treatment)* (m^3)	664	664