

APPENDIX D – DRAINAGE STRATEGY



GENERAL NOTES

- This drawing is to be read in conjunction with relevant architectural and engineering drawings.
- Levels indicated on these are Finished floor levels and are 150mm above actual finished ground levels.
- Unless otherwise indicated, all dimensions are in millimetres.
- Levels of the existing road at the point of joint with proposed site road must be checked prior to construction.
- Any discrepancies between the details shown and actual site conditions are to be reported immediately to the engineer prior to commencement of works.
- The Contractor is to check and verify in consultation with the Architects details all setting out points, including levels, and ensure that the correct levels at construction points are shown. All works are to be fully compliant with the standards and requirements of the site investigation report before work starts. The Client is not responsible for any errors or omissions in the drawings or any other documents.
- This drawing is not intended to show details of ground conditions or ground contaminants. Each area of ground relied upon to support any structure detailed (including drainage) must be investigated by the Engineer, and the results of the investigation must be made available to the Contractor. The Contractor is to ensure that the ground conditions and ground contaminants are suitable for the proposed works. Any additional assessment of typical types of ground and any other matters should be referred to the Engineer.
- Where existing trees are shown to be retained they should be subject to a full Arboricultural Inspection for all trees to be retained. The Contractor is to ensure that all trees are in a permanent position from planting to removal from drainage and services, where applicable. A fence should be provided to accommodate the retention of trees.

- Roads, footways and parking bays which form part of the highway to be adopted under Section 38 of

- _____

100

-
- Development boundary

TO DETAILED DESIGN.

Rev.	Description	Date	By
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100

Definition: Shootout of 2



APPENDIX E – DISCHARGE CALCULATIONS

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Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by:

Site name:

Site location:

Site Details

Latitude:

Longitude:

Reference:

Date:

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013), the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Runoff estimation approach

Site characteristics

Total site area (ha):

Methodology

Q_{BAR} estimation method:

SPR estimation method:

Soil characteristics

SOIL type:

HOST class:

SPR/SPRHOST:

Hydrological characteristics

SAAR (mm):

Hydrological region:

Growth curve factor 1 year:

Growth curve factor 30 years:

Growth curve factor 100 years:

Growth curve factor 200 years:

Notes

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

When Q_{BAR} is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

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

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

(3) Is $SPR/SPRHOST \leq 0.3$?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

Greenfield runoff rates	Default	Edited
Q_{BAR} (l/s):	16.05	16.05
1 in 1 year (l/s):	13.96	13.96
1 in 30 years (l/s):	27.28	27.28
1 in 100 year (l/s):	33.37	33.37
1 in 200 years (l/s):	38.03	38.03

This report was produced using the greenfield runoff tool developed by HR Wallingford and available at www.uksuds.com. The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at www.uksuds.com/terms-and-conditions.htm. The outputs from this tool are estimates of greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, CEH, Hydrosolutions or any other organisation for the use of this data in the design or operational characteristics of any drainage scheme.

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Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by:

Site name:

Site location:

Site Details

Latitude:

Longitude:

Reference:

Date:

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013), the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Runoff estimation approach

Site characteristics

Total site area (ha):

Methodology

Q_{BAR} estimation method:

SPR estimation method:

Soil characteristics

Default Edited

SOIL type:

HOST class:

SPR/SPRHOST:

Hydrological characteristics

Default Edited

SAAR (mm):

Hydrological region:

Growth curve factor 1 year:

Growth curve factor 30 years:

Growth curve factor 100 years:

Growth curve factor 200 years:

Notes

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

When Q_{BAR} is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

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

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

(3) Is $SPR/SPRHOST \leq 0.3$?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

Greenfield runoff rates

Default

Edited

Q_{BAR} (l/s):

1 in 1 year (l/s):

1 in 30 years (l/s):

1 in 100 year (l/s):

1 in 200 years (l/s):

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Calculated by:

Site name:

Site location:

Site Details

Latitude:

Longitude:

Reference:

Date:

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013), the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Runoff estimation approach

Site characteristics

Total site area (ha):

Methodology

Q_{BAR} estimation method:

SPR estimation method:

Soil characteristics

	Default	Edited
SOIL type:	4	4
HOST class:	N/A	N/A
SPR/SPRHOST:	0.47	0.47

Hydrological characteristics

	Default	Edited
SAAR (mm):	1028	1028
Hydrological region:	10	10
Growth curve factor 1 year:	0.87	0.87
Growth curve factor 30 years:	1.7	1.7
Growth curve factor 100 years:	2.08	2.08
Growth curve factor 200 years:	2.37	2.37

Notes

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

When Q_{BAR} is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

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

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

(3) Is $SPR/SPRHOST \leq 0.3$?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

Greenfield runoff rates	Default	Edited
Q_{BAR} (l/s):	25.36	25.36
1 in 1 year (l/s):	22.06	22.06
1 in 30 years (l/s):	43.1	43.1
1 in 100 year (l/s):	52.74	52.74
1 in 200 years (l/s):	60.09	60.09

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Calculated by:
 Site name:
 Site location:

Site Details

Latitude:
 Longitude:
 Reference:
 Date:

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013), the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Runoff estimation approach

Site characteristics

Total site area (ha):

Methodology

Q_{BAR} estimation method:

SPR estimation method:

Soil characteristics

	Default	Edited
SOIL type:	4	4
HOST class:	N/A	N/A
SPR/SPRHOST:	0.47	0.47

Hydrological characteristics

	Default	Edited
SAAR (mm):	1028	1028
Hydrological region:	10	10
Growth curve factor 1 year:	0.87	0.87
Growth curve factor 30 years:	1.7	1.7
Growth curve factor 100 years:	2.08	2.08
Growth curve factor 200 years:	2.37	2.37

Notes

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

When Q_{BAR} is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

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

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

(3) Is $SPR/SPRHOST \leq 0.3$?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

Greenfield runoff rates	Default	Edited
Q_{BAR} (l/s):	7.27	7.27
1 in 1 year (l/s):	6.32	6.32
1 in 30 years (l/s):	12.35	12.35
1 in 100 year (l/s):	15.11	15.11
1 in 200 years (l/s):	17.22	17.22

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Calculated by:

Site name:

Site location:

Site Details

Latitude:

Longitude:

Reference:

Date:

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013), the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Runoff estimation approach

Site characteristics

Total site area (ha):

Methodology

Q_{BAR} estimation method:

SPR estimation method:

Soil characteristics

Default

Edited

SOIL type:

HOST class:

SPR/SPRHOST:

Hydrological characteristics

Default

Edited

SAAR (mm):

Hydrological region:

Growth curve factor 1 year:

Growth curve factor 30 years:

Growth curve factor 100 years:

Growth curve factor 200 years:

Notes

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

When Q_{BAR} is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

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

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

(3) Is $SPR/SPRHOST \leq 0.3$?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

Greenfield runoff rates

Default

Edited

Q_{BAR} (l/s):

1 in 1 year (l/s):

1 in 30 years (l/s):

1 in 100 year (l/s):

1 in 200 years (l/s):

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APPENDIX F – ATTENUATION ESTIMATES

Attenuation Estimates

Catchment 1

1 in 30 Year

Quick Storage Estimate

Micro Drainage

Variables

FSR Rainfall

Return Period (years)

Region

Map

M5-60 (mm)

Ratio R

Cv (Summer)

Cv (Winter)

Impermeable Area (ha)

Maximum Allowable Discharge (l/s)

Infiltration Coefficient (m/hr)

Safety Factor

Climate Change (%)

Enter Maximum Allowable Discharge between 0.0 and 999999.0

Quick Storage Estimate

Micro Drainage

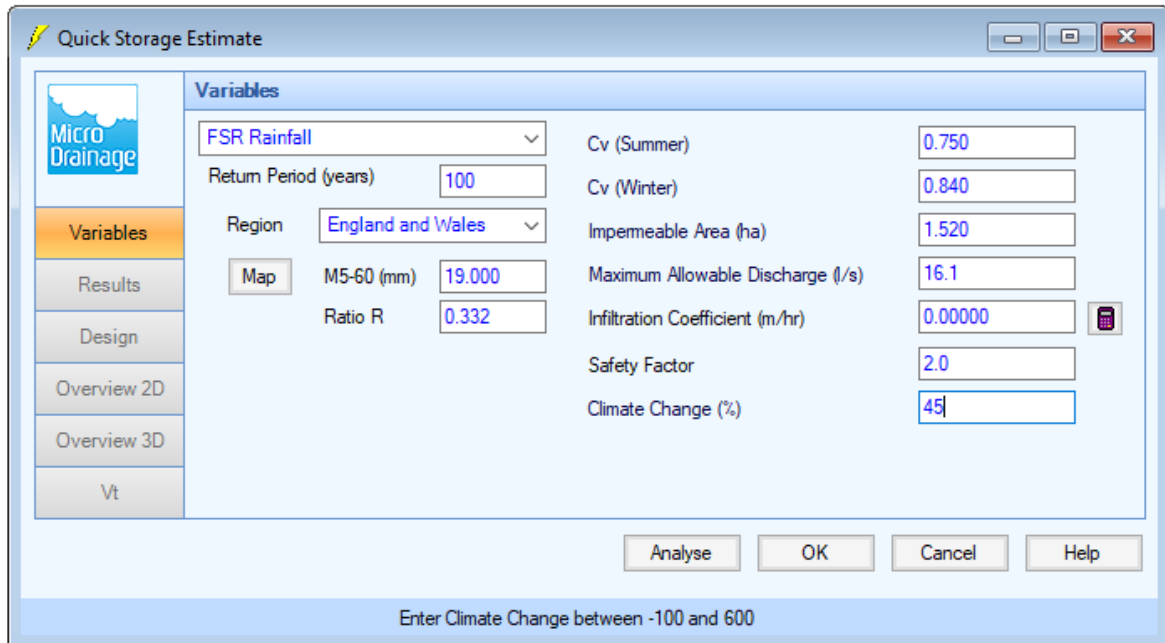
Results

Global Variables require approximate storage of between 357 m³ and 560 m³.

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

Enter Maximum Allowable Discharge between 0.0 and 999999.0

1 in 100 Year + 45% Climate Change

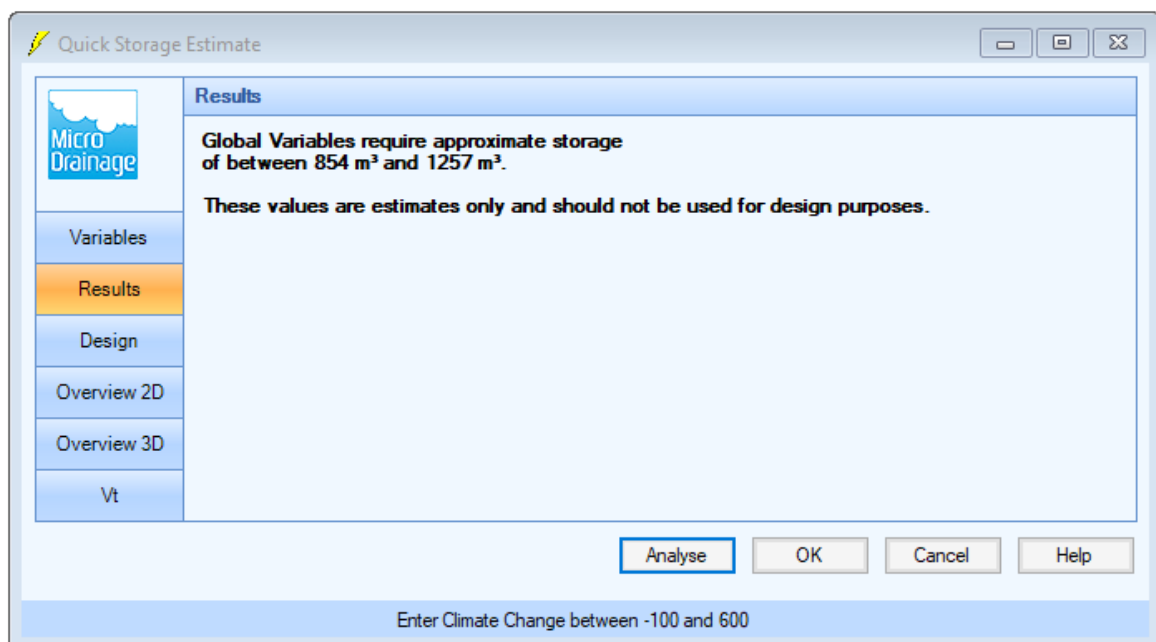


The screenshot shows the 'Variables' tab of the 'Quick Storage Estimate' window. The left sidebar contains buttons for 'Variables', 'Results', 'Design', 'Overview 2D', 'Overview 3D', and 'Vt'. The main area is titled 'Variables' and contains the following inputs:

Variable	Value
FSR Rainfall	FSR Rainfall
Return Period (years)	100
Region	England and Wales
Map	M5-60 (mm)
M5-60 (mm)	19.000
Ratio R	0.332
Cv (Summer)	0.750
Cv (Winter)	0.840
Impermeable Area (ha)	1.520
Maximum Allowable Discharge (l/s)	16.1
Infiltration Coefficient (m/hr)	0.00000
Safety Factor	2.0
Climate Change (%)	45

Buttons at the bottom: Analyse, OK, Cancel, Help.

Footer: Enter Climate Change between -100 and 600



The screenshot shows the 'Results' tab of the 'Quick Storage Estimate' window. The left sidebar contains buttons for 'Variables', 'Results', 'Design', 'Overview 2D', 'Overview 3D', and 'Vt'. The main area is titled 'Results' and contains the following text:

Global Variables require approximate storage of between 854 m³ and 1257 m³.

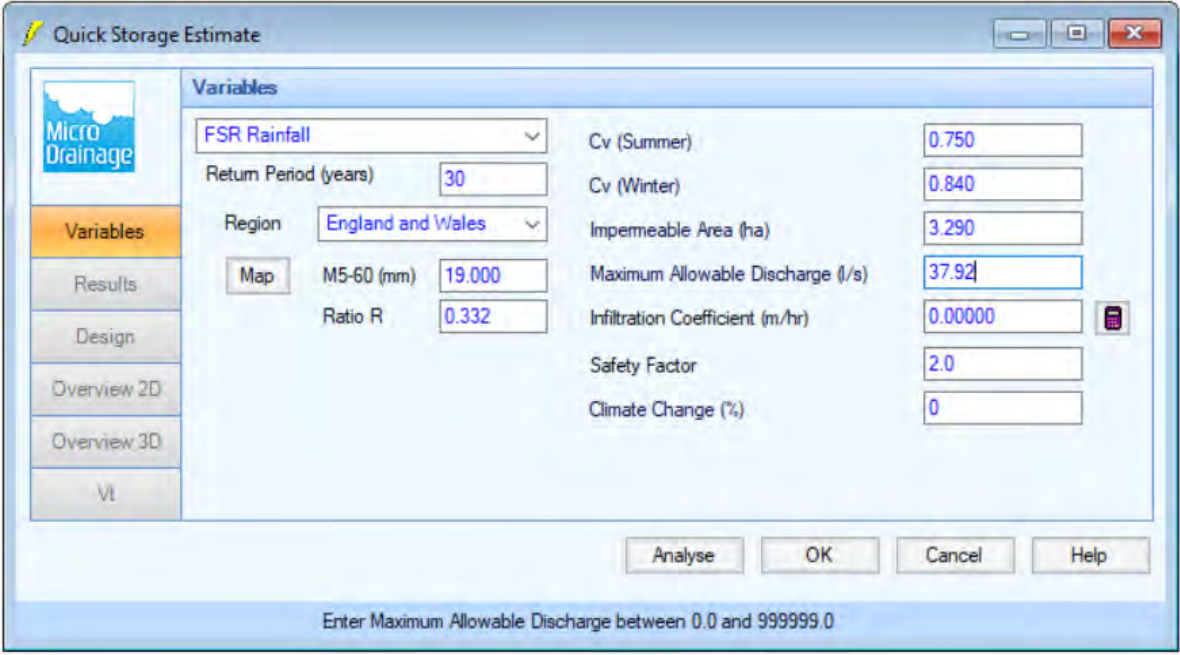
These values are estimates only and should not be used for design purposes.

Buttons at the bottom: Analyse, OK, Cancel, Help.

Footer: Enter Climate Change between -100 and 600

Catchment 2

1 in 30 Year



Micro Drainage

Variables

FSR Rainfall

Return Period (years) 30

Region England and Wales

Map

M5-60 (mm) 19.000

Ratio R 0.332

Cv (Summer) 0.750

Cv (Winter) 0.840

Impermeable Area (ha) 3.290

Maximum Allowable Discharge (l/s) 37.92

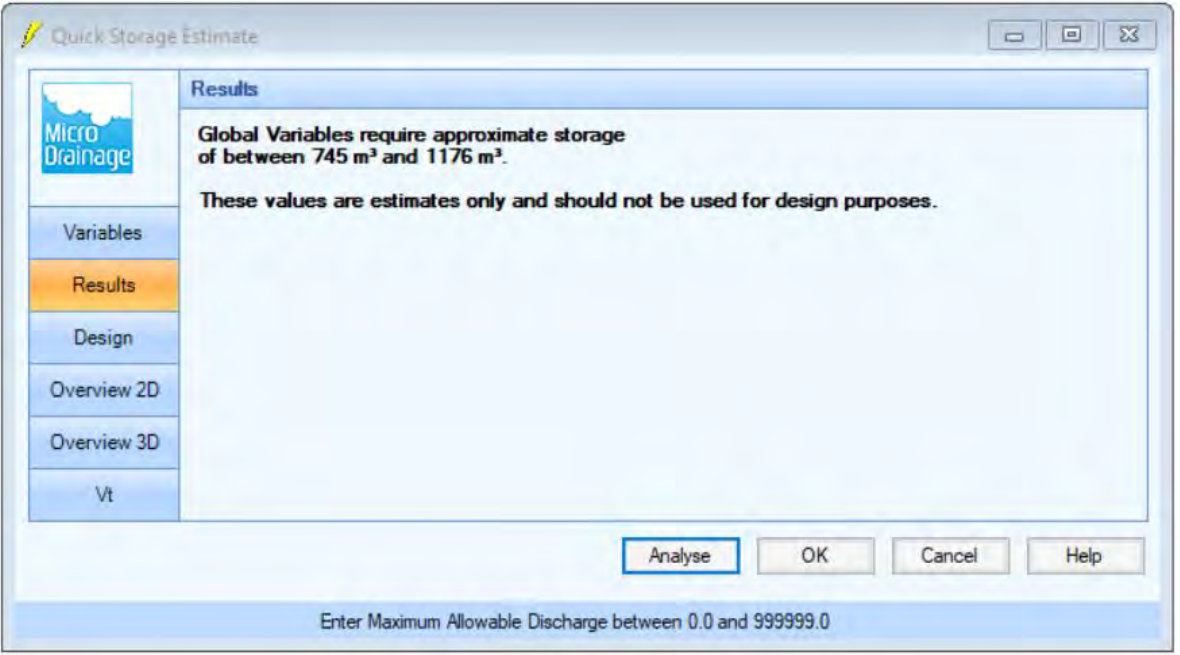
Infiltration Coefficient (m/hr) 0.00000

Safety Factor 2.0

Climate Change (%) 0

Analyse OK Cancel Help

Enter Maximum Allowable Discharge between 0.0 and 999999.0



Micro Drainage

Results

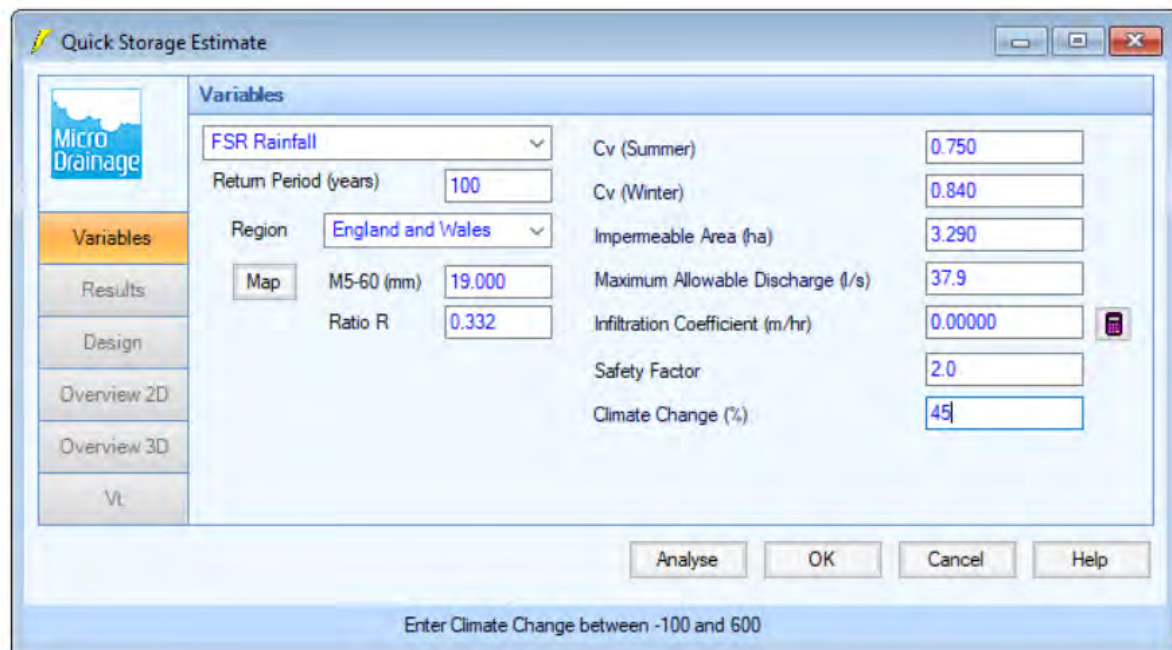
Global Variables require approximate storage of between 745 m³ and 1176 m³.

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

Analyse OK Cancel Help

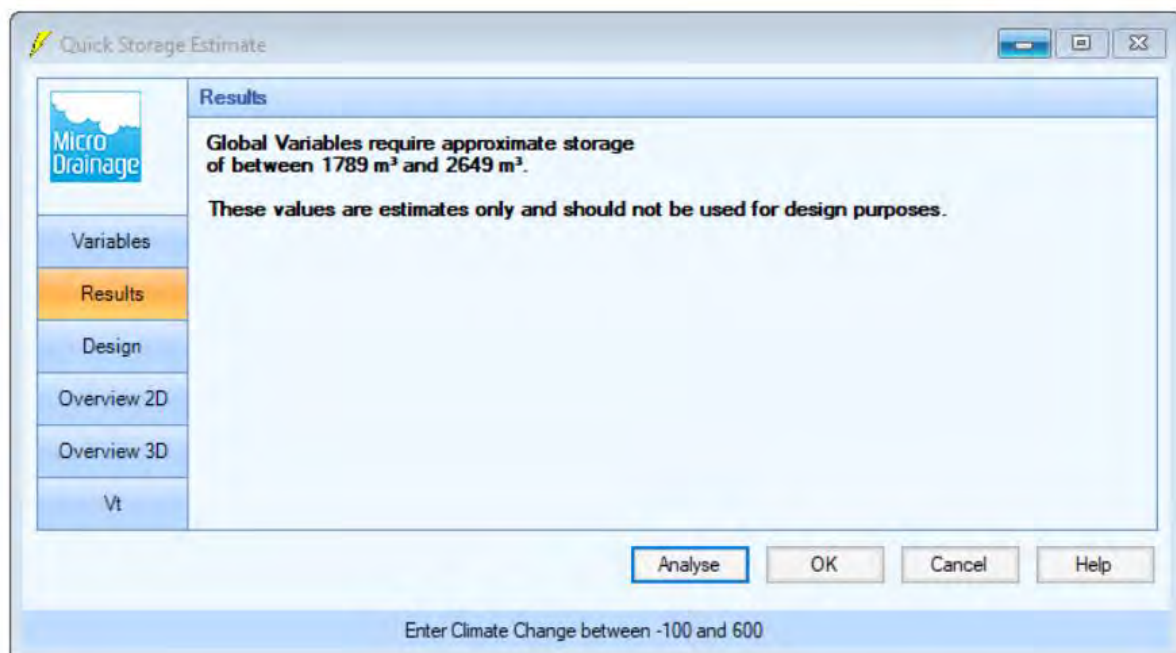
Enter Maximum Allowable Discharge between 0.0 and 999999.0

1 in 100 Year + 45% Climate Change



The screenshot shows the 'Variables' tab of the 'Quick Storage Estimate' window. The left sidebar contains buttons for 'Variables', 'Results', 'Design', 'Overview 2D', 'Overview 3D', and 'Vt'. The main area is divided into two columns of input fields. The first column includes 'FSR Rainfall' (dropdown), 'Return Period (years)' (100), 'Region' (England and Wales), a 'Map' button, 'M5-60 (mm)' (19.000), and 'Ratio R' (0.332). The second column includes 'Cv (Summer)' (0.750), 'Cv (Winter)' (0.840), 'Impermeable Area (ha)' (3.290), 'Maximum Allowable Discharge (l/s)' (37.9), 'Infiltration Coefficient (m/hr)' (0.00000), 'Safety Factor' (2.0), and 'Climate Change (%)' (45). At the bottom are 'Analyse', 'OK', 'Cancel', and 'Help' buttons. A status bar at the very bottom says 'Enter Climate Change between -100 and 600'.

Variable	Value
FSR Rainfall	[Dropdown]
Return Period (years)	100
Region	England and Wales
M5-60 (mm)	19.000
Ratio R	0.332
Cv (Summer)	0.750
Cv (Winter)	0.840
Impermeable Area (ha)	3.290
Maximum Allowable Discharge (l/s)	37.9
Infiltration Coefficient (m/hr)	0.00000
Safety Factor	2.0
Climate Change (%)	45



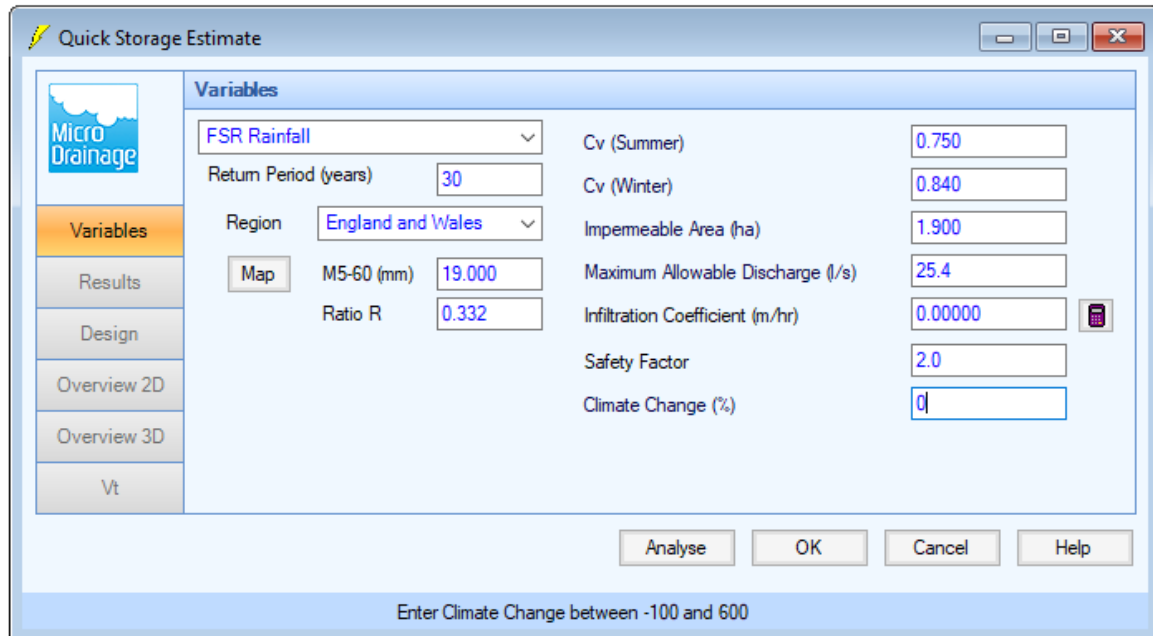
The screenshot shows the 'Results' tab of the 'Quick Storage Estimate' window. The left sidebar is the same as the previous screen. The main area displays the following text: 'Global Variables require approximate storage of between 1789 m³ and 2649 m³.' and 'These values are estimates only and should not be used for design purposes.' At the bottom are 'Analyse', 'OK', 'Cancel', and 'Help' buttons. A status bar at the very bottom says 'Enter Climate Change between -100 and 600'.

Global Variables require approximate storage of between 1789 m³ and 2649 m³.

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

Catchment 3

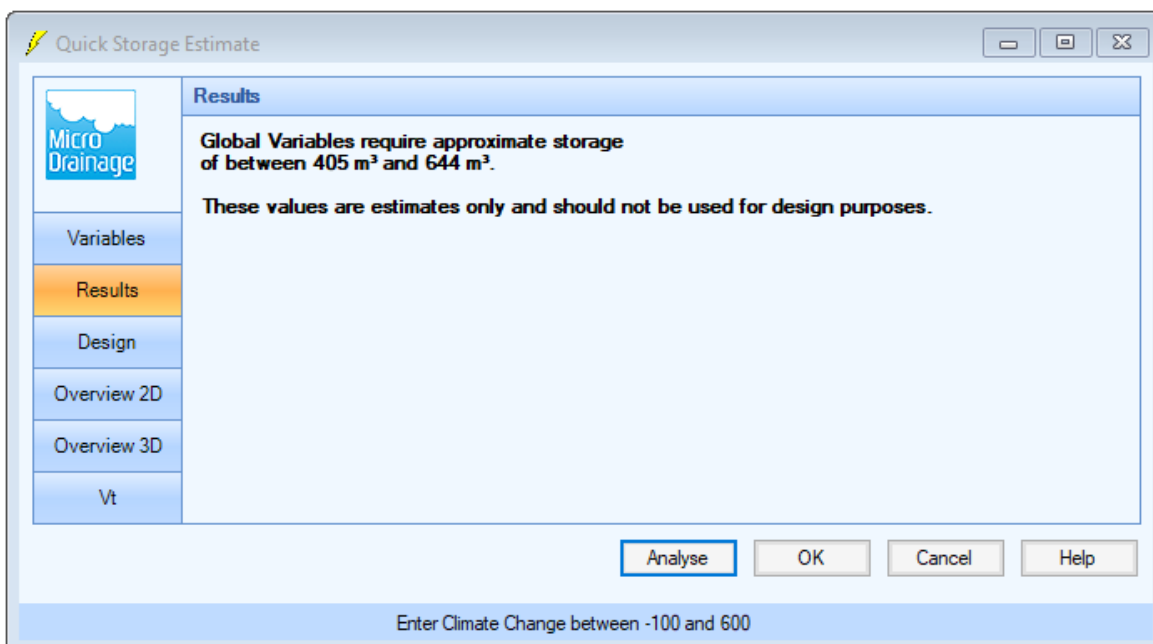
1 in 30 Year



The screenshot shows the 'Variables' tab of the 'Quick Storage Estimate' window. The left sidebar contains buttons for 'Variables', 'Results', 'Design', 'Overview 2D', 'Overview 3D', and 'Vt'. The main area is titled 'Variables' and contains the following fields:

Field	Value
FSR Rainfall	30
Return Period (years)	30
Region	England and Wales
Map	M5-60 (mm)
Ratio R	19.000
Cv (Summer)	0.750
Cv (Winter)	0.840
Impemeable Area (ha)	1.900
Maximum Allowable Discharge (l/s)	25.4
Infiltration Coefficient (m/hr)	0.00000
Safety Factor	2.0
Climate Change (%)	0

Buttons at the bottom: Analyse, OK, Cancel, Help. A footer note states: 'Enter Climate Change between -100 and 600'.



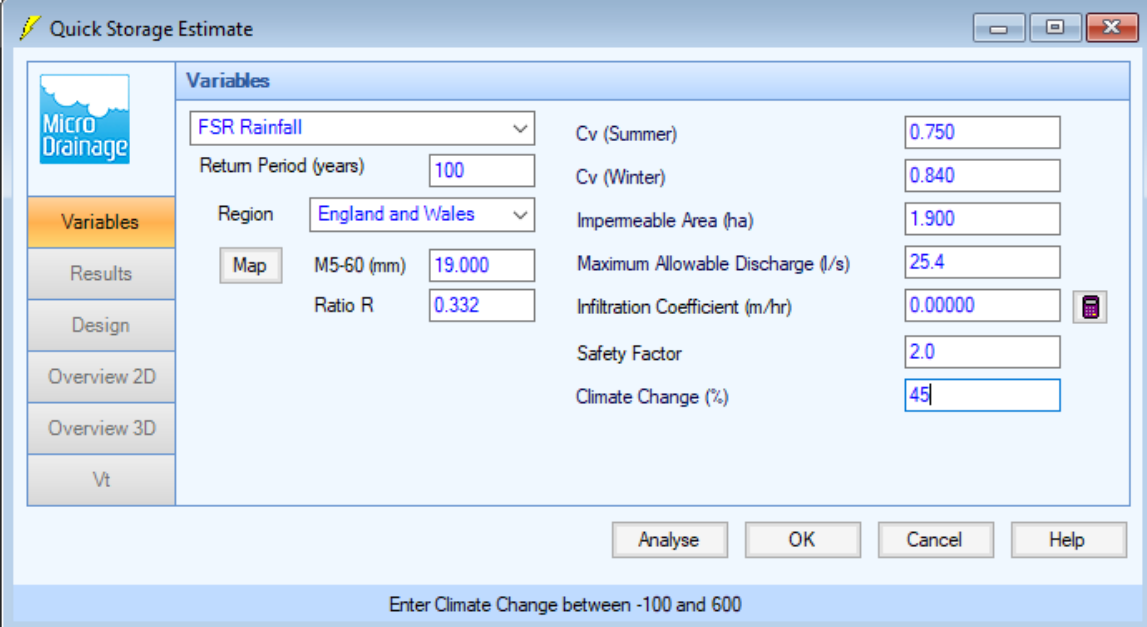
The screenshot shows the 'Results' tab of the 'Quick Storage Estimate' window. The left sidebar contains buttons for 'Variables', 'Results', 'Design', 'Overview 2D', 'Overview 3D', and 'Vt'. The main area is titled 'Results' and contains the following text:

Global Variables require approximate storage of between 405 m³ and 644 m³.

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

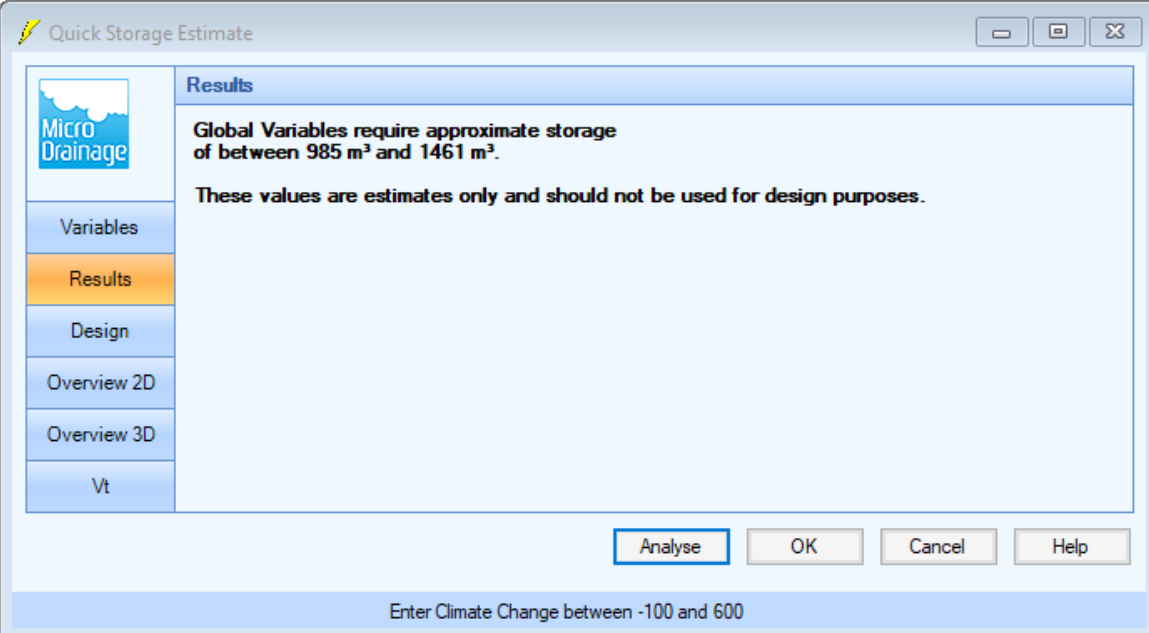
Buttons at the bottom: Analyse, OK, Cancel, Help. A footer note states: 'Enter Climate Change between -100 and 600'.

1 in 100 Year + 45% Climate Change



The screenshot shows the 'Variables' tab of the 'Quick Storage Estimate' software. The interface includes a sidebar with navigation buttons: Variables (selected), Results, Design, Overview 2D, Overview 3D, and Vt. The main area contains input fields for various parameters. The 'FSR Rainfall' dropdown is set to 'England and Wales'. The 'Return Period (years)' is 100. The 'Region' dropdown is also set to 'England and Wales'. The 'Map' button is visible. The 'M5-60 (mm)' is 19.000 and the 'Ratio R' is 0.332. The 'Cv (Summer)' is 0.750 and 'Cv (Winter)' is 0.840. The 'Impervious Area (ha)' is 1.900. The 'Maximum Allowable Discharge (l/s)' is 25.4. The 'Infiltration Coefficient (m/hr)' is 0.00000. The 'Safety Factor' is 2.0 and the 'Climate Change (%)' is 45. At the bottom, there are buttons for 'Analyse', 'OK', 'Cancel', and 'Help'. A footer note states 'Enter Climate Change between -100 and 600'.

Variable	Value
FSR Rainfall	England and Wales
Return Period (years)	100
Region	England and Wales
M5-60 (mm)	19.000
Ratio R	0.332
Cv (Summer)	0.750
Cv (Winter)	0.840
Impervious Area (ha)	1.900
Maximum Allowable Discharge (l/s)	25.4
Infiltration Coefficient (m/hr)	0.00000
Safety Factor	2.0
Climate Change (%)	45



The screenshot shows the 'Results' tab of the 'Quick Storage Estimate' software. The sidebar navigation buttons are the same as in the previous screen. The main area displays the results of the calculation. The text states: 'Global Variables require approximate storage of between 985 m³ and 1461 m³. These values are estimates only and should not be used for design purposes.' At the bottom, there are buttons for 'Analyse', 'OK', 'Cancel', and 'Help'. A footer note states 'Enter Climate Change between -100 and 600'.

Global Variables require approximate storage of between 985 m³ and 1461 m³.

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

Catchment 4

1 in 30 Year

Quick Storage Estimate

Micro Drainage

Variables

FSR Rainfall

Return Period (years) 30

Region England and Wales

Map

M5-60 (mm) 19.000

Ratio R 0.332

Cv (Summer) 0.750

Cv (Winter) 0.840

Impervious Area (ha) 0.690

Maximum Allowable Discharge (l/s) 7.3

Infiltration Coefficient (m/hr) 0.00000

Safety Factor 2.0

Climate Change (%) 0

Analyse OK Cancel Help

Enter Climate Change between -100 and 600

Quick Storage Estimate

Micro Drainage

Results

Global Variables require approximate storage of between 162 m³ and 254 m³.

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

Analyse OK Cancel Help

Enter Climate Change between -100 and 600

1 in 100 Year + 45% Climate Change

Quick Storage Estimate

Micro Drainage

Variables

FSR Rainfall

Return Period (years) 100

Region England and Wales

Map

M5-60 (mm) 19.000

Ratio R 0.332

Cv (Summer) 0.750

Cv (Winter) 0.840

Impemeable Area (ha) 0.690

Maximum Allowable Discharge (l/s) 7.3

Infiltration Coefficient (m/hr) 0.00000

Safety Factor 2.0

Climate Change (%) 45

Analyse OK Cancel Help

Enter Climate Change between -100 and 600

Quick Storage Estimate

Micro Drainage

Results

Global Variables require approximate storage of between 388 m³ and 571 m³.

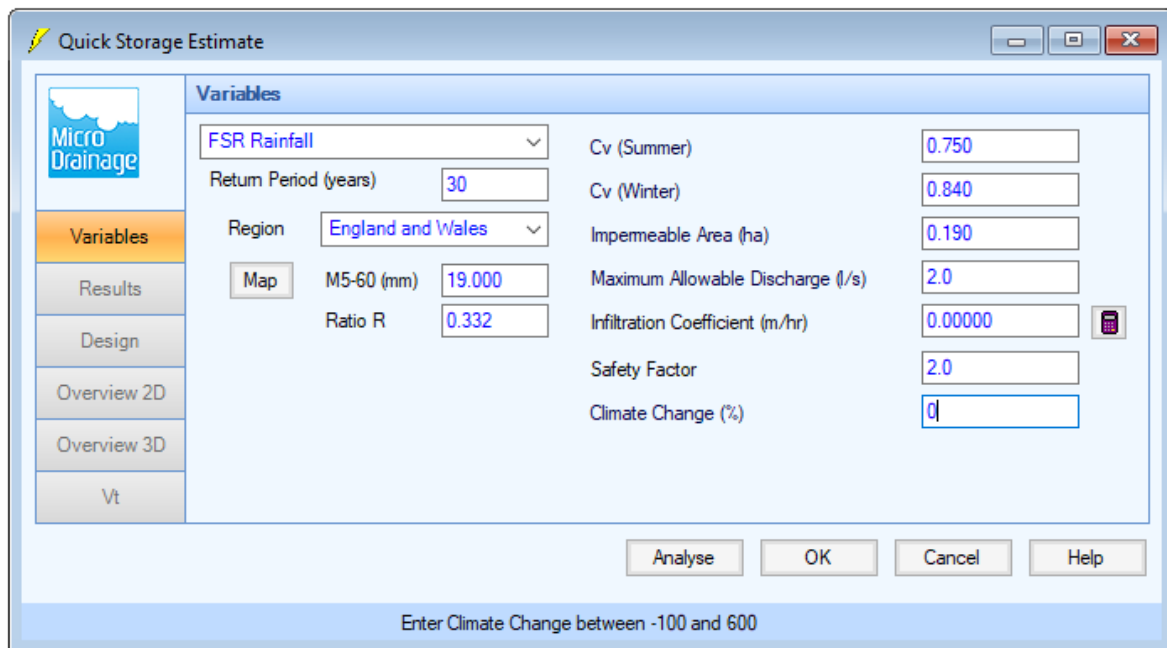
These values are estimates only and should not be used for design purposes.

Analyse OK Cancel Help

Enter Climate Change between -100 and 600

Catchment 5

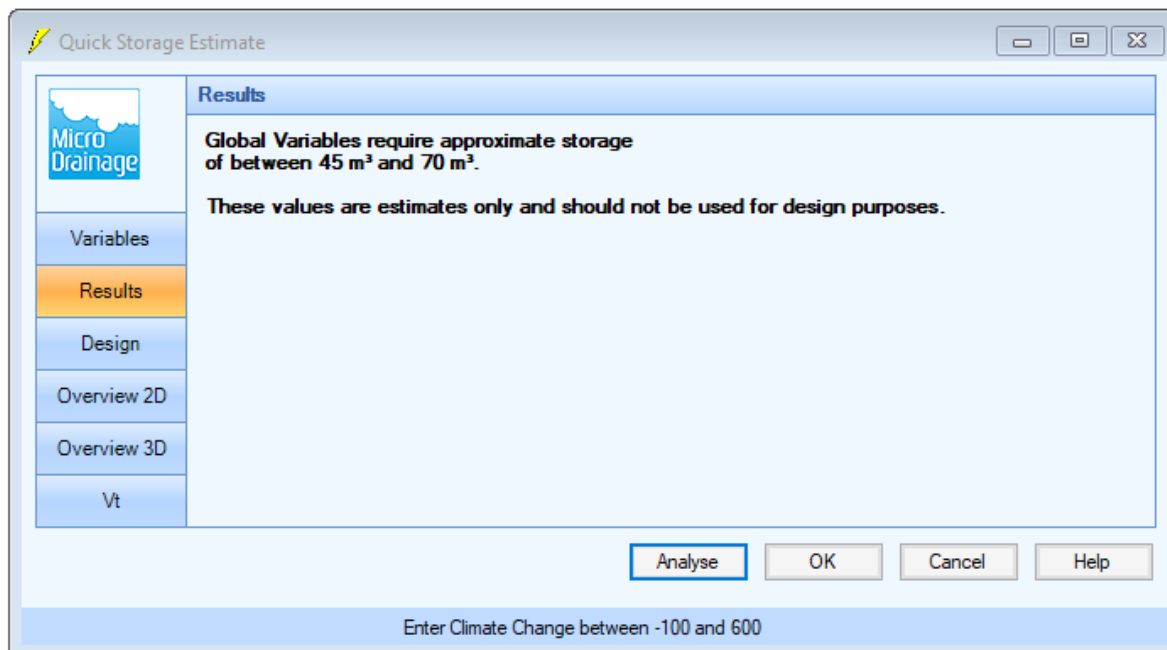
1 in 30 Year



The 'Quick Storage Estimate' window in Micro Drainage software, showing the 'Variables' tab. The left sidebar contains buttons for Variables, Results, Design, Overview 2D, Overview 3D, and Vt. The main area contains input fields for various variables. At the bottom are buttons for Analyse, OK, Cancel, and Help, and a status bar indicating the climate change range.

Variable	Value
FSR Rainfall	FSR Rainfall
Return Period (years)	30
Region	England and Wales
M5-60 (mm)	19.000
Ratio R	0.332
Cv (Summer)	0.750
Cv (Winter)	0.840
Impermeable Area (ha)	0.190
Maximum Allowable Discharge (l/s)	2.0
Infiltration Coefficient (m/hr)	0.00000
Safety Factor	2.0
Climate Change (%)	0

Enter Climate Change between -100 and 600



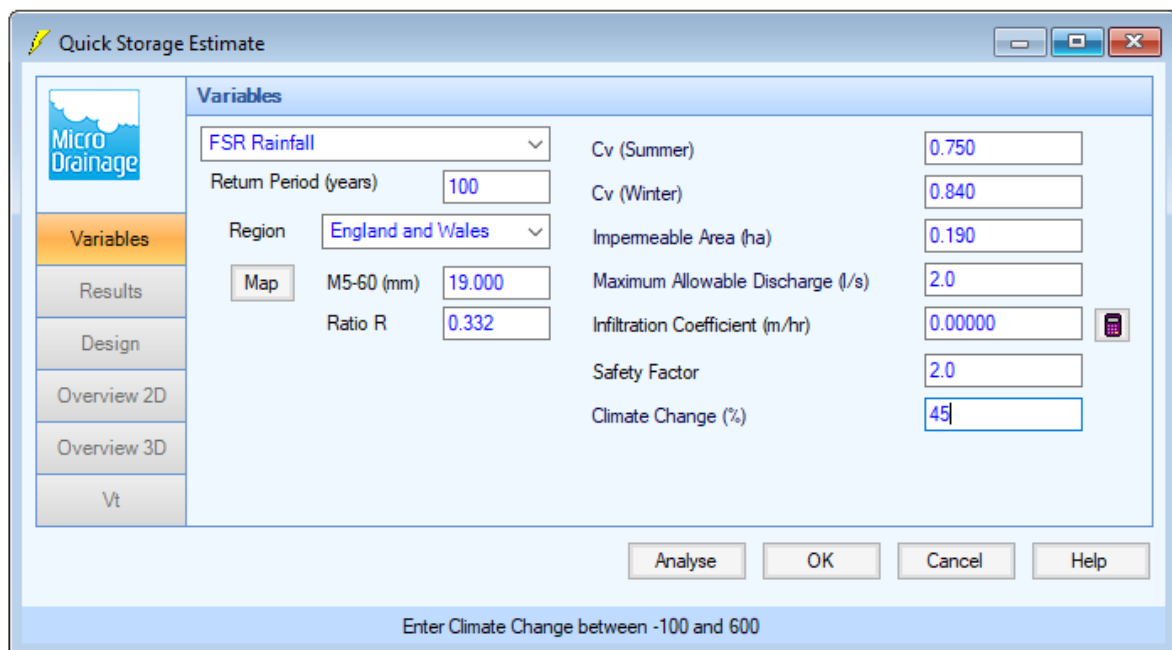
The 'Quick Storage Estimate' window in Micro Drainage software, showing the 'Results' tab. The left sidebar contains buttons for Variables, Results, Design, Overview 2D, Overview 3D, and Vt. The main area displays the results of the storage estimate. At the bottom are buttons for Analyse, OK, Cancel, and Help, and a status bar indicating the climate change range.

Global Variables require approximate storage of between 45 m³ and 70 m³.

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

Enter Climate Change between -100 and 600

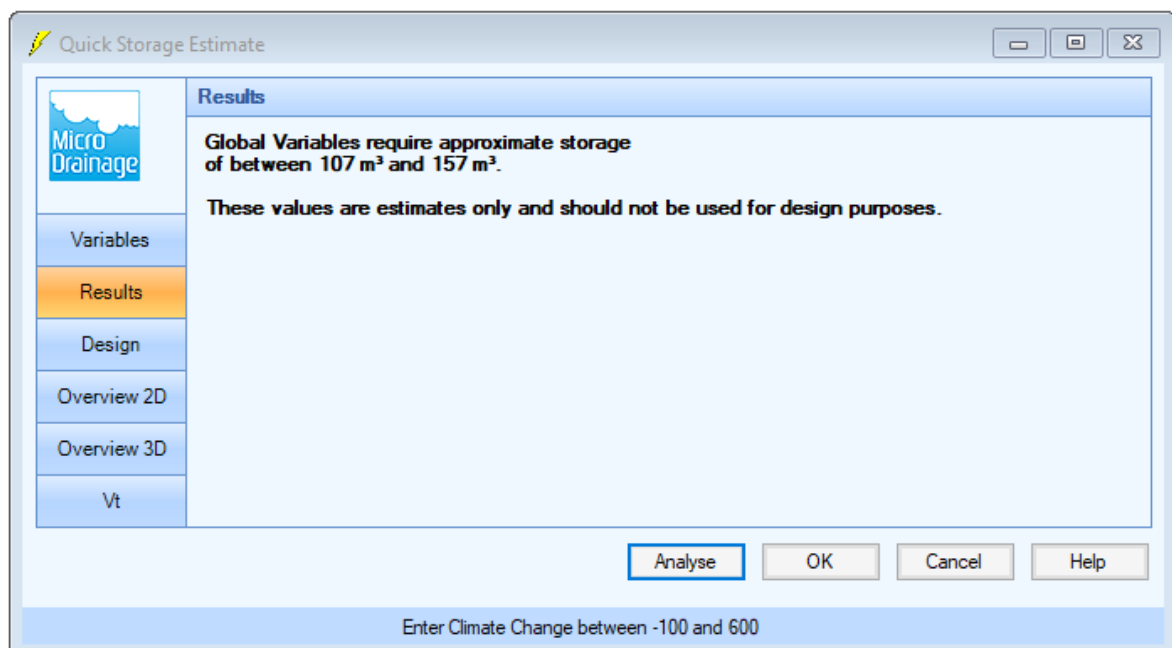
1 in 100 Year + 45% Climate Change



The screenshot shows the 'Variables' tab of the 'Quick Storage Estimate' window. The left sidebar contains buttons for 'Variables', 'Results', 'Design', 'Overview 2D', 'Overview 3D', and 'Vt'. The main area is divided into two columns of input fields. The first column includes a dropdown for 'FSR Rainfall', a text box for 'Return Period (years)' with the value '100', a dropdown for 'Region' with 'England and Wales', a 'Map' button, a text box for 'M5-60 (mm)' with '19.000', and a text box for 'Ratio R' with '0.332'. The second column includes text boxes for 'Cv (Summer)' (0.750), 'Cv (Winter)' (0.840), 'Impervious Area (ha)' (0.190), 'Maximum Allowable Discharge (l/s)' (2.0), 'Infiltration Coefficient (m/hr)' (0.00000), 'Safety Factor' (2.0), and 'Climate Change (%)' (45). At the bottom right are buttons for 'Analyse', 'OK', 'Cancel', and 'Help'. A status bar at the bottom states 'Enter Climate Change between -100 and 600'.

Variable	Value
FSR Rainfall	FSR Rainfall
Return Period (years)	100
Region	England and Wales
M5-60 (mm)	19.000
Ratio R	0.332
Cv (Summer)	0.750
Cv (Winter)	0.840
Impervious Area (ha)	0.190
Maximum Allowable Discharge (l/s)	2.0
Infiltration Coefficient (m/hr)	0.00000
Safety Factor	2.0
Climate Change (%)	45

Enter Climate Change between -100 and 600



The screenshot shows the 'Results' tab of the 'Quick Storage Estimate' window. The left sidebar is the same as the previous window, but the 'Results' button is highlighted. The main area displays the following text: 'Global Variables require approximate storage of between 107 m³ and 157 m³.' and 'These values are estimates only and should not be used for design purposes.' At the bottom right are buttons for 'Analyse', 'OK', 'Cancel', and 'Help'. A status bar at the bottom states 'Enter Climate Change between -100 and 600'.

Global Variables require approximate storage of between 107 m³ and 157 m³.

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

Enter Climate Change between -100 and 600

APPENDIX G – UU RESPONSE

From: O'Brien, Neil <Neil.O'Brien@uuplc.co.uk>
Sent: 12 December 2016 09:54
To: francisco.aguilar
Cc: Wastewater Developer Services
Subject: RE: Pre development enquiry: Former Lancashire Paper Mills, DE2966

Dear Customer

We have carried out an assessment of your application which is based on the information provided; this pre development advice will be valid for 12 months

Foul will be allowed to drain to the public combined sewer network at an unrestricted rate. The connection(s) to the public sewer can be at a point(s) convenient to yourself

Surface water from this site should drain to either soak away or directly to watercourse. Discharge rates and consents must be discussed and agreed with all interested parties.

Connection Application

Although we may discuss and agree discharge points & rates in principle, please be aware that you will have to apply for a formal sewer connection. This is so that we can assess the method of construction, Health & Safety requirements and to ultimately inspect the connection when it is made. Details of the application process and the form itself can be obtained from our website by following the link below

<http://www.unitedutilities.com/connecting-public-sewer.aspx>

Please be aware that on site drainage must be designed in accordance with Building Regulations, National Planning Policy, Planning Conditions and local flood authority guidelines, we would recommend that you liaise and make suitable agreements with the relevant statutory bodies.

Regards

Neil O'Brien

Developer Engineer
Developer Services and Planning

From: francisco.aguilar [mailto:francisco.aguilar@wyg.com]
Sent: 05 December 2016 13:43
To: Wastewater Developer Services <WastewaterDeveloperServices@uuplc.co.uk>
Cc: tom.beavis <tom.beavis@wyg.com>
Subject: Pre development enquiry: Former Lancashire Paper Mills, Church St, Radcliffe M26 2PG

Dear Sir/Madame,

Please find attached a predevelopment enquiry form in relation to an outline planning application for the site above. The site covers an area of 18.84ha, a plan showing the location and site boundary is attached for your convenience.

The application seeks approval for 450 dwellings and therefore a peak foul discharge into UU sewer network of 21l/s is proposed. We seek your views on whether there is capacity in the 450mm combined public sewer under Church Lane to accommodate this flows and as to the location of the connection point to your network, as there are a few foul sewers within the area according to your records (attached).

It is expected that surface water can be disposed via soakaways or discharged into the River Irwell or Bealey's Goit.

Thank you

Regards

Francisco Aguilar
Flood Risk & Drainage Engineer

WYG

Arndale Court, Headingley, Leeds, West Yorkshire, LS6 2UJ

Tel: +44 113 219 2284

Fax: +44 113 278 3487

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EMGateway3.uuplc.co.uk made the following annotations

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APPENDIX H – CROW TREES FARM BROOK TECHNICAL NOTE

Technical Note

Project:	East Lancashire Papermill	Office:	Manchester
Project №:	784-B038963	Prepared by:	Alex Walsh
Client:	Morris Homes	Approved by:	Robert Carr
Date:	26/07/2022	Status:	For Submission
Subject:	Discharge of condition 30 for the Crow Trees Farm Brook		

1.0 BACKGROUND

- 1.1 Outline planning permission was granted for the East Lancashire Papermill (ELPM) site (application number 62969) by Bury Borough Council (BBC) on 29/06/2018 for the development of up to 400 new homes, supported by a number of conditions. This has since been superseded by a Section 73 Decision notice on 25/10/2021 (application number 67597).
- 1.2 The original Condition 30 reads *‘Details of the exact position of the Crow Trees Farm Brook culvert beneath the site shall be submitted as part of the first reserved matters application affecting the area. The proposed dwellings and structures shall not be sited within 8m of the existing culvert structure’*.
- 1.3 Within the S73 notice, Condition 30 was updated to read *‘No dwellings or structures shall be sited within 8m of Crow Trees Brook Culvert’*.
- 1.4 The Crow Trees Farm Brook (the Brook) is classified as a Main River and believed to have been initially culverted in the 1800s.
- 1.5 The original Flood Risk Assessment (FRA) for planning proposals included for the partial opening up of the Brook to allow surface water discharge from the development.
- 1.6 Feedback received by BBC and the Environment Agency (EA) dated 07/08/2018, required that the proposals consider the need for hydraulic modelling of the Brook and avoid development within its easement. A meeting was held with the EA on 21/08/2018 and follow up letter received 24/08/2018 with updated advice. A record of these communications is found in Flood Risk Addendum Report dated 05/11/2018 which was submitted following the initial objections raised. Planning was subsequently approved following the submission of the Addendum.
- 1.7 The Addendum Report concluded that following engagement with the EA, no modelling would be required if no modifications were to be made to the Brook. This engagement also confirmed that finished flood levels (FFLs) must be set to +600mm above the 100 year + 35% climate change event. The EA noted that FFLs were set more than this so raised no objection. They also advised that infrastructure should not be placed in flow routes of the Brook flood plain.
- 1.8 The Addendum also identifies that in areas which may still experience flooding from the Brook, flood resilience measures should be provided for the 100 year + 70% climate change event, level set at 66.27m AOD.

Technical Note

- 1.9 Within the Addendum, the masterplan was revised to provide public open space above the Brook.
- 1.10 It should be noted that a separate application is being led by Bury Borough Council for the construction of a new footbridge across the River Irwell on this site. The new footbridge will be located near the outfall of the Crow Trees Farm Brook and landing by the Pioneer Mills site. This work will be subject to a bespoke permit with the Environment Agency and does not form part of this Condition or application.
- 1.11 This Technical Note will demonstrate the location of the Brook, including the required easement to allow for the Condition to be discharged in accordance with the National Planning Policy Framework (NPPF).

2.0 ASSESSMENT OF CONDITION 30

- 2.1 The FRA Addendum identified a detailed CCTV survey carried out by Aquajet in January 2012.
- 2.2 The survey includes a detailed manhole survey of the Brook from Cross Lane through the ELPM site to where it discharges into the River Irwell.
- 2.3 Each manhole is referenced by Easting, Northing and the culverts cover level.
- 2.4 Whilst the age of data is now over 10 years old, the data is considered accurate and representative of the culverts current position below the site. The site has been fully abandoned for a longer period than this, and no works have been carried out to the culvert during this time.
- 2.5 A copy of the Aquajet surveys can be found in Appendix A.
- 2.6 The results from the Aquajet survey have been plotted in GIS with the accurate geospatial references for each manhole location and the route of the culvert linked between manholes. An 8m easement has plotted to enable the development area to maintain the requirements set out in Condition 30.
- 2.7 The mapped outputs for the 8m easement can be found in Appendix B.

3.0 CONCLUSION

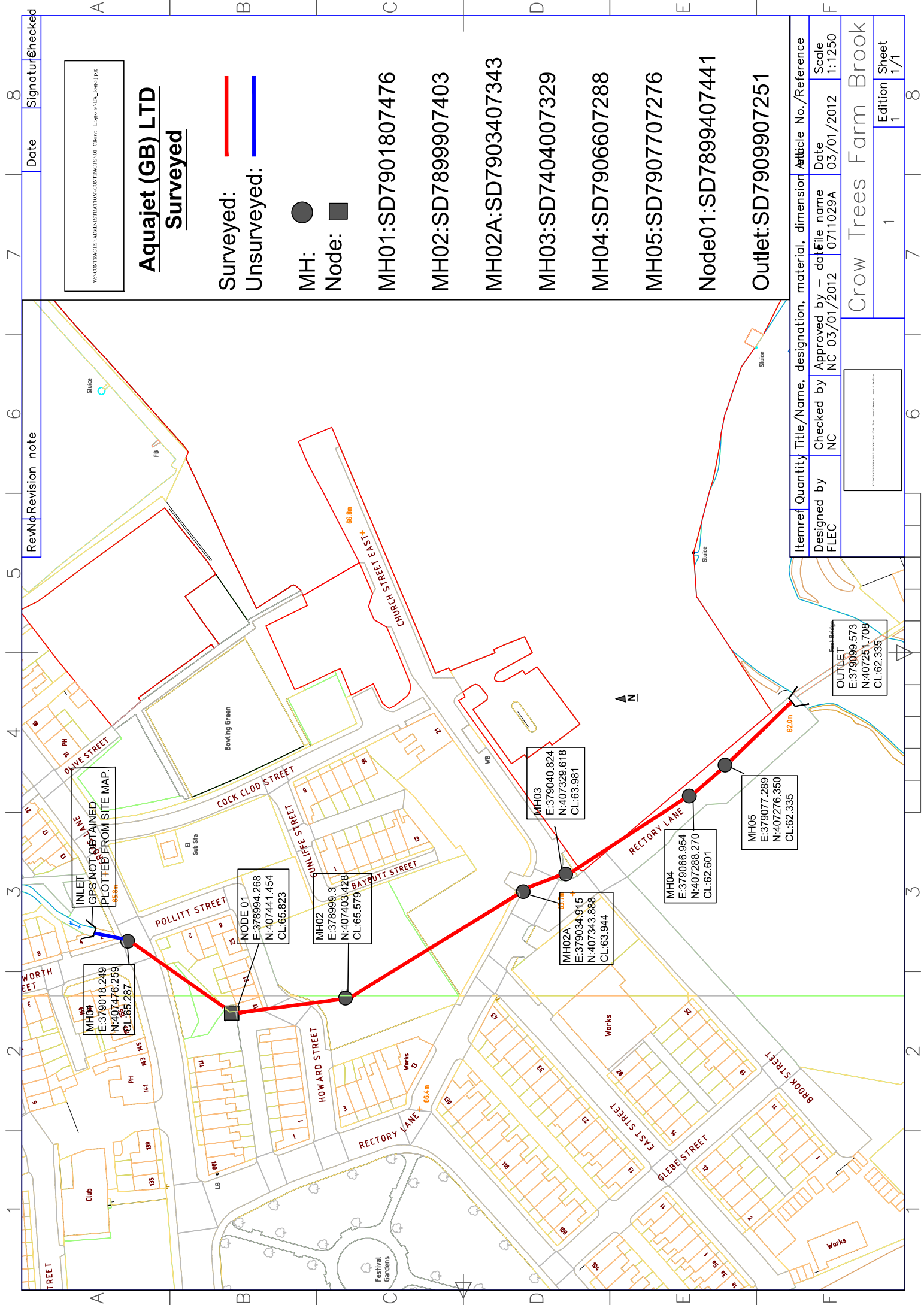
- 3.1 Survey data was provided in the previous FRA Addendum report, summarised again in this note. This survey data is considered accurate and representative of conditions on the ground today.
- 3.2 The 8m easement has been mapped and provided in Appendix B of this Technical Note.
- 3.3 It is recommended Condition 30 be discharged and the development proposals work to the mapped 8m easement to ensure no development takes place within this area.
- 3.4 The background summary outlines the historic discussions related to the Crow Trees Brook. Critically, it confirms that following engagement with the EA, it is accepted that the Brook can remain culverted throughout the site providing that there is green open space above it and within its 8m easement.

Technical Note

3.5 It is noted that Condition 32 requires details of the culvert opening designs to be submitted for approval. Given this will not be required, it is recommended that no further action be taken for this part of the condition.

Technical Note

APPENDIX A – AQUAJET SURVEY



RevNo	Revision note	Date	Signature	Checked
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W:\CONTRACTS-ADMINISTRATION\CONTRACTS\01 Client Logo's\SEA_Lago.jpg

Aquajet (GB) LTD
Surveyed

Surveyed: —
Unsurveyed: —

MH: ●
Node: ■

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- MH02:SD7899907403
- MH02A:SD7903407343
- MH03:SD7404007329
- MH04:SD7906607288
- MH05:SD7907707276
- Node01:SD7899407441
- Outlet:SD7909907251

Item	ref	Quantity	Title/Name, designation, material, dimension	Article No./Reference
Designed by	FLEC	Checked by	NC	Approved by
				NC 03/01/2012
				Date
				03/01/2012
				Scale
				1:1250

Crow Trees Farm Brook

1

1

1/1

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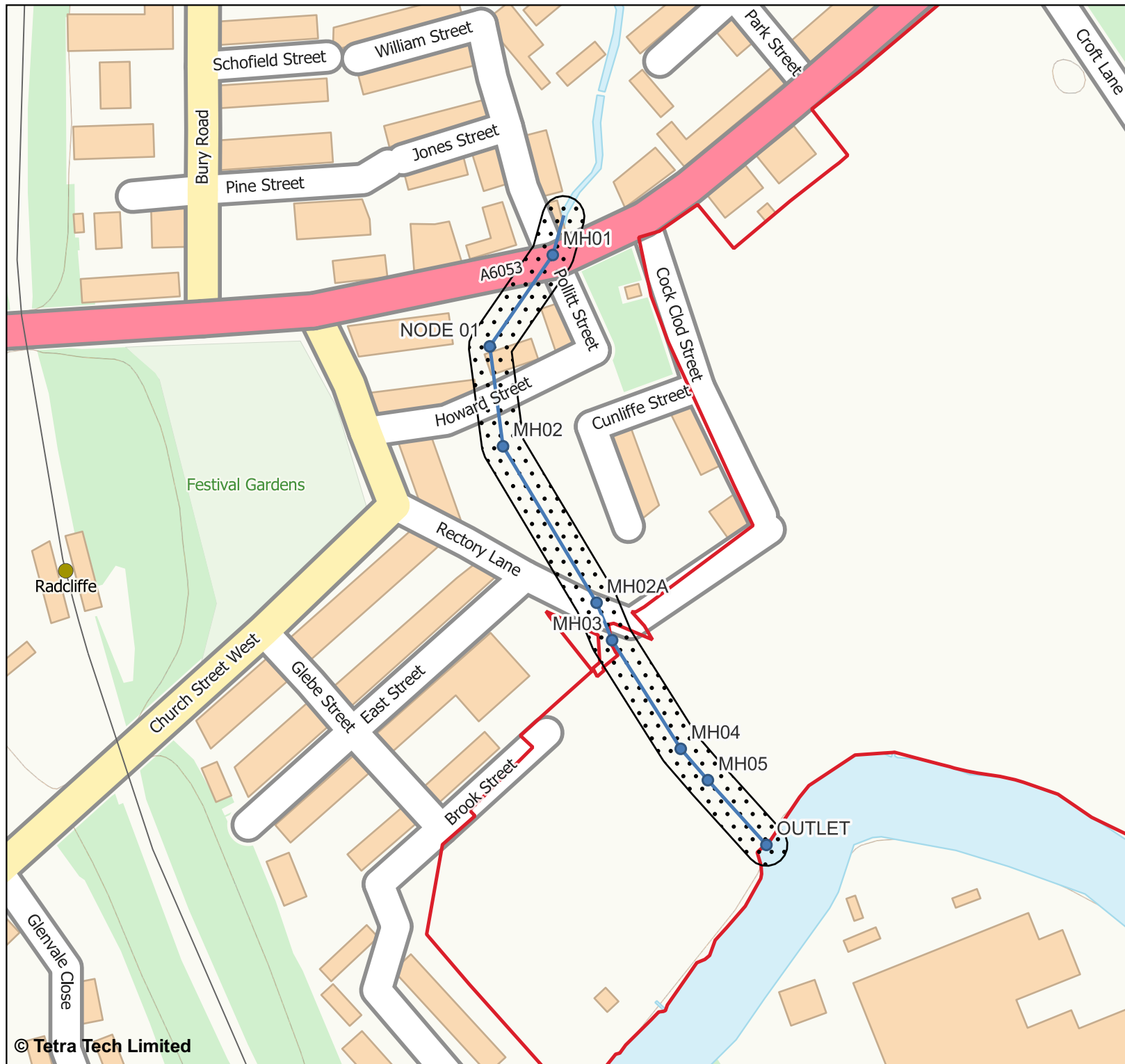
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Technical Note

APPENDIX B – CROW TREES FARM BROOK EASEMENT



Crow Trees Farm Brook Culvert Radcliffe, Greater Manchester Morris Homes



Legend

- Site Boundary
- Crow Trees Farm Brook Culvert
- Crow Trees Farm Brook Manholes
- ... Crow Trees Farm Brook Culvert Easement

0 25 50 75 100 m

1:2000

26 July 2022

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Notes:

Plan of the Crow Trees Brook Culvert alignment. This shows the alignment of the culvert and location of manholes as identified in the Aquajet GB LTD survey from January 2012. An 8m culvert easement is also identified.

Drawn by: A Walsh
Checked by: R Carr
Office: Manchester

