Drainage Strategy

Proposed Development,
Simonside Arms, South Tyneside

Reference	RWO/DS/22164
Client Name	Origin Planning
Date	February 2023

Yorkshire Office
4 Park Place
Leeds
LS1 2RU
Tel: +44 (0)113 532 500
info@rwo.group
www.rwo.group

North East Office
19-20 Brenkley Way,
Seaton Burn
Newcastle upon Tyne
Tyne & Wear
NE13 6DS
Tel: +44 (0)191 258 5632

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Confidentiality Statement

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Origin Planning

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Document History

VERSION	PURPOSE/DESCRIPTION	DATE
1	First Issue	27.02.2023
2	Suds Table in section 6.0 amended,	13.12.2023

1.0 EXECUTIVE SUMMARY

This assessment has looked at the implications of a proposed residential development in relation to foul and surface water drainage.

It is proposed to discharge surface water to public sewer at a discharge rate of 5 l/s to meet with good design practices, subject to Northumbrian Water approval. This will require onsite surface water attenuation which will be designed to accommodate the 100 year plus 45% climate change event.

Surface water quality will be achieved with the inclusion of permeable surfaces to drives and shared drives.

It is proposed to discharge foul water to public sewer, subject to Northumbrian Water approval.

Any potential impact of the development can be adequately addressed by good drainage design.

2.0 INTRODUCTION

RWO has been instructed by Origin Planning on behalf of their client to prepare a Drainage Strategy report to support a planning application for a proposed residential development at Simonside Arms, South Tyenside.

3.0 THE SITE

The proposed development is a rectangular piece of land located at the former Simonside Arms public house, in South Tyneside. The proposed development site has an approximate area of 0.36Ha.

The site is located in a predominantly residential area with Roman Road to the north and Hyperion Avenue to the south. The centre of the site has a grid reference of NZ 35035 64457.

There are no watercourses located within the site or on its boundaries.

The development site has a slope from south to north, with southern levels being circa 17m AOD dn northern 14.5m AOD. A topographical survey is included in Appendix B.



Figure 1 – Site location (Red line indicates the approximate extents)

4.0 EXISTING DRAINAGE

The existing development is understood to drain to Northumbrian Water public sewers located on Roman Road.

5.0 PROPOSED DEVELOPMENT

The proposed development consists of 13 residential dwellings, along with associated roads and infrastructure.

Surface water from the development site will discharge to public sewer utilising existing offsite connections.

A proposed site layout plan is included in Appendix C.

6.0 SURFACE AND FOUL WATER DRAINAGE

The proposed site drainage will comprise of a separate foul an surface water drainage system. The following summarises the requirements for the discharge of surface and foul water from the site.

Sustainable Urban Drainage Systems (SUDS)

A review of Solmek Geotechnical desktop study, report reference S230223, has been undertaken which identfies the site to be underlain by Sandstone, mudstone, solstone and coal seams.

The actual underlying ground strata will be confirmed by an intrusive ground investigation.

> The solid geology beneath the site is likely to mostly comprise of Carboniferous Pennine Upper Coal Measures Formation of sandstone, mudstone, siltstone and coal seams. The drift deposits on site are likely to comprise of silty, sandy and gravelly Glacial Till.

Extract 1 – Geology summary (Solmek report reference S230223)

There is limited potential for the discharge of surface water by infiltration methods if the site is underlain by the strata anticipated in the Solmek report, for this reason soil infiltration has been excluded at this stage. An intrusive ground investigation shall be undertaken to confirm the ground conditions.

Sustainable Urban Drainage System (SUDS) may be used in conjunction with conventional drainage systems to improve water quality as well as manage surface water discharge.

The following audit has been carried out relating to suitability of SUD's systems:

Drainage Method	Description/Suitability	Proposal/Feasibility
1. Infiltration.	Not suitable due to anticipated ground conditions.	Not Applicable.
2. Ponds and wetlands.	Not suitable given the constrained size of the site	Not Applicable.
3. Infiltration Basins.	Not suitable due to anticipated ground conditions.	Not Applicable.
4. Detention Basins.	Not suitable given the constrained size of the site	Not Applicable.
5. Swale/Bio-retention	May be utilised convey water/improve water quality.	Applicable.
6. French/Filter drain.	May be utilised convey water/improve water quality.	Applicable.
7. Pervious/Permeable Pavement.	May be utilised convey water/improve water quality.	Applicable.
8. Geocellular Systems/Tank systems.	May be used as surface water attenuation.	Applicable.
9. Oversized pipes.	May be used as surface water attenuation.	Applicable.
10. Box culverts.	May be used as surface water attenuation.	Applicable.
11. Purpose-designed tanks.	May be used as surface water attenuation.	Applicable.

Surface Water Drainage

The disposal of surface water shall be in accordance with the Requirement H3 of Building Regulations 2000. This establishes a preferred hierarchy for surface water disposal. Consideration should firstly be given to discharge to soakaway/infiltration system, watercourse and public sewer in that priority order.

As noted above discharge of surface water via soil infiltration is deemed unlike and therefore at this stage has been excluded.

Utilising a watercourse for discharging surface water has been reviewed and as there is not a watercourse within the site or on the boundaries, this has been excluded.

The only option for disposal of surface water flows from the development will be to public sewer. It is proposed to utilise existing offsite connections, subject to LLFA and Northumbrian Water approval. Surface water flows will need to be restricted to the greenfield rate of runoff, as per the LLFA guidance. A greenfield calculation has been undertaken and is included in Appendix D, with a calculated discharge rate of 1.55 l/s. Given the calculated low flow rate it is proposed to restrict flow to 5 l/s in accordance with good design standards, this will still offer a considerable reduction when compared to the existing brownfield discharge rate.

Consideration of water quality is also required as per the LLFA guidance. Given the constrained nature of the site it is recommended that permeable paving be utilised for shared and private drives.

As surface water discharge from the site will be restricted, on-site surface water attenuation will be required. An initial calculation of the approximate volumes of attenuation using the 'Quick Storage Estimate' element of Windes Microdrainage is provided below:

Attenuation Volumes

Storage Design Parameters

- Restricted discharge rate = 5 litres/second.
- Proposed Impermeable area = 0.18Ha (50% of site area, to allow for urban creep)
- M5-60 = 17.100
- Ratio R = 0.344
- 1:30 Year Return Period = between 23 - 40m^3
- 1:100 Year Return Period (+45% cc) = between 60 - 95m^3

The proposed on-site drainage system shall be designed in accordance with the requirements of Sewers for Adoption and shall demonstrate that:

- No surcharge of pipes occurs in the 1 in 2-year rainfall event.
- No surface flooding occurs in 1 in 30-year rainfall events.
- No flooding to buildings and adjacent properties occurs in 1 in 100-year rainfall event (including an allowance of 45% for the effects of future climate change), as defined in the Planning Practice Guidance.

Foul Water Drainage

Foul water will discharge to the public sewer, subject to Northumbrian Water approval.

7.0 CONCLUSIONS

This assessment has looked at the implications of a proposed residential development in relation to foul and surface water drainage.

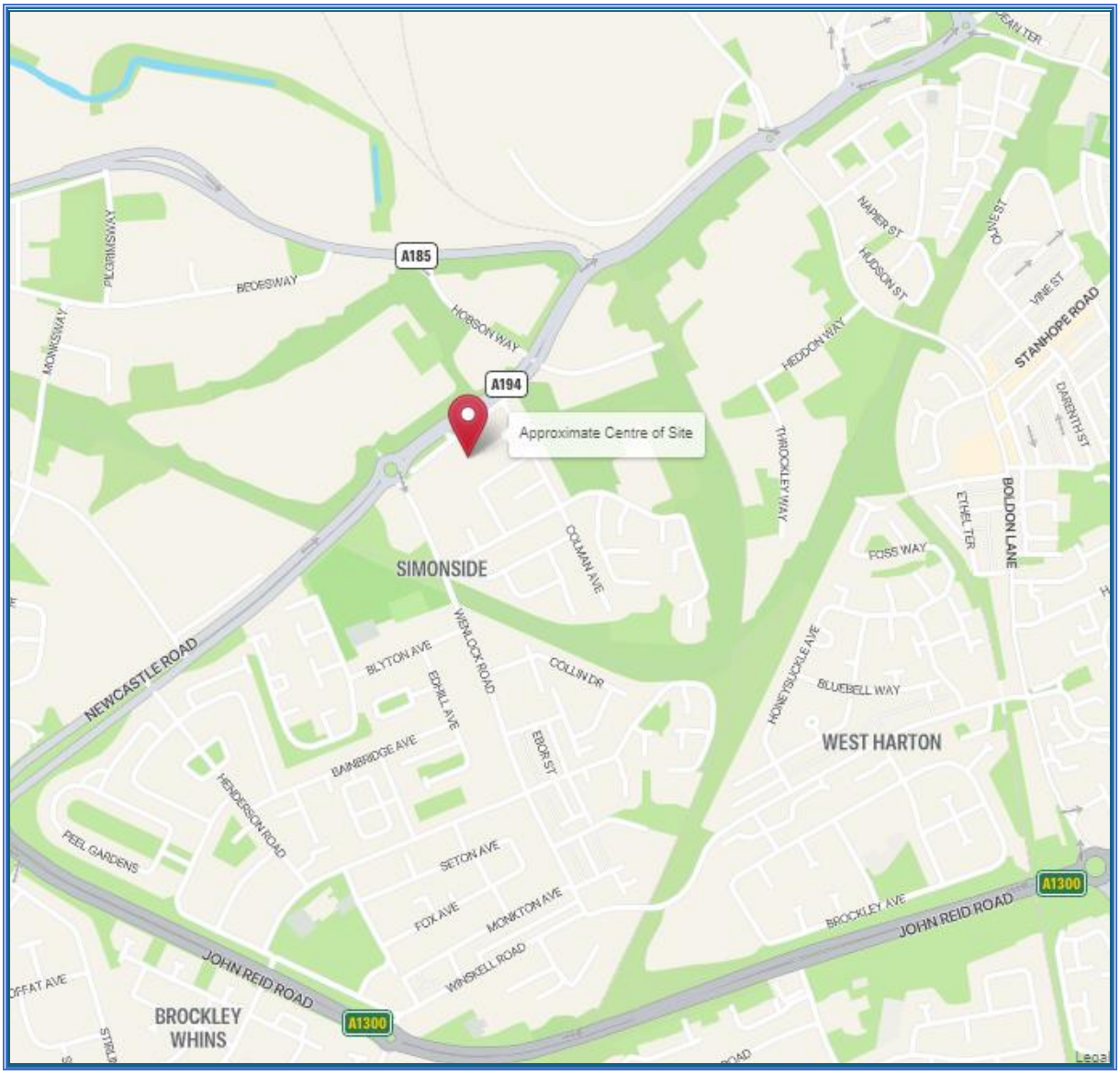
It is proposed to discharge surface water to public sewer at a discharge rate of 5 l/s to meet with good design practices, subject to Northumbrian Water approval. This will require onsite surface water attenuation which will be designed to accommodate the 100 year plus 45% climate change event.

Surface water quality will be achieved with the inclusion of permeable surfaces to drives and shared drives.

It is proposed to discharge foul water to public sewer, subject to Northumbrian Water approval.

RWO Group
February 2023

Appendix A Site Location Plan



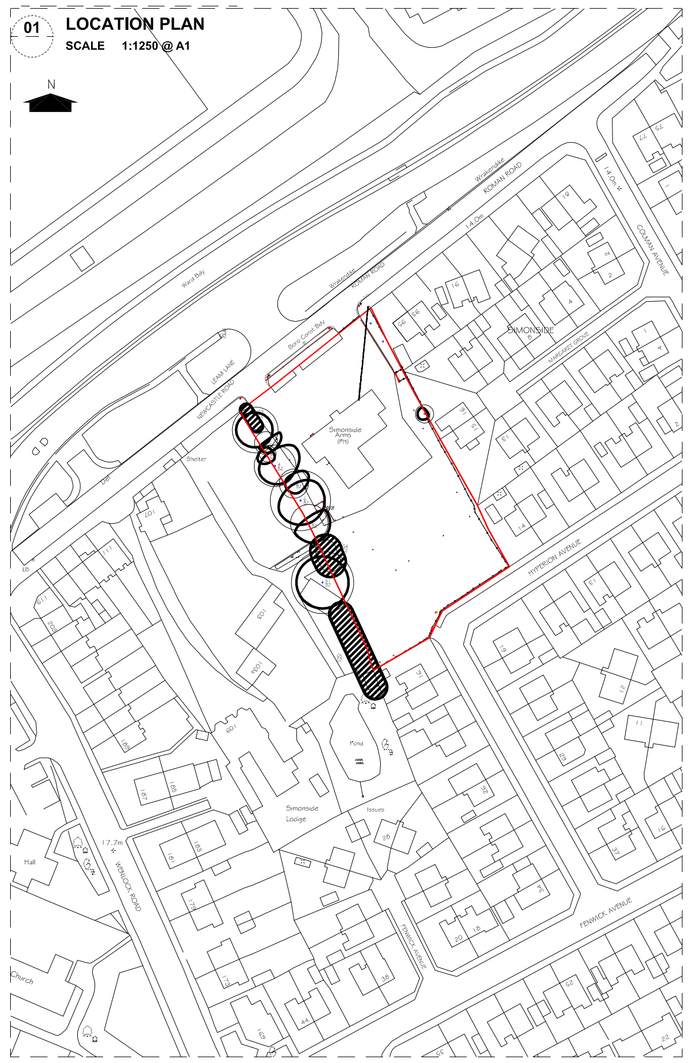
Location Map	
Site	Simonside Arms
Client	Origin Planning
Job Number	22164
Scale	NTS

Appendix B Topographic Survey


Boro Const Bdy
LEAM LANE
NEWCASTLE ROAD
ROMAN
SIMONS
TARMAC
GRASS
THRESHOLD
RWP
1 B1
2 C2
3 C1
4 B2
5 B2
6 B2
7 B2
G3 C2
G4 C2
N1 B2
G5 C2
16 C1
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Appendix C Proposed Site Layout

01 **LOCATION PLAN**
SCALE 1:1250 @ A1



02 **PROPOSED SITE PLAN**
SCALE 1:250 @ A1



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TOTAL PLANNING SOLUTIONS (UK)

5 ROMAN TERRACE, LINTHORPE,
MIDDLESBROUGH TS5 5QF

Tel: 01642 945752
Mob: 07932036065

Email: info@totalplanningsolutions.co.uk
Web: www.totalplanningsolutions.co.uk
Facebook: Total Planning Solutions-UK Ltd

PROJECT: 13NO. HOUSING PLAN
DWG TITLE: TPS001/SITE PLAN
LOCATION: SIMONSIDE ARMS
NEWCASTLE ROAD
SOUTH SHIELDS

SCALE: 1:1250;1:250 @A1
DATE: JANUARY 2023
DWG No: 001

DRAWN BY: FF

Appendix D Surface Water Runoff Calculation

Print | Close Report

Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by:	Ross Oakley
Site name:	Simonside Arms
Site location:	

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.

Site Details

Latitude:	54.97354° N
Longitude:	1.45431° W
Reference:	46191328
Date:	Feb 27 2023 12:58

Runoff estimation approach IH124

Site characteristics

Total site area (ha): 0.36

Methodology

Q_{BAR} estimation method: Calculate from SPR and SAAR

SPR estimation method: Calculate from SOIL type

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):	633	633
Hydrological region:	3	3
Growth curve factor 1 year:	0.86	0.86
Growth curve factor 30 years:	1.75	1.75
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.

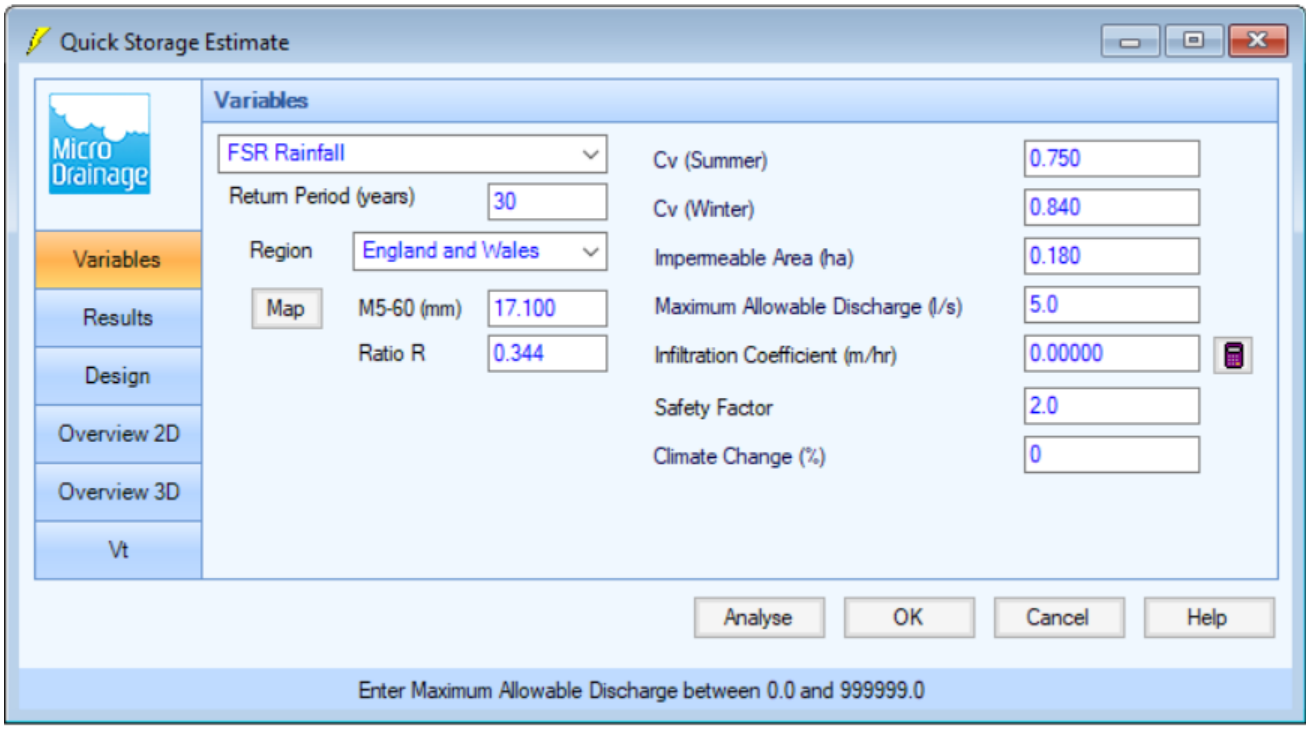
(3) Is SPR/SPRHOST ≤ 0.3?

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

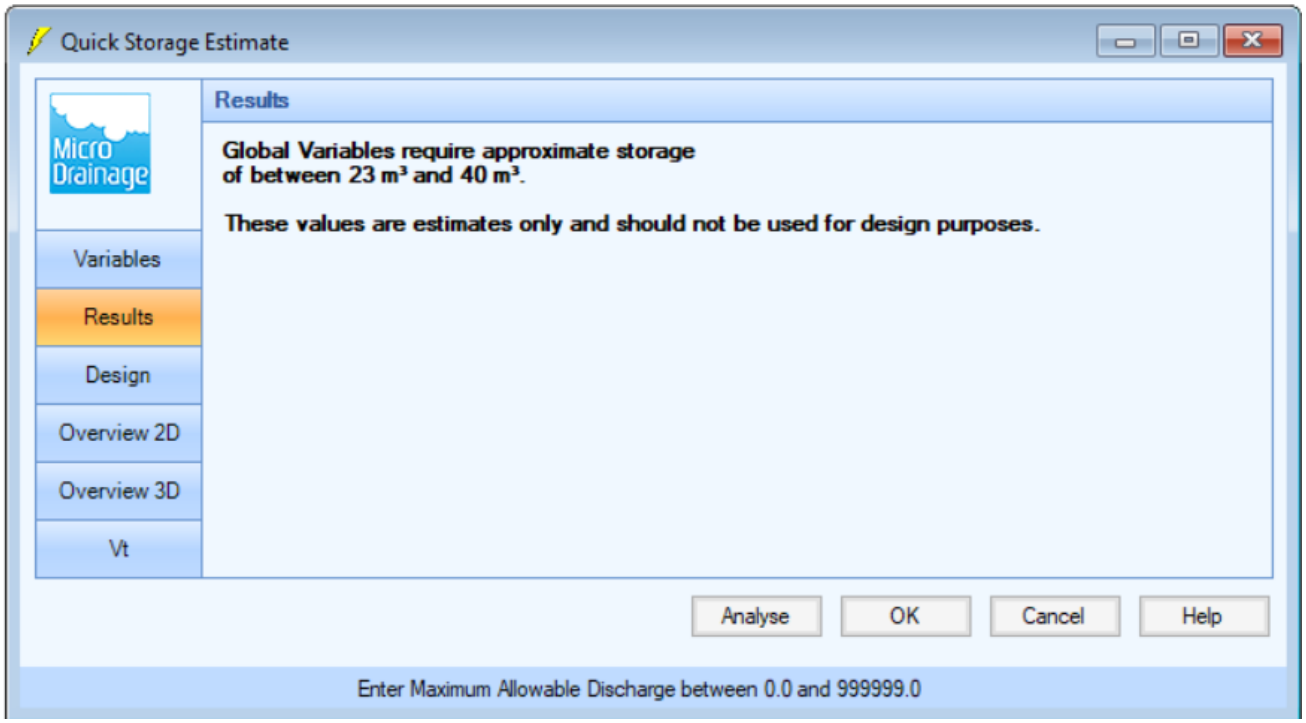
Greenfield runoff rates	Default	Edited
Q_{BAR} (l/s):	1.55	1.55
1 in 1 year (l/s):	1.33	1.33
1 in 30 years (l/s):	2.7	2.7
1 in 100 year (l/s):	3.21	3.21
1 in 200 years (l/s):	3.66	3.66

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.

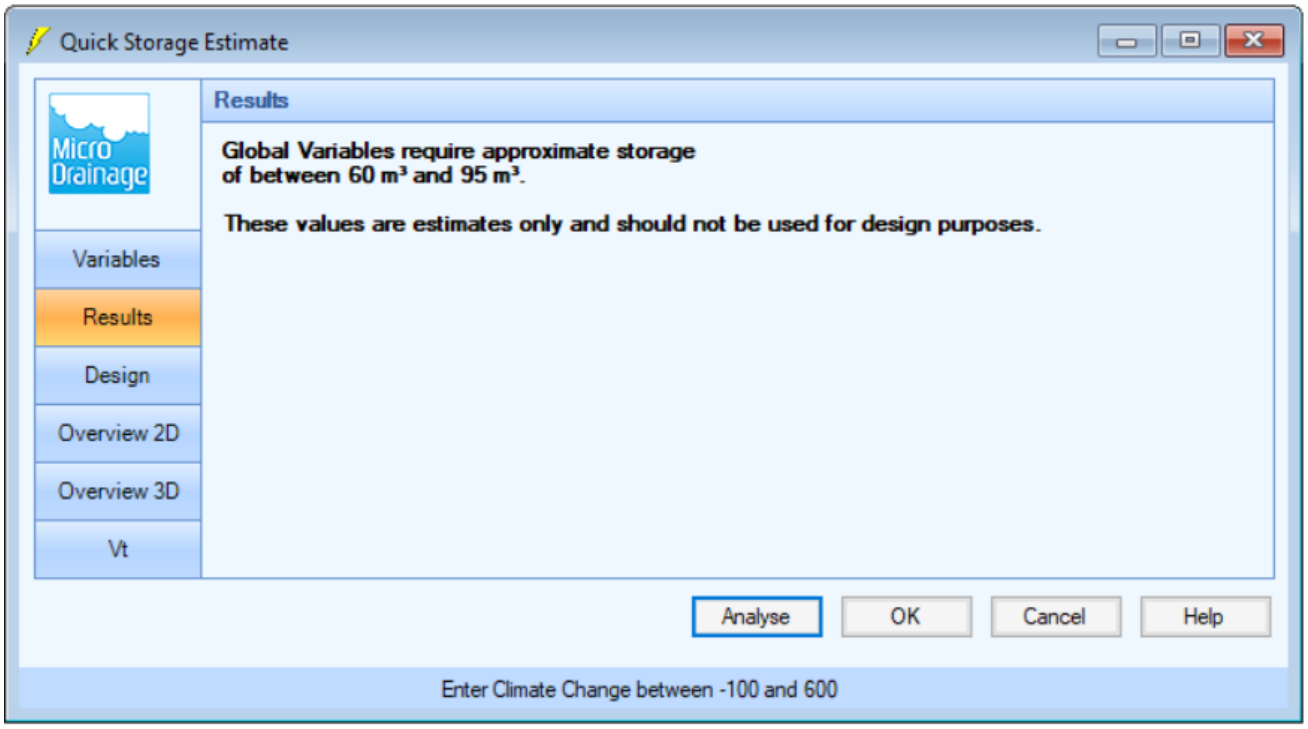
Appendix E Surface Water Storage Calculations



Design Parameters



30 year Storage Estimates



100 year + 45% CC Storage Estimates

Yorkshire Office
4 Park Place
Leeds
LS1 2RU
Tel: +44 (0)113 532 500
info@rwo.group
www.rwo.group

North East Office
19-20 Brenkley Way
Seaton Burn
Newcastle upon Tyne
Tyne & Wear
NE13 6DS
Tel: +44 (0)191 258 5632