Wormald Burrows Partnership Limited
Civil Engineering Consultants

HAVERHILL NORTH
SUFFOLK

DRAINAGE STRATEGY

May 2022

E3838-Haverhill-Drainage Strategy-Rev9

12a –18a Hitchin Street Biggleswade, SG18 8AX
Web: http://www.wormburp.com
Tel: (01767) 317 244 Fax: (01767) 325 434
Email: engineer@wormburp.com

HAVERHILL NORTH
SUFFOLK

DRAINAGE STRATEGY

Client: PERSIMMON HOMES (SUFFOLK) LIMITED

Engineer: Wormald, Burrows Partnership Limited
12a – 18a Hitchin Street
Biggleswade
Bedfordshire SG18 8AX
Tel: (01767) 317 244
Fax (01767) 315 434

Date: January 2019

Original Ref: E3838-Haverhill-Drainage Strategy-Rev0

Written By:	Checked By:	Approved By:
[redacted]	[redacted]	[redacted]
Tom Wilson *Director*	Nick Kohli *Managing Director*	Nick Kohli *Managing Director*

Status: Final

COPYRIGHT
© Wormald Burrows Partnership Limited. All rights reserved. The contents of this document must not be copied or reproduced in whole or in part without the written consent of Wormald Burrows Partnership Limited and PERSIMMON HOMES (SUFFOLK) LIMITED.

DISCLAIMER
Wormald Burrows Partnership Limited has attempted to produce this document in accordance with all known and relevant legislation, policies, standards and methodologies at the time of publication. We cannot, however, be held responsible for the effect any changes in these will have on the document. We therefore recommend that the information contained within be checked for relevance before it is used.

REGISTRATION OF AMENDMENTS

Revision	Date	Amendment Details	Prepared by	Checked by
Rev 9	27.05.22	Updated Drainage Strategy Appendix	Laurence Meiklereid	Nick Kohli
Rev 8	18.02.22	Updated Ponds 2 and 4, Microdrainage calculations updated	Laurence Meiklereid	Nick Kohli
Rev 7	07.12.21	Catchment areas & outfall rates corrected	Laurence Meiklereid	Nick Kohli
Rev 6	02.09.21	Catchment areas updated. Foul water final discharge point now known	Laurence Meiklereid	Nick Kohli
Rev 5	25.08.21	Updated to suit latest infrastructure pond designs	Laurence Meiklereid	Nick Kohli
Rev 4	11.08.21	Updated to suit last phase 2 layouts	Laurence Meiklereid	Nick Kohli
Rev 3	13.05.21	Amendments to suit Phase 2 layout	Paul Whitlock	Nick Kohli
Rev 2	23.07.20	Drainage strategy updated	Tom Wilson	Nick Kohli
Rev 1	14/02/21	Layout changes to drawings affecting Appendices B, D & E	Nick Kohli	Tom Wilson
Rev 0	15/01/19	First Issue	Tom Wilson	Nick Kohli

CONTENTS

1 INTRODUCTION 5
2 SITE DESCRIPTION 6
3 SURFACE WATER DRAINAGE STRATEGY 8
4 FOUL WATER DRAINAGE STRATEGY 11
5 CONCLUSIONS 12

APPENDICES

Appendix A - Site Location Plan
Appendix B - Drawing E3838/510 - Catchment Areas Plan
Appendix C - Greenfield Runoff Calculations
Appendix D - Drawings E3838/500-508 –Drainage Strategy Plans
Appendix E - Microdrainage Simulation Calculations
Appendix F - Soil Investigation Report Extracts
Appendix G - SuDS Maintenance Schedule

1 INTRODUCTION

1.1.1 Wormald Burrows Partnership Limited (WBPL) has been appointed by Persimmon Homes (Suffolk) Limited to prepare and Foul and Surface water Drainage Strategy for a proposed residential development to the north of Haverhill.

1.1.2 The strategy, where possible, follows the details set out in the approved Flood Risk Assessment prepared by MLM, dated September 2010, which formed part of the outline planning application.

1.1.3 The drainage strategy provided in this report sets out how the proposals will not increase off-site flood risk and has been designed in accordance with the Suffolk County Council Surface Water Drainage (SUDS) Guidance Document dated May 2018.

2 SITE DESCRIPTION

2.1 Site Context

2.1.1 The site is located to the north west of Haverhill, approximately 1.2 kilometres north of Haverhill Town Centre and occupies an area of approximately 49.5 Hectares.

2.1.2 This is predominately greenfield and has a number of watercourses running north to south towards Stour Brook, which ultimately discharges into the River Stour to the south east of Haverhill.

2.1.3 The site is bound to the north by the proposed northern relief road (which is currently at the detailed design stage and will be under construction shortly), to the south by the existing residential developments and to the east and west by agricultural land.

2.1.4 Phase 1 of the proposed development is currently under construction, which is located immediately east of the proposed development.

2.1.5 A location plan is provided in **Appendix A**.

2.2 Topography

2.2.1 The topographical survey for the site was undertaken by Survey Solutions in November 2017. This indicates several steep valleys within the development, each with watercourses running within them. The site generally falls from North to South with a high point of around 102.9m AOD centrally along the northern boundary to a low point of 82.40m AOD in the south west corner.

2.3 Geology

2.3.1 Inspection of the Site Investigation Report prepared by Geosphere Environmental Limited dated December 2014, confirms that the site is generally underlain by the Lowestoft Formation, which was underlain by the Undifferentiated Lewes nodular and Seaford Chalk formations.

2.3.2 Percolation testing was carried out at various locations across the site, which confirms that infiltration techniques for surface water disposal are not possible.

2.3.3 Extracts from the report are attached in **Appendix F**, these include the executive summary, borehole logs and percolation test results.

2.4 Site Proposals

2.4.1 The proposals consist of up to 850 residential dwellings, with associated highways and drainage infrastructure., a local centre, allotments, and a primary school. The main access will be taken from the northern relief road and will also connect a number of local roads, such as Hales Barn Road, Ann Suckling Road and Howes Road.

2.4.2 As mentioned above, Phase 1 of the proposed development is currently under construction and has its own separate foul and surface water drainage outfalls.

3 SURFACE WATER DRAINAGE STRATEGY

3.1.1 The proposed development will lead to an increase in impermeable area and as such will increase the volume of surface water run-off from the site unless properly managed.

3.1.2 The Sustainable Drainage Systems (SuDS) hierarchy requires that surface water run-off be controlled and preferably re-used wherever possible. Where it is not practicable to reuse, the following methods of disposal shall be considered (in order of preference)

- Via Infiltration
- To a local watercourse
- To existing public sewers

3.1.3 Following a review of the existing geology (See Section 2.3) it is unlikely that any of the site is suitable for infiltration and therefore this option has been discounted. There are however several existing watercourses which pass through the site from the north. It is proposed that these are utilised as the main point of discharge.

3.1.4 Review of the site levels and development proposals and phasing has led to the site being split into five separate catchments, all with their own outfalls, flow controls and associated attenuation features.

3.1.5 The SCC SuDS Guidance provides options for the discharge of surface water from the site:

- Option 1 –simple control, use Qbar for discharge of surface water runoff.
- Complex –use greenfield rates and long term storage for the discharge of surface water runoff.

3.1.6 The proposed surface water strategy is based on Option 1, simple control. The greenfield runoff rates have been calculated using the ICP SuDS method within Microdrainage. Details of the Qbar rates are indicated in the table below and supporting calculations and drawings are included in **Appendix B and C**.

Catchment	Catchment Area (Ha)	Qbar (litres/second)
Catchment 1	5.064	11.6
Catchment 2	2.305	5.3
Catchment 3	2.699	6.3
Catchment 4	3.314	7.7
Catchment 5	10.149	23.5

3.1.7 Each of the catchment areas has its own flow control and attenuation facilities, where possible these are above ground dry ponds, with the exception of Catchment 2, which contains the local centre. This catchment has underground geocellular tank.

3.1.8 The Suffolk SuDS Guidance requires the drainage systems should be designed to incorporate a number of surface water treatment stages based on the level of pollution entering the system. The guide states that a minimum of one treatment stage is required for runoff from roofs and two stages for runoff from roads and parking areas.

3.1.9 Deep trapped gullies will provide an initial stage of treatment to highways and large parking areas, especially during the more polluting low intensity storms. All flows will then pass through the balancing ponds prior to discharge into the existing watercourses.

3.1.10 There will also be options to explore additional treatment stages within the parcels such as filter strips, filter trenches and permeable paving.

3.1.11 The surface water drainage strategy, indicating the proposed piped network and attenuation facilities is depicted on drawings E3838/500–508 in **Appendix D**.

3.1.12 The five drainage networks have been modelled using the Microdrainage Windes software for a 100 year event with a 40% allowance for climate change, results from the simulations area included in **Appendix E**.

3.1.13 The sports pitches to the north east of the site will continue to drain overland as they do currently, with a newly cut swale running along the northern edge of the

spine road directing flows into the adjacent watercourse.

3.1.14 It is essential that any SuDS feature is properly maintained to remain effective over the lifespan of the development, a maintenance schedule in included within **Appendix G**, which sets out the type of maintenance required and the frequency.

4 FOUL WATER DRAINAGE STRATEGY

4.1.1 A pre-development report has been obtained from Anglian Water, which provides details on proposed connection points and capacity within the existing public sewer network.

4.1.2 The findings of this report confirm that the Haverhill Water Recycling Centre has sufficient capacity to treat the proposed flows generated from the site, but a direct connection to the existing public sewer network could have a detrimental effect and the need for hydraulic modelling is required.

4.1.3 Results of the hydraulic modelling are awaited.

4.1.4 The onsite foul water network will be directed to a new pumping station located along the southern boundary. The final discharge point has been allocated in the Anglian Water Pre-Planning Assessment Report (29/06/2021) as being existing foul manhole 9501 in Withersfield Road at National Grid Reference (NGR) TL 65955 46594. As a temporary measure, Anglian Water have confirmed a point of connection to Manhole 7602 in Howe Road at NGR TL 66791 46641, where up to a maximum of 170 dwellings can be pumped from the pumping station at a maximum rate of 5.0l/s

5 CONCLUSIONS

5.1.1 Surface water will be attenuated onsite and disposed of via proprietary flow control devices to existing watercourses at existing greenfield rates.

5.1.2 Percolation testing has confirmed that the use of infiltration techniques for the disposal of surface water in not feasible.

5.1.3 Discharge rates will be limited to the Qbar values in accordance with SCC guidance.

5.1.4 Due to the undulating nature of the site, careful consideration should be given to the proposed site levels in accordance with normal good practice to ensure that there is no likelihood of flooding caused by overland flow and that any overland flow is directed around buildings in the event of an failure to the piped drainage system.

5.1.5 Further opportunities should be explored to incorporate SuDS into the development parcels where practicable.

APPENDICES

Appendix A

Reproduced from Ordnance Survey digital map data ©Crown copyright 2018. All rights reserved. Licence number 0100031673

SITE

Rev	Description	Date	Drawn	Checked

Drawing Approval Status:-

N/A Section 104 N/A Section 38 N/A Section 278

FOR COMMENT

Wormald Burrows Partnership Ltd
Civil Engineering Consultants
12a - 18a Hitchin Street, Biggleswade, SG18 8AX
Tel: (01767) 317244 Fax: (01767) 315434
Web: www.wormburp.com
Email: engineer@wormburp.com

©This drawing is Copyright, Wormald Burrows Partnership Limited 2018.

Certified by Afnor UK

Scale: 1:2500 @ A1
1:5000 @ A3

Project: Haverhill North

Drawing Description: Location Plan

Drawing Number: E3838/100

Client: PERSIMMON

Client Reference:

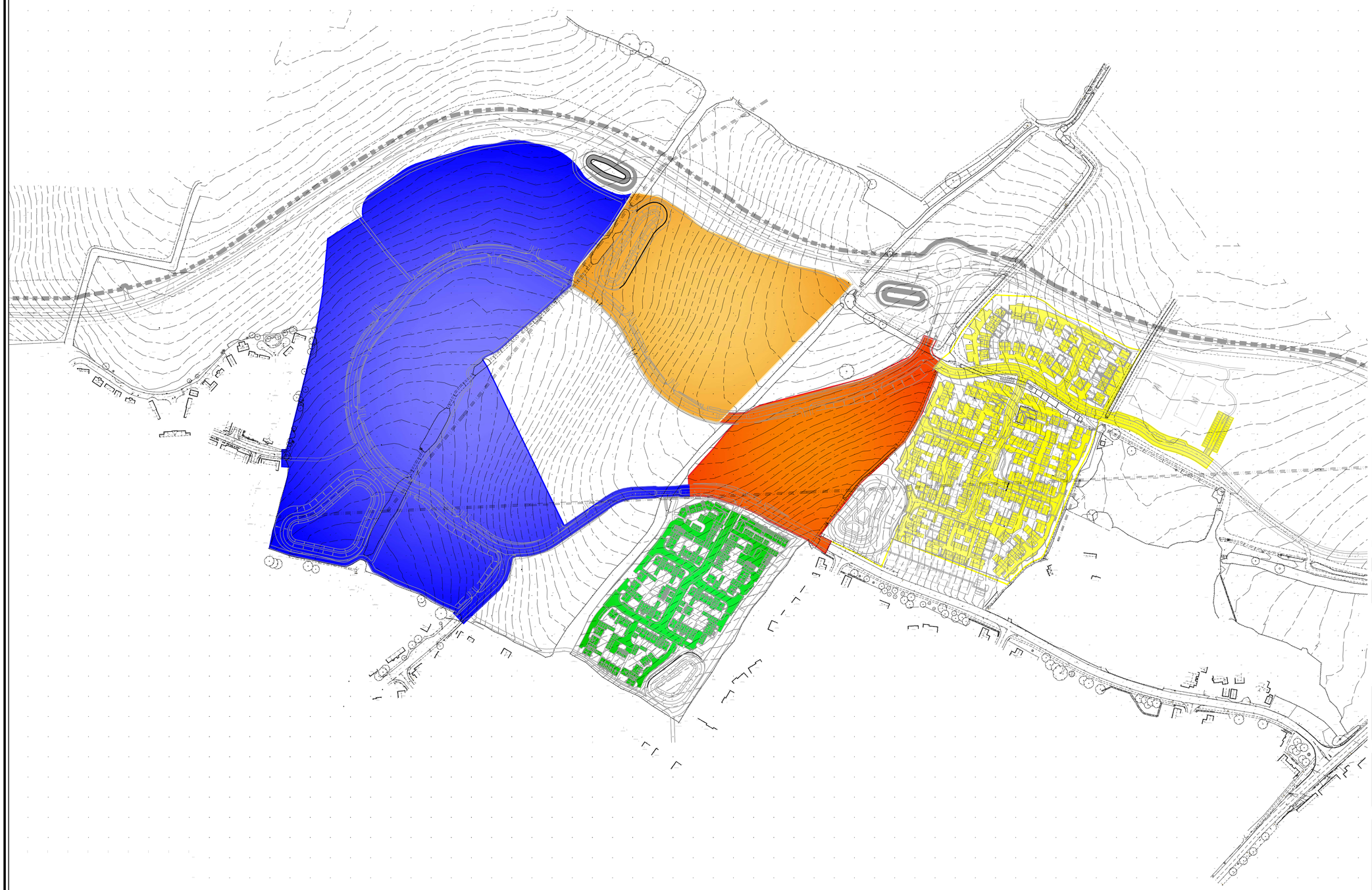
Designed By: Date:

Drawn By: Date:

Checked By: Date:

Appendix B

Reproduced from Ordnance Survey digital map data ©Crown copyright 2018. All rights reserved. Licence number 0100031673



LEGEND

- CATCHMENT AREA 1 - 5.064 Ha (Qbar - 11.7 litres/second)
- CATCHMENT AREA 2 - 2.305 Ha (Qbar - 5.3 litres/second)
- CATCHMENT AREA 3 - 2.699 Ha (Qbar - 6.3 litres/second)
- CATCHMENT AREA 4 - 3.314 Ha (Qbar - 7.7 litres/second)
- CATCHMENT AREA 5 - 10.149 Ha (Qbar - 23.5 litres/second)

Rev	Description	Date	Drawn	Checked
F	Updated Catchment 3 to new phase 6 layout.	18:02:22	LAM	LAM
E	Updated to show catchment areas and outfall rates correctly	07:12:21	LAM	NK
D	Catchment areas updated to latest designs	06:09:21	LAM	NK
C	Updated Catchment areas to include phase 2A and 2B imermeable areas	25.08.21	LAM	NK
B	Catchment areas updated	22:07:20	TJW	TJW
A	Minor adjustment to catchment areas following layout change	08:01:20	TJW	TJW

Drawing Approval Status:-

N/A Section 104 N/A Section 38 N/A Section 278

FOR INFORMATION

Wormald Burrows Partnership Ltd
Civil Engineering Consultants
12a - 18a Hitchin Street, Biggleswade, SG18 8AX
Tel: (01767) 317244 Fax: (01767) 315434
Web: www.wormburp.com
Email: engineer@wormburp.com

Project:

Haverhill, Boyton Place - Phases 2-6

Drawing Description:

Catchment Areas Plan

Client:

PERSIMMON

Persimmon Homes (Suffolk) Ltd
Orion Court
Orion Court
Great Blakenham
Suffolk IP6 0LW

Drawing Number:
E3838/510/F

Client Reference:

Scale:
1:2000 @ A1
NTS @ A3

Designed By:	Drawn By:	Checked By:
TJW	JMW	
Date: 20.12.18	Date: 03.01.19	Date:

afaq ISO 9001 Quality
UKAS MANAGEMENT SYSTEMS 022
Certified by Afnor UK

©This drawing is Copyright, Wormald Burrows Partnership Limited 2018.

Appendix C

ICP SUDS Mean Annual Flood

Input

Return Period (years)	100	Soil	0.370
Area (ha)	4.990	Urban	0.000
SAAR (mm)	583	Region Number	Region 5

Results l/s

QBAR Rural	11.6
QBAR Urban	11.6
Q100 years	41.2
Q1 year	10.1
Q30 years	27.8
Q100 years	41.2

©1982-2019 Innovyze

ICP SUDS Mean Annual Flood

Input

Return Period (years)	100	Soil	0.370
Area (ha)	2.305	Urban	0.000
SAAR (mm)	583	Region Number	Region 5

Results l/s

QBAR Rural	5.3
QBAR Urban	5.3
Q100 years	19.0
Q1 year	4.7
Q30 years	12.8
Q100 years	19.0

©1982-2019 Innovyze

ICP SUDS Mean Annual Flood

Input

Return Period (years)	100	Soil	0.370
Area (ha)	2.699	Urban	0.000
SAAR (mm)	583	Region Number	Region 5

Results l/s

QBAR Rural	6.3
QBAR Urban	6.3
Q100 years	22.3
Q1 year	5.4
Q30 years	15.0
Q100 years	22.3

©1982-2019 Innovyze

ICP SUDS Mean Annual Flood

Input

Return Period (years)	100	Soil	0.370
Area (ha)	3.314	Urban	0.000
SAAR (mm)	583	Region Number	Region 5

Results l/s

QBAR Rural	7.7
QBAR Urban	7.7
Q100 years	27.4
Q1 year	6.7
Q30 years	18.5
Q100 years	27.4

©1982-2019 Innovyze

ICP SUDS Mean Annual Flood

Input

Return Period (years)	100	Soil	0.370
Area (ha)	10.149	Urban	0.000
SAAR (mm)	583	Region Number	Region 5

Results l/s

QBAR Rural	23.5
QBAR Urban	23.5
Q100 years	83.8
Q1 year	20.5
Q30 years	56.6
Q100 years	83.8

©1982-2019 Innovyze

Appendix D

Reproduced from Ordnance Survey digital map data ©Crown copyright 2018. All rights reserved. Licence number 0100031673

12	K	Updated to suit latest infrastructure layout	27.05.22	LAM	LAM
11	J	Phase 6 layout and drainage strategy now shown. Foul sewer to infrastructure pumping station amended.	17:03:22	LAM	LAM
10	I	Updated to show new pond 2 and 4 shapes	18:02:22	LAM	LAM
9	H	Updated to show outfall rates correctly	07:12:21	LAM	NK
8	G	Random phase 2b layout removed	02:09:21	LAM	LAM
7	F	Updated to show amended infrastructure pond layouts	25.08.21	LAM	NK
6	E	Revised to suit updated Phase 2 layouts	11:08:21	LAM	NK
5	D	Revised to suit updated Phase 2 layout and pond to suit LLFA comments	14:05:21	PMW	PMW
4	C	Updated to suit SCC comments	05:11:20	JMW	TJW
3	B	Drainage strategy updated to suit Local Flood Authority comments	23:07:20	JMW	TJW
2	A	Minor updates to drainage strategy following layout changes	08:01:20	TJW	TJW
1	Rev	Description	Date	Drawn	Checked
	A	B	C	D	E

Drawing Approval Status:-

N/A Section 104 N/A Section 38 N/A Section 278

FOR APPROVAL

Wormald Burrows Partnership Ltd
Civil Engineering Consultants
12a - 18a Hitchin Street, Biggleswade, SG18 8AX
Tel: (01767) 317244 Fax: (01767) 315434
Web: www.wormburp.com
Email: engineer@wormburp.com

Project:

Haverhill, Boyton Place - Phases 2-6

Drawing Description:

Drainage Strategy Plan (Overall)

Client:

PERSIMMON

Persimmon Homes (Suffolk) Ltd
Orion Court
Orion Court
Great Blakenham
Suffolk IP6 0LW

Drawing Number:

E3838/500/K

Client Reference:

Scale:

1:2000 @ A1
NTS @ A3

Designed By:	Drawn By:	Checked By:
TJW	JMW	
Date: 20.12.18	Date: 03.01.19	Date:

afaq ISO 9001 Quality
UKAS MANAGEMENT SYSTEMS 022
Certified by Afnor UK

©This drawing is Copyright, Wormald Burrows Partnership Limited 2018.

Reproduced from Ordnance Survey digital map data ©Crown copyright 2018. All rights reserved. Licence number 0100031673

N

Drainage Strategy Legend

- Proposed adoptable Foul Water Sewer
- Proposed adoptable Surface Water Sewer
- Proposed adoptable Highway Drain
- Proposed precast concrete headwall
- Proposed pond

0 5m 10m 20m 30m 40m

Scale 1:500

Rev	Description	Date	Drawn	Checked
F	Updated to suit latest infrastructure layout	27.05.22	LAM	LAM
E	Revised to suit updated Phase 2 layouts	11:08:21	LAM	NK
D	Revised to suit updated Phase 2 layout and pond to suit LLFA comments	13:05:21	JMW	PMW
C	Updated to suit SCC comments	05:11:20	JMW	TJW
B	Drainage strategy updated to suit Local Flood Authority comments	23:07:20	JMW	TJW
A	Minor updates to drainage strategy following layout changes	08:01:20	TJW	TJW

Drawing Approval Status:-

N/A Section 104 N/A Section 38 N/A Section 278

FOR APPROVAL

Wormald Burrows Partnership Ltd
Civil Engineering Consultants
12a - 18a Hitchin Street, Biggleswade, SG18 8AX
Tel: (01767) 317244 Fax: (01767) 315434
Web: www.wormburp.com
Email: engineer@wormburp.com

Project:

Haverhill, Boyton Place - Phases 2-6

Drawing Description:

Drainage Strategy Plan - Sheet 1 of 8

Client:

PERSIMMON

Persimmon Homes (Suffolk) Ltd
Orion Court
Orion Court
Great Blakenham
Suffolk IP6 0LW

Drawing Number:
E3838/501/F

Client Reference:

Scale:
1:500 @ A1
1:1000 @ A3

Designed By:	Drawn By:	Checked By:
TJW	JMW	
Date: 20.12.18	Date: 03.01.19	Date:

afaq ISO 9001 Quality — UKAS MANAGEMENT SYSTEMS 022

Certified by Afnor UK

©This drawing is Copyright, Wormald Burrows Partnership Limited 2018.

Reproduced from Ordnance Survey digital map data ©Crown copyright 2018. All rights reserved. Licence number 0100031673

Gabion wall to create sediment forebay

TANK 1 (35x30x1.6m)
Invert Level - 88.262m AOD
Soffit Level - 89.862m AOD
Storage Volume - 3,686m3
Total available for attenuation 1,686m3
Permanent Storage 1,558m3

Intercepton storage areas, 300mm maximum depth with 1:4 side slopes
Additional storage - 128m³

OUTFALL 1 - Phase 2a and 2b
Maximum outflow rate - 11.6 litres/second
for all storms up to and including 100y +40% CC

OUTFALL 1 - Catchment area 1
Maximum outflow rate - 11.6 litres/second
for all storms up to and including 100y +40% CC

OUTFALL 2 - Catchment area 2
Maximum outflow rate - 5.3 litres/second
for all storms up to and including 100y +40% CC

POND 1 (dry)
Bed Level - 89.200m AOD
Berm level - 89.800m AOD
Bank Level - 90.850m AOD
Top Water Level - 90.550m AOD
Maximum Storage Volume - 1,917m³
1 in 4 side slopes
300mm freeboard
Overall Cut - 6,982.5m³
Overall Fill - 136.2m³

0.94 ACRES

Road 12

LIMIT OF CONSTRUCTION

Private Drive

Footpath

Drainage Strategy Legend

- Proposed adoptable Foul Water Sewer
- Proposed adoptable Surface Water Sewer
- Proposed adoptable Highway Drain
- Proposed precast concrete headwall
- Proposed pond

0 5m 10m 20m 30m 40m

Scale 1:500

Rev	Description	Date	Drawn	Checked
G	Updated to suit latest infrastructure layout	27.05.22	LAM	LAM
F	Updated to show outfall rates correctly	07:12:21	LAM	NK
E	Revised to suit updated Phase 2 layouts	11:08:21	LAM	NK
D	Revised to suit updated Phase 2 layout and pond to suit LLFA comments	13:05:21	JMW	PMW
C	Updated to suit SCC comments	05:11:20	JMW	TJW
B	Drainage strategy updated to suit Local Flood Authority comments	23:07:20	JMW	TJW
A	Minor updates to drainage strategy following layout changes	08:01:20	TJW	TJW

Drawing Approval Status:-

N/A Section 104 N/A Section 38 N/A Section 278

FOR APPROVAL

Wormald Burrows Partnership Ltd
Civil Engineering Consultants
12a - 18a Hitchin Street, Biggleswade, SG18 8AX
Tel: (01767) 317244 Fax: (01767) 315434
Web: www.wormburp.com
Email: engineer@wormburp.com

Project:
Haverhill, Boyton Place - Phases 2-6

Drawing Description:
Drainage Strategy Plan - Sheet 2 of 8

Client:
PERSIMMON
Persimmon Homes (Suffolk) Ltd
Orion Court
Orion Court
Great Blakenham
Suffolk IP6 0LW

Drawing Number:
E3838/502/G

Client Reference:

Scale:
1:500 @ A1
1:1000 @ A3

Designed By: TJW Date: 20.12.18
Drawn By: JMW Date: 03.01.19
Checked By: Date:

afaq ISO 9001 Quality
UKAS MANAGEMENT SYSTEMS 022
Certified by Afnor UK

©This drawing is Copyright, Wormald Burrows Partnership Limited 2018.

Reproduced from Ordnance Survey digital map data ©Crown copyright 2018. All rights reserved. Licence number 0100031673

POND 3 (dry)
Bed Level - 89.700m AOD
Bank Level - 91.275m AOD
Top Water Level - 90.937m AOD
Storage Volume - 1,304m3
Overall Cut - 4345m3
Overall Fill - 147m3

Road 13

Road 12

Road 1

MRT ref CP/WP/BEXTON

Drainage Strategy Legend

- Proposed adoptable Foul Water Sewer
- Proposed adoptable Surface Water Sewer
- Proposed adoptable Highway Drain
- Proposed precast concrete headwall
- Proposed pond

0 5m 10m 20m 30m 40m

Scale 1:500

Rev	Description	Date	Drawn	Checked
F	Updated to suit latest infrastructure layout	27.05.22	LAM	LAM
E	Updated to show amended infrastructure pond layouts	25.08.21	LAM	NK
D	Revised to suit updated Phase 2 layouts	11:08:21	LAM	NK
C	Updated to suit SCC comments	05:11:20	JMW	TJW
B	Drainage strategy updated to suit Local Flood Authority comments	23:07:20	JMW	TJW
A	Minor updates to drainage strategy following layout changes	08:01:20	TJW	TJW

Drawing Approval Status:-

N/A Section 104 N/A Section 38 N/A Section 278

FOR INFORMATION

Wormald Burrows Partnership Ltd
Civil Engineering Consultants
12a - 18a Hitchin Street, Biggleswade, SG18 8AX
Tel: (01767) 317244 Fax: (01767) 315434
Web: www.wormburp.com
Email: engineer@wormburp.com

Project:
Haverhill, Boyton Place - Phases 2-6

Drawing Description:
Drainage Strategy Plan - Sheet 3 of 8

Client:
PERSIMMON
Persimmon Homes (Suffolk) Ltd
Orion Court
Orion Court
Great Blakenham
Suffolk IP6 0LW

Drawing Number:
E3838/503/F

Client Reference:

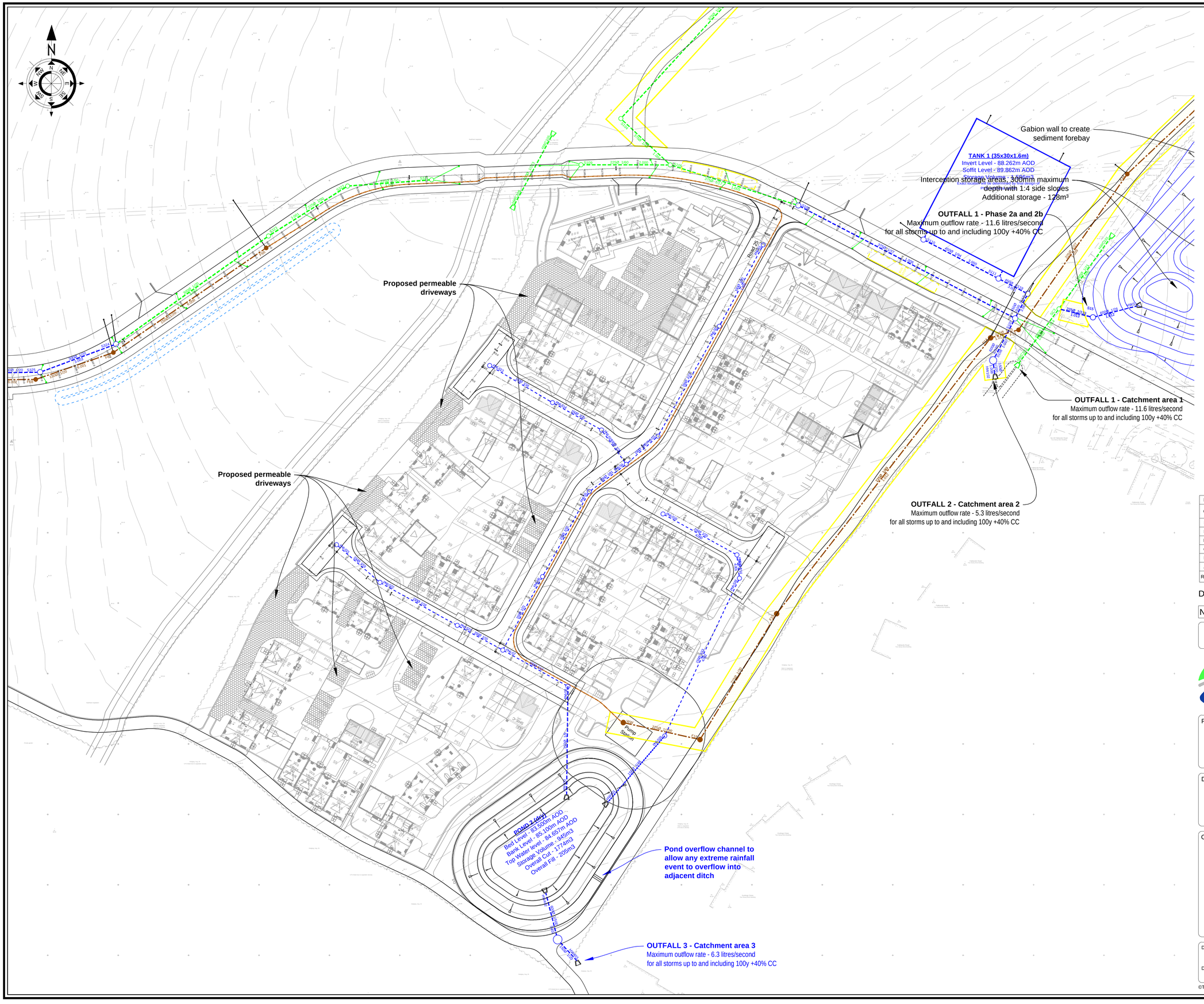
Scale:
1:500 @ A1
1:1000 @ A3

Designed By:	Drawn By:	Checked By:
TJW	JMW	
Date: 20.12.18	Date: 03.01.19	Date:

©This drawing is Copyright, Wormald Burrows Partnership Limited 2018.

afaq ISO 9001 Quality
UKAS MANAGEMENT SYSTEMS 022
Certified by Afnor UK

Reproduced from Ordnance Survey digital map data ©Crown copyright 2018. All rights reserved. Licence number 0100031673



0 5m 10m 20m 30m 40m

Scale 1:500

Rev	Description	Date	Drawn	Checked
H	Updated to suit latest infrastructure layout	27.05.22	LAM	LAM
G	Phase 6 layout and drainage strategy now shown. Foul sewer to infrastructure pumping station amended.	17:03:22	LAM	LAM
F	Updated pond 2 size	18:02:22	LAM	LAM
E	Updated to show outfall rates correctly	07:12:21	LAM	NK
D	Updated to show amended infrastructure pond layouts	25.08.21	LAM	NK
C	Updated to suit SCC comments	05:11:20	JMW	TJW
B	Drainage strategy updated to suit Local Flood Authority comments	23:07:20	JMW	TJW
A	Minor updates to drainage strategy following layout changes	08:01:20	TJW	TJW

Drawing Approval Status:-

N/A Section 104 N/A Section 38 N/A Section 278

FOR INFORMATION

Wormald Burrows Partnership Ltd
Civil Engineering Consultants
12a - 18a Hitchin Street, Biggleswade, SG18 8AX
Tel: (01767) 317244 Fax: (01767) 315434
Web: www.wormburp.com
Email: engineer@wormburp.com

Project:

Haverhill, Boyton Place - Phases 2-6

Drawing Description:

Drainage Strategy Plan - Sheet 4 of 8

Client:

PERSIMMON

Persimmon Homes (Suffolk) Ltd
Orion Court
Orion Court
Great Blakenham
Suffolk IP6 0LW

Drawing Number: E3838/504/H

Client Reference:

Scale: 1:500 @ A1
1:1000 @ A3

Designed By:	Drawn By:	Checked By:
TJW	JMW	
Date: 20.12.18	Date: 03.01.19	Date:

afaq ISO 9001 Quality — UKAS MANAGEMENT SYSTEMS 022

Certified by Afnor UK

©This drawing is Copyright, Wormald Burrows Partnership Limited 2018.

Reproduced from Ordnance Survey digital map data ©Crown copyright 2018. All rights reserved. Licence number 0100031673

POND 4 (dry)
Bed Level - 80.900m AOD
Bank Level - 82.475m AOD
Top Water Level - 82.095m AOD
Storage Volume - 4183m3
Overall Cut - 13190m3
Overall Fill - 37m3

OUTFALL 5 - Catchment area 5
Maximum outflow rate - 23.5 litres/second
for all storms up to and including 100y +40% CC

Road 21

Road 22

Proposed perm
drive

0 5m 10m 20m 30m 40m

Scale 1:500

Rev	Description	Date	Drawn	Checked
G	Updated to suit latest infrastructure layout	27.05.22	LAM	LAM
F	Phase 6 layout and drainage strategy now shown. Foul sewer to infrastructure pumping station amended.	17:03:22	LAM	LAM
E	Pond 4 size updated	18:02:22	LAM	LAM
D	Updated to show outfall rates correctly	07:12:21	LAM	NK
C	Updated to show latest pond layout	02:09:21	LAM	LAM
B	Updated to suit SCC comments	05:11:20	JMW	TJW
A	Minor updates to drainage strategy following layout changes	08:01:20	TJW	TJW

Drawing Approval Status:-

N/A Section 104 N/A Section 38 N/A Section 278

FOR INFORMATION

Wormald Burrows Partnership Ltd
Civil Engineering Consultants
12a - 18a Hitchin Street, Biggleswade, SG18 8AX
Tel: (01767) 317244 Fax: (01767) 315434
Web: www.wormburp.com
Email: engineer@wormburp.com

Project:
Haverhill, Boyton Place - Phases 2-6

Drawing Description:
Drainage Strategy Plan - Sheet 5 of 8

Client:
PERSIMMON
Persimmon Homes (Suffolk) Ltd
Orion Court
Orion Court
Great Blakenham
Suffolk IP6 0LW

Drawing Number:
E3838/505/G

Client Reference:

Scale:
1:500 @ A1
1:1000 @ A3

Designed By:	Drawn By:	Checked By:
TJW	JMW	
Date: 20.12.18	Date: 03.01.19	Date:

afaq ISO 9001 Quality
UKAS MANAGEMENT SYSTEMS 022
Certified by Afnor UK

©This drawing is Copyright, Wormald Burrows Partnership Limited 2018.

Reproduced from Ordnance Survey digital map data ©Crown copyright 2018. All rights reserved. Licence number 0100031673

OUTFALL 4 - Catchment area 4
Maximum outflow rate - 7.7 litres/second
for all storms up to and including 100y +40% CC

POND 3 (dry)
Bed Level - 89.700m AOD
Bank Level - 91.275m AOD
Top Water Level - 90.937m AOD
Storage Volume - 1,304m3
Overall Cut - 4345m3
Overall Fill - 147m3

Road 17
Road 18
Road 19
Road 20
Road 21
Road 13

0 5m 10m 20m 30m 40m
Scale 1:500

Rev	Description	Date	Drawn	Checked
F	Updated to suit latest infrastructure layout	27.05.22	LAM	LAM
E	Updated to show outfall rates correctly	07:12:21	LAM	NK
D	Random phase 2b layout removed	02:09:21	LAM	LAM
C	Updated to show amended infrastructure pond layouts	25.08.21	LAM	NK
B	Updated to suit SCC comments	05:11:20	JMW	TJW
A	Minor updates to drainage strategy following layout changes	08:01:20	TJW	TJW

Drawing Approval Status:-

N/A Section 104 N/A Section 38 N/A Section 278

FOR INFORMATION

Wormald Burrows Partnership Ltd
Civil Engineering Consultants
12a - 18a Hitchin Street, Biggleswade, SG18 8AX
Tel: (01767) 317244 Fax: (01767) 315434
Web: www.wormburp.com
Email: engineer@wormburp.com

Project:
Haverhill, Boyton Place - Phases 2-6

Drawing Description:
Drainage Strategy Plan - Sheet 6 of 8

Client:
PERSIMMON
Persimmon Homes (Suffolk) Ltd
Orion Court
Orion Court
Great Blakenham
Suffolk IP6 0LW

Drawing Number:
E3838/506/F

Client Reference:

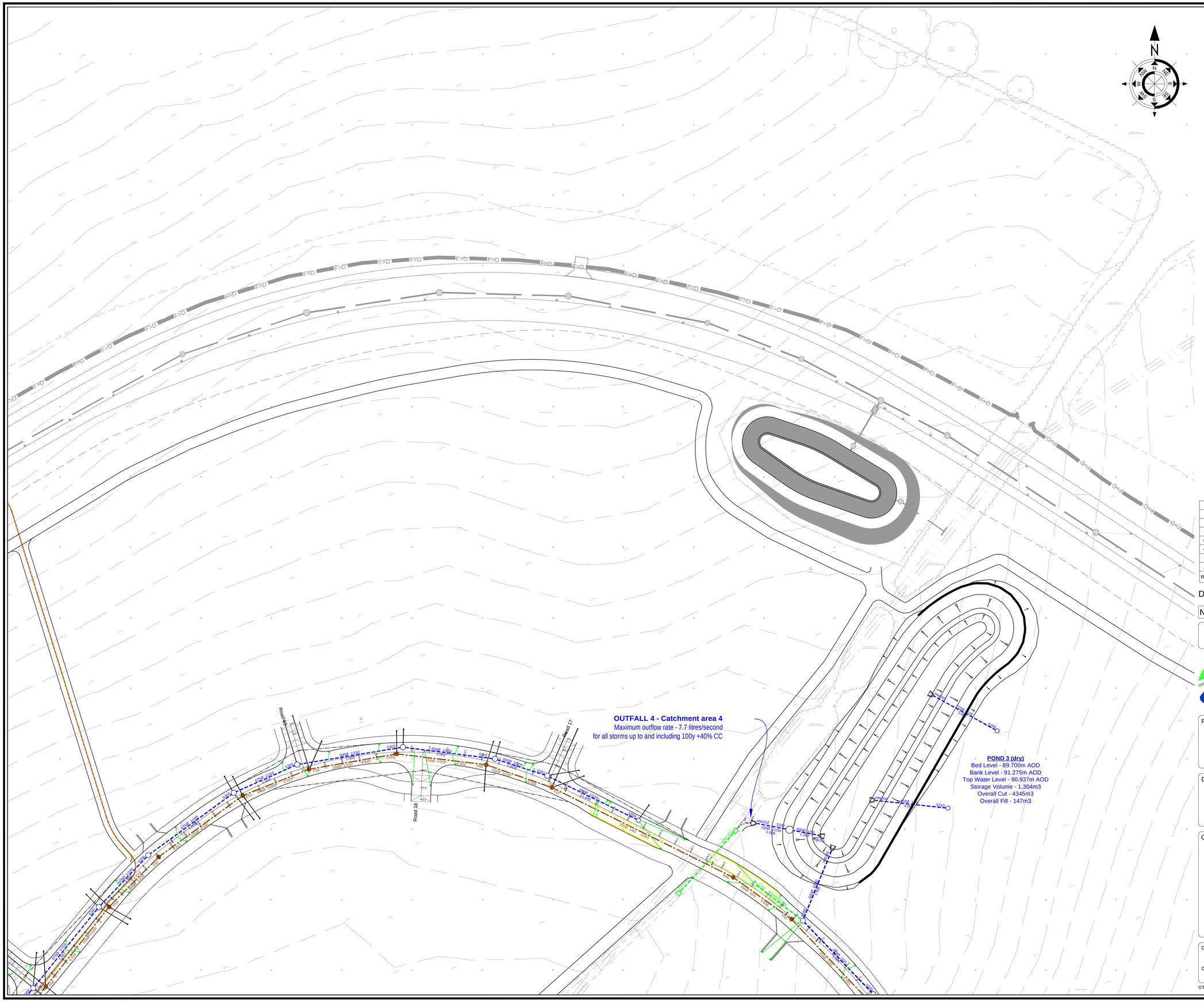
Scale:
1:500 @ A1
1:1000 @ A3

Designed By:	Drawn By:	Checked By:
TJW	JMW	
Date: 20.12.18	Date: 03.01.19	Date:

afaq ISO 9001 Quality
UKAS MANAGEMENT SYSTEMS 022
Certified by Afnor UK

©This drawing is Copyright, Wormald Burrows Partnership Limited 2018.

Reproduced from Ordnance Survey digital map data ©Crown copyright 2018. All rights reserved. Licence number 0100031673



0 5m 10m 20m 30m 40m

Scale 1:500

Rev	Description	Date	Drawn	Checked
E	Updated to suit latest infrastructure layout	27.05.22	LAM	LAM
D	Updated to show outfall rates correctly	07:12:21	LAM	NK
C	Updated to show amended infrastructure pond layouts	25.08.21	LAM	NK
B	Updated to suit SCC comments	05:11:20	JMW	TJW
A	Minor updates to drainage strategy following layout changes	08:01:20	TJW	TJW

Drawing Approval Status:-

N/A Section 104 N/A Section 38 N/A Section 278

FOR INFORMATION

Wormald Burrows Partnership Ltd
Civil Engineering Consultants
12a - 18a Hitchin Street, Biggleswade, SG18 8AX
Tel: (01767) 317244 Fax: (01767) 315434
Web: www.wormburp.com
Email: engineer@wormburp.com

Project:

Haverhill, Boyton Place - Phases 2-6

Drawing Description:

Drainage Strategy Plan - Sheet 7 of 8

Client:

PERSIMMON

Persimmon Homes (Suffolk) Ltd
Orion Court
Orion Court
Great Blakenham
Suffolk IP6 0LW

Drawing Number:
E3838/507/E

Client Reference:

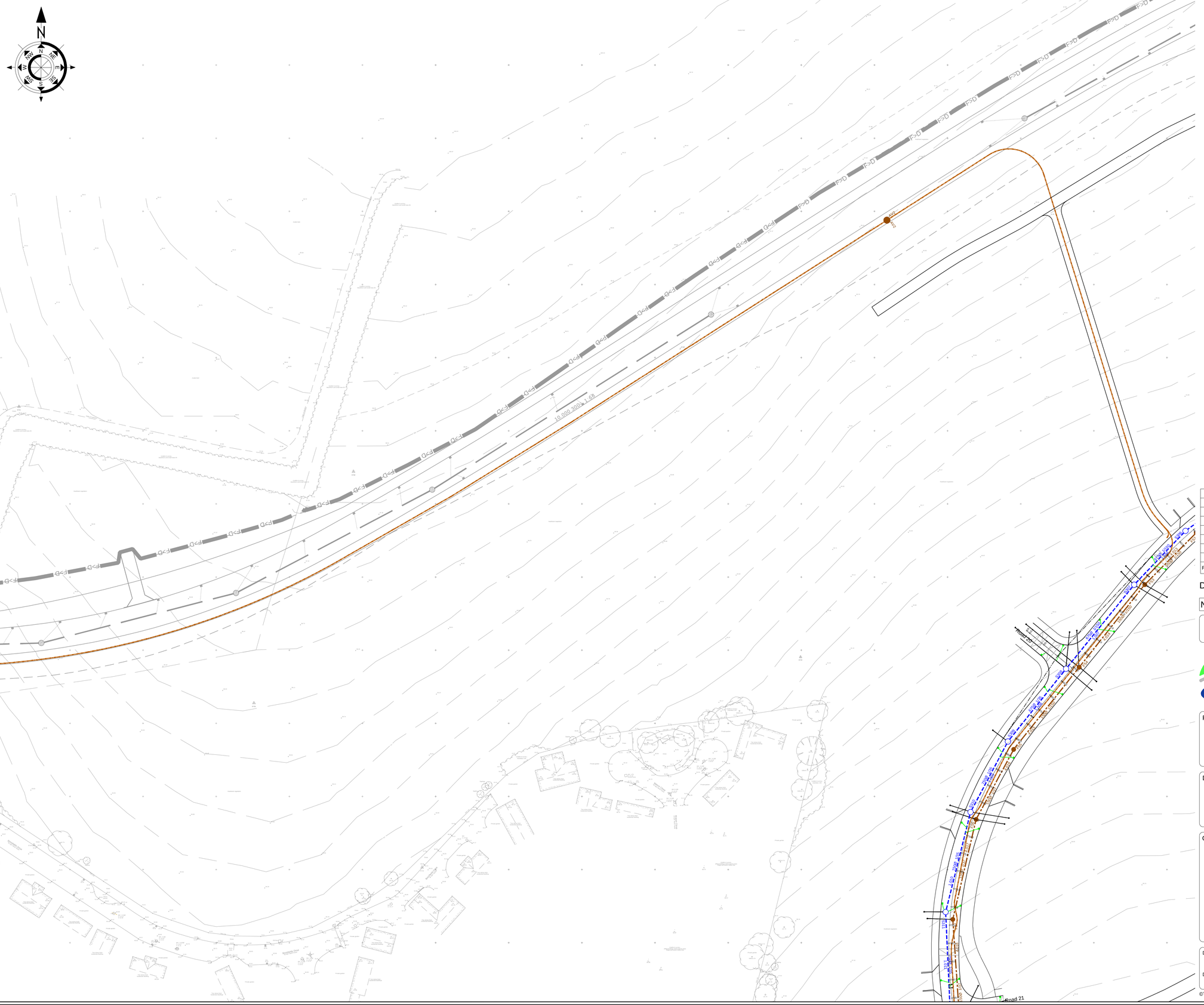
Scale:
1:500 @ A1
1:1000 @ A3

Designed By:	Drawn By:	Checked By:
TJW	JMW	
Date: 20.12.18	Date: 03.01.19	Date:

afaq ISO 9001 Quality
UKAS MANAGEMENT SYSTEMS 022
Certified by Afnor UK

©This drawing is Copyright, Wormald Burrows Partnership Limited 2018.

Reproduced from Ordnance Survey digital map data ©Crown copyright 2018. All rights reserved. Licence number 0100031673



0 5m 10m 20m 30m 40m

Scale 1:500

Rev	Description	Date	Drawn	Checked
D	Updated to suit latest infrastructure layout	27.05.22	LAM	LAM
C	Updated to suit latest road alignment	02:09:21	LAM	LAM
B	Updated to suit SCC comments	05:11:20	JMW	TJW
A	Minor updates to drainage strategy following layout changes	08:01:20	TJW	TJW

Drawing Approval Status:-

N/A Section 104 N/A Section 38 N/A Section 278

FOR INFORMATION

Wormald Burrows Partnership Ltd
Civil Engineering Consultants
12a - 18a Hitchin Street, Biggleswade, SG18 8AX
Tel: (01767) 317244 Fax: (01767) 315434
Web: www.wormburp.com
Email: engineer@wormburp.com

Project:

Haverhill, Boyton Place - Phases 2-6

Drawing Description:

Drainage Strategy Plan - Sheet 8 of 8

Client:

PERSIMMON

Persimmon Homes (Suffolk) Ltd
Orion Court
Orion Court
Great Blakenham
Suffolk IP6 0LW

Drawing Number:

E3838/508/D

Client Reference:

Scale:

1:500 @ A1
1:1000 @ A3

Designed By:	Drawn By:	Checked By:
TJW	JMW	
Date: 20.12.18	Date: 03.01.19	Date:

afaq ISO 9001 Quality — UKAS MANAGEMENT SYSTEMS 022

Certified by Afnor UK

©This drawing is Copyright, Wormald Burrows Partnership Limited 2018.

Appendix E

STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for Surface Network 1

- Indicates pipe length does not match coordinates
« - Indicates pipe capacity < flow

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	37.098	0.247	150.0	0.118	5.00	0.0	0.600		o	225	Pipe/Conduit	
1.001	36.315	0.242	149.8	0.034	0.00	0.0	0.600		o	300	Pipe/Conduit	
1.002	60.489	2.023	29.9	0.058	0.00	0.0	0.600		o	300	Pipe/Conduit	
1.003	21.256	1.063	20.0	0.028	0.00	0.0	0.600		o	300	Pipe/Conduit	
2.000	18.207	0.910	20.0	0.045	5.00	0.0	0.600		o	225	Pipe/Conduit	
2.001	23.015	1.151	20.0	0.044	0.00	0.0	0.600		o	225	Pipe/Conduit	
2.002	18.714	0.936	20.0	0.030	0.00	0.0	0.600		o	225	Pipe/Conduit	
1.004	31.023	1.551	20.0	0.167	0.00	0.0	0.600		o	375	Pipe/Conduit	
1.005	24.034	1.202	20.0	0.084	0.00	0.0	0.600		o	375	Pipe/Conduit	
1.006	24.153	1.208	20.0	0.079	0.00	0.0	0.600		o	375	Pipe/Conduit	
1.007	45.287	2.264	20.0	0.052	0.00	0.0	0.600		o	375	Pipe/Conduit	
1.008	56.344	2.662	21.2	0.237	0.00	0.0	0.600		o	450	Pipe/Conduit	
3.000	11.382	0.474	24.0	0.156	5.00	0.0	0.600		o	225	Pipe/Conduit	
3.001	15.716	0.655	24.0	0.018	0.00	0.0	0.600		o	300	Pipe/Conduit	
3.002	20.772	0.866	24.0	0.105	0.00	0.0	0.600		o	300	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	5.58	105.368	0.118	0.0	0.0	0.0	1.07	42.4	16.0
1.001	50.00	6.05	105.045	0.152	0.0	0.0	0.0	1.28	90.6	20.6
1.002	50.00	6.40	104.803	0.210	0.0	0.0	0.0	2.89	204.0	28.4
1.003	50.00	6.50	102.780	0.238	0.0	0.0	0.0	3.53	249.6	32.2
2.000	50.00	5.10	104.714	0.045	0.0	0.0	0.0	2.94	116.9	6.1
2.001	50.00	5.23	103.804	0.089	0.0	0.0	0.0	2.94	116.9	12.1
2.002	50.00	5.34	102.653	0.119	0.0	0.0	0.0	2.94	116.9	16.1
1.004	50.00	6.63	101.642	0.524	0.0	0.0	0.0	4.07	449.2	71.0
1.005	50.00	6.73	100.091	0.608	0.0	0.0	0.0	4.07	449.2	82.3
1.006	50.00	6.83	98.889	0.687	0.0	0.0	0.0	4.07	449.3	93.0
1.007	50.00	7.01	97.682	0.739	0.0	0.0	0.0	4.07	449.2	100.1
1.008	50.00	7.22	95.342	0.976	0.0	0.0	0.0	4.43	705.3	132.2
3.000	50.00	5.07	99.310	0.156	0.0	0.0	0.0	2.68	106.6	21.1
3.001	50.00	5.15	98.761	0.174	0.0	0.0	0.0	3.22	227.8	23.6
3.002	50.00	5.26	98.106	0.279	0.0	0.0	0.0	3.22	227.8	37.8

©1982-2019 Innovyze

STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for Surface Network 1

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
3.003	12.587	0.524	24.0	0.123	0.00	0.0	0.600		o	300	Pipe/Conduit	
3.004	62.262	2.481	25.1	0.060	0.00	0.0	0.600		o	300	Pipe/Conduit	
3.005	16.463	1.405	11.7	0.221	0.00	0.0	0.600		o	375	Pipe/Conduit	
1.009	56.440	2.635	21.4	0.030	0.00	0.0	0.600		o	600	Pipe/Conduit	
1.010	13.825	0.046	303.8	0.074	0.00	0.0	0.600		o	600	Pipe/Conduit	
1.011	5.000#	0.650	7.7	0.000	0.00	0.0		0.045	3 \=/	1000	1:3 Swale	
4.000	30.631	1.802	17.0	0.161	5.00	0.0	0.600		o	225	Pipe/Conduit	
4.001	37.835	2.226	17.0	0.141	0.00	0.0	0.600		o	300	Pipe/Conduit	
4.002	8.458	0.211	40.0	0.035	0.00	0.0	0.600		o	300	Pipe/Conduit	
4.003	24.209	0.605	40.0	0.022	0.00	0.0	0.600		o	300	Pipe/Conduit	
4.004	16.835	0.421	40.0	0.094	0.00	0.0	0.600		o	300	Pipe/Conduit	
4.005	48.852	4.134	11.8	0.349	0.00	0.0	0.600		o	375	Pipe/Conduit	
4.006	9.626	0.963	10.0	0.154	0.00	0.0	0.600		o	375	Pipe/Conduit	
4.007	27.906	2.791	10.0	0.052	0.00	0.0	0.600		o	375	Pipe/Conduit	
4.008	5.000#	0.010	521.4	0.000	0.00	0.0		0.045	3 \=/	1000	1:3 Swale	
1.012	9.805	0.050	196.1	0.000	0.00	0.0	0.600		o	600	Pipe/Conduit	
1.013	9.949	0.075	132.7	0.000	0.00	0.0	0.600		o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
3.003	50.00	5.32	97.240	0.402	0.0	0.0	0.0	3.22	227.8	54.4
3.004	50.00	5.65	96.716	0.462	0.0	0.0	0.0	3.15	222.8	62.6
3.005	50.00	5.71	94.160	0.683	0.0	0.0	0.0	5.32	587.4	92.5
1.009	50.00	7.40	92.530	1.689	0.0	0.0	0.0	5.28	1492.1	228.7
1.010	50.00	7.57	89.896	1.763	0.0	0.0	0.0	1.39	393.5	238.7
1.011	50.00	7.61	89.850	1.763	0.0	0.0	0.0	1.86	404.0	238.7
4.000	50.00	5.16	102.602	0.161	0.0	0.0	0.0	3.19	126.8	21.8
4.001	50.00	5.32	100.726	0.302	0.0	0.0	0.0	3.83	270.8	40.9
4.002	50.00	5.38	98.500	0.337	0.0	0.0	0.0	2.49	176.2	45.6
4.003	50.00	5.54	98.289	0.359	0.0	0.0	0.0	2.49	176.3	48.6
4.004	50.00	5.66	97.683	0.453	0.0	0.0	0.0	2.49	176.2	61.3
4.005	50.00	5.81	97.188	0.802	0.0	0.0	0.0	5.30	584.9	108.6
4.006	50.00	5.84	93.053	0.956	0.0	0.0	0.0	5.76	635.9	129.5
4.007	50.00	5.92	92.091	1.008	0.0	0.0	0.0	5.76	635.9	136.5
4.008	50.00	6.29	89.300	1.008	0.0	0.0	0.0	0.23	49.1«	136.5
1.012	50.00	7.71	89.200	2.771	0.0	0.0	0.0	1.74	490.7	375.2
1.013	50.00	7.85	89.150	2.771	0.0	0.0	0.0	1.13	45.1«	375.2

©1982-2019 Innovyze

STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for Surface Network 1

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
5.000	24.866	1.200	20.7	0.000	5.00	0.0	0.600		o	600	Pipe/Conduit	
1.014	19.062	0.095	200.0	0.000	0.00	0.0	0.600		o	600	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
5.000	50.00	5.08	89.900	0.000	0.0	0.0	0.0	5.37	1517.1	0.0
1.014	50.00	8.04	88.700	2.771	0.0	0.0	0.0	1.72	485.8	375.2

Free Flowing Outfall Details for Surface Network 1

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.014	HWC12	89.415	88.605	0.000	900	1050

Simulation Criteria for Surface Network 1

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.900	Storm Duration (mins)	30
Ratio R	0.432		

©1982-2019 Innovyze

Online Controls for Surface Network 1

Hydro-Brake® Optimum Manhole: S15, DS/PN: 1.013, Volume (m³): 7.7

Unit Reference	MD-SHE-0146-1160-1650-1160
Design Head (m)	1.650
Design Flow (l/s)	11.6
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	146
Invert Level (m)	89.150
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1500

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.650	11.6
Flush-Flo™	0.487	11.6
Kick-Flo®	1.022	9.3
Mean Flow over Head Range	-	10.1

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	5.3	1.200	10.0	3.000	15.4	7.000	23.1
0.200	10.2	1.400	10.7	3.500	16.6	7.500	23.9
0.300	11.1	1.600	11.4	4.000	17.7	8.000	24.6
0.400	11.5	1.800	12.1	4.500	18.7	8.500	25.4
0.500	11.6	2.000	12.7	5.000	19.7	9.000	26.1
0.600	11.5	2.200	13.3	5.500	20.6	9.500	26.8
0.800	11.0	2.400	13.8	6.000	21.4		
1.000	9.5	2.600	14.4	6.500	22.3		

©1982-2019 Innovyze

Storage Structures for Surface Network 1

Tank or Pond Manhole: HW3, DS/PN: 1.012

Invert Level (m) 89.200

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	829.4	0.600	1155.0	0.601	1376.9	1.650	2073.4

©1982-2019 Innovyze

Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model		FSR Ratio R	0.432
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	20.900	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	450.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	ON
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	1, 2, 30, 100
Climate Change (%)	0, 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	S1	15 Winter	100	+40%	30/15 Winter				106.228
1.001	S2	15 Winter	100	+40%	100/15 Summer				105.384
1.002	S3	15 Winter	100	+40%					104.978
1.003	S4	15 Winter	100	+40%					102.957
2.000	S12	15 Winter	100	+40%					104.796
2.001	S13	15 Winter	100	+40%					103.927
2.002	S14	15 Winter	100	+40%					102.805
1.004	S5	15 Winter	100	+40%					101.923
1.005	S6	15 Winter	100	+40%	100/15 Summer				100.873
1.006	S7	15 Winter	100	+40%	100/15 Summer				99.800
1.007	S8	15 Winter	100	+40%	100/15 Summer				98.400
1.008	S9	15 Winter	100	+40%					95.683
3.000	S16	15 Winter	100	+40%	100/15 Summer				100.041
3.001	S17	15 Winter	100	+40%	100/15 Summer				99.587
3.002	S18	15 Winter	100	+40%	100/15 Summer				99.328
3.003	S19	15 Winter	100	+40%	100/15 Summer				98.831
3.004	S20	15 Winter	100	+40%	100/15 Summer				98.056
3.005	S21	15 Winter	100	+40%					94.431
1.009	S10	15 Winter	100	+40%					93.078

©1982-2019 Innovyze

Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	S1	0.636	0.000	1.81		72.6	SURCHARGED	
1.001	S2	0.039	0.000	1.08		90.7	SURCHARGED	
1.002	S3	-0.125	0.000	0.63		122.2	OK	
1.003	S4	-0.123	0.000	0.64		139.8	OK	
2.000	S12	-0.143	0.000	0.29		30.1	OK	
2.001	S13	-0.102	0.000	0.57		61.3	OK	
2.002	S14	-0.073	0.000	0.79		82.5	OK	
1.004	S5	-0.094	0.000	0.84		335.2	OK	
1.005	S6	0.407	0.000	0.97		374.5	SURCHARGED	
1.006	S7	0.535	0.000	1.07		412.9	SURCHARGED	
1.007	S8	0.344	0.000	1.07		441.9	SURCHARGED	
1.008	S9	-0.109	0.000	0.91		589.3	OK	
3.000	S16	0.506	0.000	1.06		95.9	SURCHARGED	
3.001	S17	0.526	0.000	0.55		105.6	SURCHARGED	
3.002	S18	0.922	0.000	0.79		157.6	FLOOD RISK	
3.003	S19	1.290	0.000	1.20		217.8	SURCHARGED	
3.004	S20	1.040	0.000	1.18		251.1	SURCHARGED	
3.005	S21	-0.104	0.000	0.85		394.2	OK	
1.009	S10	-0.052	0.000	0.76		1003.4	OK	

©1982-2019 Innovyze

Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.010	S11	15 Winter	100	+40%	30/15 Summer			
1.011	HW1	720 Winter	100	+40%				
4.000	S22	15 Winter	100	+40%	100/15 Winter			
4.001	S23	15 Winter	100	+40%	100/15 Summer			
4.002	S24	15 Winter	100	+40%	30/15 Summer	100/15 Summer		
4.003	S25	15 Winter	100	+40%	100/15 Summer			
4.004	S26	15 Winter	100	+40%	30/15 Summer			
4.005	S27	15 Winter	100	+40%	100/15 Summer			
4.006	S28	15 Winter	100	+40%	100/15 Summer			
4.007	S29	15 Winter	100	+40%	100/15 Summer			
4.008	HW2	720 Winter	100	+40%				
1.012	HW3	720 Winter	100	+40%	30/60 Winter			
1.013	S15	720 Winter	100	+40%	1/15 Summer			
5.000	HWC11	120 Winter	2	+0%				
1.014	SC3	960 Winter	30	+0%				

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.010	S11	91.524	1.028	0.000	3.90		1051.7	SURCHARGED	
1.011	HW1	90.533	-2.208	0.000	0.00		81.5	OK	
4.000	S22	102.899	0.072	0.000	0.88		103.9	SURCHARGED	
4.001	S23	101.605	0.579	0.000	0.75		188.5	SURCHARGED	
4.002	S24	100.312	1.512	3.498	1.73		199.1	FLOOD	2
4.003	S25	99.829	1.241	0.000	1.31		205.8	FLOOD RISK	
4.004	S26	98.931	0.948	0.000	1.66		248.9	FLOOD RISK	
4.005	S27	97.798	0.235	0.000	0.85		457.2	SURCHARGED	
4.006	S28	94.821	1.393	0.000	1.43		550.6	SURCHARGED	
4.007	S29	92.832	0.367	0.000	1.04		582.0	SURCHARGED	
4.008	HW2	90.533	-2.667	0.000	0.00		44.3	OK	
1.012	HW3	90.533	0.733	0.000	0.07		20.0	FLOOD RISK	
1.013	S15	90.541	1.166	0.000	0.31		11.6	FLOOD RISK	
5.000	HWC11	89.900	-0.600	0.000	0.00		0.0	OK	
1.014	SC3	88.771	-0.529	0.000	0.03		11.6	OK	

©1982-2019 Innovyze

STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for Surface Network 5

« - Indicates pipe capacity < flow

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	54.552	0.546	100.0	0.067	5.00	0.0	0.600	o	225	Pipe/Conduit	
1.001	68.137	0.568	120.0	0.086	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.002	51.563	0.430	120.0	0.058	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.003	80.301	1.785	45.0	0.027	0.00	0.0	0.600	o	375	Pipe/Conduit	
1.004	19.249	0.428	45.0	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
2.000	25.355	0.420	60.4	0.035	5.00	0.0	0.600	o	225	Pipe/Conduit	
1.005	38.140	2.210	17.3	0.034	0.00	0.0	0.600	o	375	Pipe/Conduit	
1.006	69.432	3.967	17.5	0.092	0.00	0.0	0.600	o	375	Pipe/Conduit	
3.000	24.016	0.255	94.1	0.542	5.00	0.0	0.600	o	450	Pipe/Conduit	
3.001	9.353	0.079	119.0	0.703	0.00	0.0	0.600	o	450	Pipe/Conduit	
3.002	7.843	0.036	216.7	0.143	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.007	13.469	0.027	500.0	0.036	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.008	3.900	0.039	100.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	5.70	98.893	0.067	0.0	0.0	0.0	1.31	52.0	9.1
1.001	50.00	6.49	98.273	0.153	0.0	0.0	0.0	1.43	101.4	20.7
1.002	50.00	7.09	97.705	0.211	0.0	0.0	0.0	1.43	101.4	28.6
1.003	50.00	7.58	97.200	0.238	0.0	0.0	0.0	2.71	299.0	32.2
1.004	50.00	7.70	95.416	0.238	0.0	0.0	0.0	2.71	299.0	32.2
2.000	50.00	5.25	95.591	0.035	0.0	0.0	0.0	1.69	67.0	4.7
1.005	50.00	7.84	94.988	0.307	0.0	0.0	0.0	4.38	483.8	41.6
1.006	50.00	8.11	92.778	0.399	0.0	0.0	0.0	4.35	480.4	54.0
3.000	50.00	5.19	89.105	0.542	0.0	0.0	0.0	2.10	333.3	73.4
3.001	50.00	5.27	88.850	1.245	0.0	0.0	0.0	1.86	296.3	168.6
3.002	50.00	5.37	88.771	1.388	0.0	0.0	0.0	1.38	219.0	188.0
1.007	50.00	8.32	88.585	1.823	0.0	0.0	0.0	1.08	306.0	246.9
1.008	50.00	8.38	88.558	1.823	0.0	0.0	0.0	1.00	17.8«	246.9

©1982-2019 Innovyze

Free Flowing Outfall Details for Surface Network 5

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.008	HW102	89.692	88.519	0.000	0	0

Simulation Criteria for Surface Network 5

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	21.000	Storm Duration (mins)	30
Ratio R	0.422		

©1982-2019 Innovyze

Storage Structures for Surface Network 5

Cellular Storage Manhole: S111, DS/PN: 3.001

Invert Level (m) 88.850 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	1050.0	1050.0	1.601	0.0	1258.0
1.600	1050.0	1258.0			

©1982-2019 Innovyze

Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 5

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.422
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	21.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	450.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880
Return Period(s) (years)	2, 10, 30, 100
Climate Change (%)	0, 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	S100	15 Winter	100	+40%					99.110
1.001	S101	15 Winter	100	+40%	100/15 Summer				98.733
1.002	S102	15 Winter	100	+40%	100/15 Summer				98.234
1.003	S103	15 Winter	100	+40%					97.380
1.004	S104	15 Winter	100	+40%					95.608
2.000	S109	15 Winter	100	+40%					95.687
1.005	S105	15 Winter	100	+40%					95.150
1.006	S106	15 Winter	100	+40%					92.968
3.000	S110	720 Winter	100	+40%	100/15 Summer				90.090
3.001	S111	720 Winter	100	+40%	30/60 Winter				90.089
3.002	S112	720 Winter	100	+40%	2/15 Summer				90.105
1.007	S107	720 Winter	100	+40%	2/15 Summer				90.117
1.008	S108	720 Winter	100	+40%	2/15 Summer				90.117

©1982-2019 Innovyze

Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 5

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	S100	-0.008	0.000	0.85		42.5	OK	
1.001	S101	0.160	0.000	0.93		90.0	SURCHARGED	
1.002	S102	0.229	0.000	1.23		118.1	SURCHARGED	
1.003	S103	-0.195	0.000	0.46		130.0	OK	
1.004	S104	-0.182	0.000	0.52		129.7	OK	
2.000	S109	-0.129	0.000	0.37		23.2	OK	
1.005	S105	-0.212	0.000	0.38		167.2	OK	
1.006	S106	-0.185	0.000	0.49		224.1	OK	
3.000	S110	0.535	0.000	0.10		27.2	SURCHARGED	
3.001	S111	0.789	0.000	0.11		18.1	SURCHARGED	
3.002	S112	0.884	0.000	0.11		15.8	SURCHARGED	
1.007	S107	0.932	0.000	0.09		14.6	FLOOD RISK	
1.008	S108	1.409	0.000	0.60		7.5	FLOOD RISK	

©1982-2019 Innovyze

STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for Surface Network 9

- Indicates pipe length does not match coordinates
« - Indicates pipe capacity < flow

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	17.960	0.299	60.0	1.434	5.00	0.0	0.600		o	600	Pipe/Conduit	
1.001	5.000#	0.050	100.0	0.000	0.00	0.0		0.045	3 \=/	500	1:3 Swale	
2.000	20.969	0.350	60.0	0.000	5.00	0.0	0.600		o	600	Pipe/Conduit	
2.001	5.000#	0.050	100.0	0.000	0.00	0.0		0.045	3 \=/	500	1:3 Swale	
1.002	9.264	0.018	514.7	0.000	0.00	0.0	0.600		o	600	Pipe/Conduit	
1.003	18.733	0.952	19.7	0.000	0.00	0.0	0.600		o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	5.10	83.849	1.434	0.0	0.0	0.0	3.15	890.0	194.2
1.001	50.00	5.27	83.550	1.434	0.0	0.0	0.0	0.47	67.5«	194.2
2.000	50.00	5.11	83.900	0.000	0.0	0.0	0.0	3.15	890.0	0.0
2.001	50.00	5.29	83.550	0.000	0.0	0.0	0.0	0.47	67.5	0.0
1.002	50.00	5.43	83.500	1.434	0.0	0.0	0.0	1.07	301.5	194.2
1.003	50.00	5.57	83.482	1.434	0.0	0.0	0.0	2.28	40.3«	194.2

Free Flowing Outfall Details for Surface Network 9

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.003	HW403	83.300	82.530	0.000	900	675

©1982-2019 Innovyze

Simulation Criteria for Surface Network 9

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	21.000	Storm Duration (mins)	30
Ratio R	0.422		

©1982-2019 Innovyze

Online Controls for Surface Network 9

Hydro-Brake® Optimum Manhole: S402, DS/PN: 1.003, Volume (m³): 7.8

Unit Reference	MD-SHE-0113-6300-1300-6300
Design Head (m)	1.300
Design Flow (l/s)	6.3
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	113
Invert Level (m)	83.482
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.300	6.3
Flush-Flo™	0.384	6.3
Kick-Flo®	0.805	5.0
Mean Flow over Head Range	-	5.5

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	3.9	1.200	6.1	3.000	9.3	7.000	13.9
0.200	5.8	1.400	6.5	3.500	10.0	7.500	14.4
0.300	6.2	1.600	6.9	4.000	10.7	8.000	14.9
0.400	6.3	1.800	7.3	4.500	11.3	8.500	15.3
0.500	6.2	2.000	7.7	5.000	11.9	9.000	15.7
0.600	6.0	2.200	8.1	5.500	12.4	9.500	16.1
0.800	5.1	2.400	8.4	6.000	13.0		
1.000	5.6	2.600	8.7	6.500	13.5		

©1982-2019 Innovyze

Storage Structures for Surface Network 9

Tank or Pond Manhole: HW402, DS/PN: 1.002

Invert Level (m) 83.500

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	493.0	0.600	734.0	0.601	903.0	1.600	1423.9

©1982-2019 Innovyze

Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 9

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.422
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	21.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	450.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880
Return Period(s) (years)	2, 10, 30, 100
Climate Change (%)	0, 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	S401	15 Winter	100	+40%	100/15 Summer				85.055
1.001	HW401	720 Winter	100	+40%					84.657
2.000	S400	720 Winter	100	+40%	100/120 Winter				84.657
2.001	HW400	720 Winter	100	+40%					84.657
1.002	HW402	720 Winter	100	+40%	30/120 Winter				84.657
1.003	S402	720 Winter	100	+40%	2/15 Summer				84.667

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	S401	0.606	0.000	1.73		947.4	SURCHARGED	
1.001	HW401	-0.418	0.000	0.01		70.3	FLOOD RISK	
2.000	S400	0.158	0.000	0.00		0.0	SURCHARGED	
2.001	HW400	-0.418	0.000	0.00		0.0	FLOOD RISK	
1.002	HW402	0.557	0.000	0.06		9.4	FLOOD RISK	
1.003	S402	1.035	0.000	0.17		6.3	FLOOD RISK	

©1982-2019 Innovyze

STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for Surface Network 6

- Indicates pipe length does not match coordinates
« - Indicates pipe capacity < flow

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	16.578	0.332	50.0	0.040	5.00	0.0	0.600		o	225	Pipe/Conduit	
1.001	13.951	0.467	29.9	0.083	0.00	0.0	0.600		o	225	Pipe/Conduit	
1.002	16.350	0.908	18.0	0.833	0.00	0.0	0.600		o	450	Pipe/Conduit	
1.003	32.637	1.813	18.0	0.084	0.00	0.0	0.600		o	450	Pipe/Conduit	
1.004	31.876	1.771	18.0	0.090	0.00	0.0	0.600		o	450	Pipe/Conduit	
1.005	28.944	1.475	19.6	0.548	0.00	0.0	0.600		o	525	Pipe/Conduit	
2.000	17.207	0.086	200.0	0.053	5.00	0.0	0.600		o	300	Pipe/Conduit	
1.006	19.685	0.039	500.0	0.000	0.00	0.0	0.600		o	600	Pipe/Conduit	
1.007	5.000#	0.050	100.0	0.000	0.00	0.0		0.045	3 \=/	500	1:3 Swale	
3.000	21.113	0.352	60.0	0.216	5.00	0.0	0.600		o	450	Pipe/Conduit	
3.001	5.000#	0.050	100.0	0.000	0.00	0.0		0.045	3 \=/	500	1:3 Swale	
4.000	22.102	1.128	19.6	0.000	5.00	0.0	0.600		o	450	Pipe/Conduit	
4.001	5.000#	0.050	100.0	0.000	0.00	0.0		0.045	3 \=/	500	1:3 Swale	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	5.15	96.930	0.040	0.0	0.0	0.0	1.85	73.7	5.4
1.001	50.00	5.25	96.598	0.123	0.0	0.0	0.0	2.40	95.5	16.7
1.002	50.00	5.30	95.907	0.956	0.0	0.0	0.0	4.81	765.0	129.5
1.003	50.00	5.42	94.998	1.040	0.0	0.0	0.0	4.81	764.9	140.8
1.004	50.00	5.53	93.185	1.130	0.0	0.0	0.0	4.81	765.0	153.0
1.005	50.00	5.62	91.339	1.678	0.0	0.0	0.0	5.07	1098.1	227.2
2.000	50.00	5.26	90.175	0.053	0.0	0.0	0.0	1.11	78.3	7.2
1.006	50.00	5.92	89.789	1.731	0.0	0.0	0.0	1.08	306.0	234.4
1.007	50.00	6.10	89.750	1.731	0.0	0.0	0.0	0.47	67.5«	234.4
3.000	50.00	5.13	90.102	0.216	0.0	0.0	0.0	2.63	418.0	29.2
3.001	50.00	5.31	89.750	0.216	0.0	0.0	0.0	0.47	67.5	29.2
4.000	50.00	5.08	90.878	0.000	0.0	0.0	0.0	4.61	733.1	0.0
4.001	50.00	5.26	89.750	0.000	0.0	0.0	0.0	0.47	67.5	0.0

©1982-2019 Innovyze

STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for Surface Network 6

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
1.008	9.460	0.234	40.4	0.000	0.00	0.0	0.600		o	600	Pipe/Conduit	
1.009	9.945	0.066	150.0	0.000	0.00	0.0	0.600		o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.008	50.00	6.14	89.700	1.947	0.0	0.0	0.0	3.84	1085.1	263.6
1.009	50.00	6.34	89.466	1.947	0.0	0.0	0.0	0.82	14.5«	263.6

Free Flowing Outfall Details for Surface Network 6

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.009	HW202	90.183	89.400	0.000	900	675

Simulation Criteria for Surface Network 6

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	21.000	Storm Duration (mins)	30
Ratio R	0.422		

©1982-2019 Innovyze

Online Controls for Surface Network 6

Hydro-Brake® Optimum Manhole: S207, DS/PN: 1.009, Volume (m³): 6.9

Unit Reference	MD-SHE-0122-7700-1500-7700
Design Head (m)	1.500
Design Flow (l/s)	7.7
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	122
Invert Level (m)	89.466
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.500	7.7
Flush-Flo™	0.442	7.7
Kick-Flo®	0.922	6.1
Mean Flow over Head Range	-	6.7

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	4.3	1.200	6.9	3.000	10.7	7.000	16.0
0.200	6.9	1.400	7.4	3.500	11.5	7.500	16.5
0.300	7.5	1.600	7.9	4.000	12.2	8.000	17.0
0.400	7.7	1.800	8.4	4.500	12.9	8.500	17.5
0.500	7.7	2.000	8.8	5.000	13.6	9.000	18.0
0.600	7.6	2.200	9.2	5.500	14.2	9.500	18.5
0.800	7.0	2.400	9.6	6.000	14.8		
1.000	6.4	2.600	10.0	6.500	15.4		

©1982-2019 Innovyze

Storage Structures for Surface Network 6

Tank or Pond Manhole: HW201, DS/PN: 1.008

Invert Level (m) 89.700

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	477.8	0.600	887.5	0.601	1162.0	1.575	1941.6

©1982-2019 Innovyze

Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 6

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.422
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	21.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	450.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880
Return Period(s) (years)	2, 10, 30, 100
Climate Change (%)	0, 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	S200	15 Winter	100	+40%					97.030
1.001	S201	15 Winter	100	+40%	100/15 Winter				96.840
1.002	S202	15 Winter	100	+40%	100/15 Winter				96.445
1.003	S203	15 Winter	100	+40%	100/15 Winter				95.582
1.004	S204	15 Winter	100	+40%	100/15 Summer				94.251
1.005	S205	15 Winter	100	+40%	100/15 Summer				92.698
2.000	S208	15 Winter	100	+40%	10/15 Summer				91.297
1.006	S206	15 Winter	100	+40%	10/15 Summer				91.209
1.007	HW200	720 Winter	100	+40%					90.937
3.000	S209	720 Winter	100	+40%	100/30 Winter				90.937
3.001	HW203	720 Winter	100	+40%					90.937
4.000	S210	720 Winter	100	+40%					90.937
4.001	HW204	720 Winter	100	+40%					90.937
1.008	HW201	720 Winter	100	+40%	10/120 Winter				90.937
1.009	S207	720 Winter	100	+40%	2/15 Summer				90.957

©1982-2019 Innovyze

Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 6

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	S200	-0.125	0.000	0.41		26.7	OK	
1.001	S201	0.017	0.000	1.00		83.4	SURCHARGED	
1.002	S202	0.089	0.000	1.00		536.0	SURCHARGED	
1.003	S203	0.134	0.000	0.88		582.5	SURCHARGED	
1.004	S204	0.616	0.000	0.94		619.5	SURCHARGED	
1.005	S205	0.834	0.000	1.00		909.9	SURCHARGED	
2.000	S208	0.822	0.000	0.47		31.2	FLOOD RISK	
1.006	S206	0.820	0.000	4.61		940.3	SURCHARGED	
1.007	HW200	-0.338	0.000	0.01		86.5	FLOOD RISK	
3.000	S209	0.385	0.000	0.03		10.7	SURCHARGED	
3.001	HW203	-0.338	0.000	0.00		10.6	FLOOD RISK	
4.000	S210	-0.391	0.000	0.00		0.0	OK	
4.001	HW204	-0.338	0.000	0.00		0.0	FLOOD RISK	
1.008	HW201	0.637	0.000	0.02		11.3	FLOOD RISK	
1.009	S207	1.341	0.000	0.60		7.7	FLOOD RISK	

©1982-2019 Innovyze

Existing Network Details for Surface Network 7

- Indicates pipe length does not match coordinates

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type
1.000	28.797	0.192	150.0	0.105	5.00	0.0	0.600		o	600	Pipe/Conduit
1.001	15.611	0.104	150.0	0.469	0.00	0.0	0.600		o	600	Pipe/Conduit
1.002	26.383	0.176	150.1	0.067	0.00	0.0	0.600		o	600	Pipe/Conduit
1.003	30.451	0.203	150.0	0.089	0.00	0.0	0.600		o	600	Pipe/Conduit
1.004	19.680	0.131	150.0	0.660	0.00	0.0	0.600		o	675	Pipe/Conduit
1.005	30.069	0.201	150.0	0.148	0.00	0.0	0.600		o	675	Pipe/Conduit
1.006	20.333	0.136	149.9	0.024	0.00	0.0	0.600		o	675	Pipe/Conduit
1.007	29.597	0.197	150.0	0.161	0.00	0.0	0.600		o	675	Pipe/Conduit
1.008	25.457	0.727	35.0	0.604	0.00	0.0	0.600		o	675	Pipe/Conduit
1.009	21.829	0.624	35.0	0.131	0.00	0.0	0.600		o	750	Pipe/Conduit
1.010	28.164	0.805	35.0	0.149	0.00	0.0	0.600		o	750	Pipe/Conduit
1.011	28.731	0.821	35.0	0.121	0.00	0.0	0.600		o	750	Pipe/Conduit
1.012	26.028	0.744	35.0	0.898	0.00	0.0	0.600		o	825	Pipe/Conduit
1.013	26.493	0.757	35.0	0.149	0.00	0.0	0.600		o	825	Pipe/Conduit
1.014	26.910	0.269	100.0	0.024	0.00	0.0	0.600		o	825	Pipe/Conduit
2.000	21.123	1.056	20.0	0.143	5.00	0.0	0.600		o	300	Pipe/Conduit
2.001	14.054	0.703	20.0	0.696	0.00	0.0	0.600		o	375	Pipe/Conduit
2.002	27.245	1.089	25.0	0.057	0.00	0.0	0.600		o	450	Pipe/Conduit
2.003	38.448	1.282	30.0	0.162	0.00	0.0	0.600		o	450	Pipe/Conduit

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
1.000	88.200	0.105	0.0	1.99	561.6
1.001	88.008	0.574	0.0	1.99	561.6
1.002	87.904	0.641	0.0	1.99	561.4
1.003	87.728	0.730	0.0	1.99	561.6
1.004	87.450	1.390	0.0	2.14	765.0
1.005	87.319	1.538	0.0	2.14	765.1
1.006	87.118	1.562	0.0	2.14	765.1
1.007	86.983	1.723	0.0	2.14	765.0
1.008	86.786	2.327	0.0	4.44	1588.6
1.009	85.983	2.458	0.0	4.74	2094.0
1.010	85.360	2.607	0.0	4.74	2093.9
1.011	84.555	2.728	0.0	4.74	2093.8
1.012	83.659	3.626	0.0	5.03	2687.8
1.013	82.915	3.775	0.0	5.03	2688.4
1.014	82.158	3.799	0.0	2.97	1587.2
2.000	86.544	0.143	0.0	3.53	249.6
2.001	85.413	0.839	0.0	4.07	449.3
2.002	84.635	0.896	0.0	4.08	648.5
2.003	83.546	1.058	0.0	3.72	592.1

©1982-2019 Innovyze

Existing Network Details for Surface Network 7

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type
1.015	9.662	0.483	20.0	0.048	0.00	0.0	0.600		o	900	Pipe/Conduit
1.016	18.385	0.381	48.3	0.000	0.00	0.0	0.600		o	900	Pipe/Conduit
1.017	5.000#	0.050	100.0	0.000	0.00	0.0		0.045	3 \=/	500	1:3 Swale
3.000	23.933	0.476	50.2	0.046	5.00	0.0	0.600		o	225	Pipe/Conduit
3.001	26.561	1.328	20.0	0.025	0.00	0.0	0.600		o	225	Pipe/Conduit
3.002	53.083	2.654	20.0	0.056	0.00	0.0	0.600		o	300	Pipe/Conduit
3.003	22.988	1.149	20.0	0.078	0.00	0.0	0.600		o	300	Pipe/Conduit
3.004	23.091	1.155	20.0	0.030	0.00	0.0	0.600		o	300	Pipe/Conduit
3.005	30.223	1.511	20.0	0.094	0.00	0.0	0.600		o	375	Pipe/Conduit
3.006	28.822	1.945	14.8	0.045	0.00	0.0	0.600		o	375	Pipe/Conduit
4.000	19.171	0.113	170.0	0.043	5.00	0.0	0.600		o	225	Pipe/Conduit
3.007	33.059	1.653	20.0	0.013	0.00	0.0	0.600		o	450	Pipe/Conduit
3.008	75.229	1.885	39.9	0.105	0.00	0.0	0.600		o	450	Pipe/Conduit
3.009	30.174	0.310	97.2	0.260	0.00	0.0	0.600		o	525	Pipe/Conduit
3.010	5.000#	0.050	100.0	0.000	0.00	0.0		0.045	3 \=/	500	1:3 Swale
5.000	20.100	0.502	40.0	0.185	5.00	0.0	0.600		o	600	Pipe/Conduit
5.001	5.000#	0.050	100.0	0.000	0.00	0.0		0.045	3 \=/	500	1:3 Swale

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
1.015	81.814	4.905	0.0	7.02	4467.9
1.016	81.331	4.905	0.0	4.52	2872.7
1.017	80.950	4.905	0.0	1.86	14359.2
3.000	95.316	0.046	0.0	1.85	73.5
3.001	94.840	0.071	0.0	2.94	116.9
3.002	93.437	0.127	0.0	3.53	249.6
3.003	90.783	0.205	0.0	3.53	249.6
3.004	89.633	0.235	0.0	3.53	249.6
3.005	88.404	0.329	0.0	4.07	449.2
3.006	86.893	0.374	0.0	4.73	522.1
4.000	85.175	0.043	0.0	1.00	39.8
3.007	84.873	0.430	0.0	4.56	725.6
3.008	83.220	0.535	0.0	3.23	513.0
3.009	81.260	0.795	0.0	2.27	491.9
3.010	80.950	0.795	0.0	1.86	14359.2
5.000	81.452	0.185	0.0	3.86	1090.3
5.001	80.950	0.185	0.0	1.86	14359.2

©1982-2019 Innovyze

Existing Network Details for Surface Network 7

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type
1.018	9.350	0.045	207.8	0.000	0.00	0.0	0.600		o	600	Pipe/Conduit
1.019	14.200	0.095	149.9	0.000	0.00	0.0	0.600		o	225	Pipe/Conduit

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
1.018	80.900	5.885	0.0	1.69	476.6
1.019	80.855	5.885	0.0	1.07	42.4

Free Flowing Outfall Details for Surface Network 7

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.019	HW303	81.346	80.760	0.000	0	0

Simulation Criteria for Surface Network 7

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	21.000	Storm Duration (mins)	30
Ratio R	0.422		

©1982-2019 Innovyze

Online Controls for Surface Network 7

Hydro-Brake® Optimum Manhole: S332, DS/PN: 1.019, Volume (m³): 8.0

Unit Reference	MD-SHE-0209-2350-1300-2350
Design Head (m)	1.300
Design Flow (l/s)	23.5
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	209
Invert Level (m)	80.855
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1500

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.300	23.5
Flush-Flo™	0.407	23.5
Kick-Flo®	0.892	19.6
Mean Flow over Head Range	-	20.1

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	7.1	1.200	22.6	3.000	35.1	7.000	52.8
0.200	20.2	1.400	24.3	3.500	37.8	7.500	54.6
0.300	23.1	1.600	25.9	4.000	40.3	8.000	56.4
0.400	23.5	1.800	27.5	4.500	42.7	8.500	58.1
0.500	23.3	2.000	28.9	5.000	44.9	9.000	59.7
0.600	22.9	2.200	30.2	5.500	47.0	9.500	61.3
0.800	21.5	2.400	31.5	6.000	49.0		
1.000	20.7	2.600	32.7	6.500	51.0		

©1982-2019 Innovyze

Storage Structures for Surface Network 7

Tank or Pond Manhole: HW302, DS/PN: 1.018

Invert Level (m) 80.900

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	2762.6	0.600	3311.7	0.601	3673.2	1.575	4679.3

©1982-2019 Innovyze

Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 7

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.422
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	21.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	450.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	S300	15 Winter	100	+40%	100/15 Summer				89.876
1.001	S301	15 Winter	100	+40%	100/15 Summer				89.840
1.002	S302	15 Winter	100	+40%	100/15 Summer				89.794
1.003	S303	15 Winter	100	+40%	100/15 Summer				89.650
1.004	S304	15 Winter	100	+40%	100/15 Summer				89.506
1.005	S305	15 Winter	100	+40%	100/15 Summer				89.273
1.006	S306	15 Winter	100	+40%	30/15 Winter				88.969
1.007	S307	15 Winter	100	+40%	100/15 Summer				88.653
1.008	S308	15 Winter	100	+40%	100/15 Summer				88.258
1.009	S309	15 Winter	100	+40%	100/15 Summer				87.530
1.010	S310	15 Winter	100	+40%	100/15 Summer				87.009
1.011	S311	15 Winter	100	+40%	100/15 Summer				86.447
1.012	S312	15 Winter	100	+40%	100/15 Summer				85.863
1.013	S313	15 Winter	100	+40%	100/15 Summer				85.151
1.014	S314	15 Winter	100	+40%	30/15 Winter				84.398
2.000	S317	15 Winter	100	+40%	100/15 Winter				87.044
2.001	S318	15 Winter	100	+40%	100/15 Summer				86.769
2.002	S319	15 Winter	100	+40%	100/15 Summer				85.587
2.003	S320	15 Winter	100	+40%	100/15 Summer				84.864

©1982-2019 Innovyze

Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 7

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	S300	1.076	0.000	0.13		55.6	FLOOD RISK	
1.001	S301	1.232	0.000	0.92		320.9	FLOOD RISK	
1.002	S302	1.290	0.000	0.86		359.7	SURCHARGED	
1.003	S303	1.322	0.000	0.90		404.2	SURCHARGED	
1.004	S304	1.381	0.000	1.57		733.2	SURCHARGED	
1.005	S305	1.279	0.000	1.40		796.6	SURCHARGED	
1.006	S306	1.176	0.000	1.70		793.6	SURCHARGED	
1.007	S307	0.996	0.000	1.53		861.7	SURCHARGED	
1.008	S308	0.797	0.000	1.03		1114.0	SURCHARGED	
1.009	S309	0.797	0.000	0.91		1121.5	SURCHARGED	
1.010	S310	0.899	0.000	0.83		1168.4	SURCHARGED	
1.011	S311	1.142	0.000	0.85		1203.0	SURCHARGED	
1.012	S312	1.379	0.000	0.97		1591.5	FLOOD RISK	
1.013	S313	1.410	0.000	0.99		1631.0	FLOOD RISK	
1.014	S314	1.415	0.000	1.67		1638.4	SURCHARGED	
2.000	S317	0.199	0.000	0.43		94.5	SURCHARGED	
2.001	S318	0.981	0.000	1.34		438.6	SURCHARGED	
2.002	S319	0.502	0.000	0.83		453.8	SURCHARGED	
2.003	S320	0.869	0.000	1.00		525.0	SURCHARGED	

©1982-2019 Innovyze

Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 7

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.015	S315	15 Winter	100	+40%	100/15 Summer				83.639
1.016	S316	15 Winter	100	+40%	100/15 Summer				82.723
1.017	HW300	960 Winter	100	+40%					82.098
3.000	S321	15 Winter	100	+40%					95.423
3.001	S322	15 Winter	100	+40%					94.946
3.002	S323	15 Winter	100	+40%					93.564
3.003	S324	15 Winter	100	+40%					90.960
3.004	S325	15 Winter	100	+40%					89.828
3.005	S326	15 Winter	100	+40%					88.610
3.006	S327	15 Winter	100	+40%					87.097
4.000	S331	15 Winter	100	+40%					85.329
3.007	S328	15 Winter	100	+40%					85.092
3.008	S329	15 Winter	100	+40%					83.521
3.009	S330	960 Winter	100	+40%	100/15 Summer				82.096
3.010	HW301	960 Winter	100	+40%					82.095
5.000	S333	960 Winter	100	+40%	100/480 Winter				82.095
5.001	HW304	960 Winter	100	+40%					82.095
1.018	HW302	960 Winter	100	+40%	30/180 Winter				82.095
1.019	S332	600 Winter	100	+40%	1/60 Summer				82.098

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.015	S315	0.925	0.000	1.37		2150.7	SURCHARGED	
1.016	S316	0.492	0.000	1.55		2153.0	SURCHARGED	
1.017	HW300	-0.377	0.000	0.02		194.6	FLOOD RISK	
3.000	S321	-0.118	0.000	0.45		30.7	OK	
3.001	S322	-0.119	0.000	0.45		48.2	OK	
3.002	S323	-0.173	0.000	0.37		87.9	OK	
3.003	S324	-0.122	0.000	0.65		143.3	OK	
3.004	S325	-0.105	0.000	0.74		164.3	OK	
3.005	S326	-0.169	0.000	0.58		230.8	OK	
3.006	S327	-0.171	0.000	0.57		261.7	OK	
4.000	S331	-0.071	0.000	0.79		28.3	OK	
3.007	S328	-0.231	0.000	0.47		297.0	OK	
3.008	S329	-0.149	0.000	0.76		365.0	OK	
3.009	S330	0.311	0.000	0.08		31.1	SURCHARGED	
3.010	HW301	-0.380	0.000	0.00		30.8	FLOOD RISK	
5.000	S333	0.043	0.000	0.01		7.2	SURCHARGED	
5.001	HW304	-0.380	0.000	0.00		6.7	FLOOD RISK	
1.018	HW302	0.595	0.000	0.13		36.8	FLOOD RISK	
1.019	S332	1.018	0.000	0.63		23.4	FLOOD RISK	

©1982-2019 Innovyze

Appendix F

APPENDIX 6 – EXPLORATORY HOLE LOGS

Borehole Logs

(BH1 to BH8)

Windowless Sample Hole Logs

(WS1 to WS19 and WSA to WSI)

Trial Pit Logs

(TP1 to TP*)

DRAFT

CLIENT: c/o Savills	PROJECT: Land to the North West of Haverhill	GROUND LEVEL	HOLE No. BH1
LOGGED BY: AC FIELDWORK BY: AGB TEMPLATE REF: GEL AGS BH BETA CHECKED BY: DATE:	EXCAVATION METHOD: Cable Percussion (shell and auger) 1.50mm cased from 0.0 to 10.0m	COORDINATES E N DATES 20/10/2014 - 20/10/2014	SHEET 1 OF 1 PROJECT NO. 995,SI

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata: Leg	Strata: Reduced Level	Strata: Depth	Graphical Representation: SPT 'N' Value (0 10 20 30 40)	Sampling/In-Situ Testing: Depths	Type	No.	Blows	SPT N	Laboratory Testing: <425 %	WC %	PL %	LL %	ρ Mg/m³	Cu kN/m²	Additional Tests and Notes
20/10 09:00	0.00	Dry		TOPSOIL (Dark brown clay with rootlets).			0.00													Hand pit from GL to 1.2m
				Firm to stiff orange brown grey mottled slightly gravelly CLAY. Gravel of rounded fine to coarse chalk. (LOWESTOFT FORMATION)			0.30		0.40-0.80	B	1									
				1.50 Becoming pale in colour with depth					1.20	D S	1	1 2 3 4 4 4	15	78	20	18	37			Moisture content, Atterberg Limit
									2.00	D S	2	1 2 3 3 4 4	14							
									3.00-3.45	U	U	(45)								
									3.45	D	3			89	21	17	35			Moisture content, Atterberg Limit
20/10	1.00	4.00							4.00	D S	4	1 2 3 5 5 6	19							Seepage inflow of water at 4m
				Stiff grey gravelly CLAY. Gravel of rounded fine to coarse chalk. (LOWESTOFT FORMATION)			4.80		5.00	D S	5	2 4 6 7 8 10	31							
									6.00	D	6									
									6.50	D S	7	2 4 6 6 6 7	25							pH and Sulphate
									7.50	D	8									
									8.00-8.45	U	2	(70)		90	18	17	33	2.14	272.4	Moisture content, Atterberg Limit, Triaxial test
									8.45	D	9									
									9.00	D	10									
20/10 16:30	1.50	Damp							9.50	D S	11	3 5 7 8 9 9	33							
20/10 16:45	0.00						10.00													Borehole completed at 10.0m

*WATER ▼ Standing water level ▽ Water strikes

PIEZOMETER Upper seal, Response zone, Lower seal

SAMPLE AND TEST KEY

D Small disturbed sample
B Bulk disturbed sample
U Undisturbed sample
P Piston sample
J Disturbed jar sample
ES Environmental soil sample
W Water Sample
S Standard penetration test
C Cone penetration test
K Permeability test

Blows SPT blows for each 75mm increment (35) Undisturbed sample blow count
SPT N N = SPT N value (blows after seating) N*120 = Total blows/penetration including seating
<425 Sample % passing 425 micron sieve

DEPTH All depths, level and thicknesses in metres

Geosphere Environmental Ltd
Brightwell Barns, Ipswich Road
Birghtwell, Suffolk, IP10 0BJ
Telephone: 01603 298 076
Fax: 01603 298 075

HOLE No. BH1.
SHEET 1 OF 1
PROJECT No 995,SI

GEL AGS BH BETA 995,SI - NW HAVERHILL, 31-10-14, LF,SG.GPJ GINT STD AGS 3_1.GDT 11/12/14

CLIENT: c/o Savills	PROJECT: Land to the North West of Haverhill	GROUND LEVEL	HOLE No. BH2
LOGGED BY: AC FIELDWORK BY: AGB TEMPLATE REF: GEL AGS BH BETA CHECKED BY: DATE:	EXCAVATION METHOD: Cable Percussion (shell and auger) 4.50mm cased from 0.0 to 10.0m	COORDINATES E N DATES 21/10/2014 - 21/10/2014	SHEET 1 OF 1 PROJECT NO. 995,SI

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata: Leg	Strata: Reduced Level	Strata: Depth	Graphical Representation: SPT 'N' Value (0 10 20 30 40)	Sampling/In-Situ Testing: Depths	Type	No.	Blows	SPT N	Laboratory Testing: <425 %	WC %	PL %	LL %	ρ Mg/m³	Cu kN/m²	Additional Tests and Notes
21/10 08:30	0.00	Dry		TOPSOIL			0.00		0											Hand pit from GL to 1.2m
				Firm to stiff brown slightly sandy CLAY. (HEAD DEPOSITS)			0.30		0.40-0.80	B	1									
									1											
									1.20	D S	1	1 1 2 2 2 3	9							
				Firm brown slightly gravelly CLAY. Gravel of rounded fine to coarse chalk. (LOWESTOFT FORMATION)			1.80		2											
									2.00-2.45	U	1	(45)								
									2.45	D	2			91	19	16	30			Moisture content, Atterberg Limit, pH and sulphate
									3											
									3.00	D S	3	2 2 3 3 3 3	12							
21/10	1.50	4.00							4											
+ 15 mins		1.60							4.00	D S	4	1 1 1 2 2 3	8							Inflow of water at 4m
				Firm to stiff grey gravelly CLAY. Gravel of rounded fine to coarse rounded chalk. (LOWESTOFT FORMATION)			4.40													Water sealed out at 4.5m.
									5.00-5.45	U	2	(35)			20			2.07	80.5	pH and sulphate, Triaxial test
									5.45	D	5									
									6											
									6.00	D	6									
									6.50	D S	7	1 2 3 4 5 8	20							
									7											
									7.50	D	8									
									8											
									8.00	D S	9	2 3 6 6 7 7	26							
									9											
									9.00	D	10									pH and sulphate
									9.50	D S	11	3 4 6 6 8 9	29							
21/10 13:00	4.50	Dry							10											
21/10 13:15	0.00						10.00													Borehole completed at 10.0m

*WATER ▼ Standing water level ▽ Water strikes

PIEZOMETER Upper seal / Response zone / Lower seal

SAMPLE AND TEST KEY

D Small disturbed sample
B Bulk disturbed sample
U Undisturbed sample
P Piston sample
J Disturbed jar sample
ES Environmental soil sample
W Water Sample
S Standard penetration test
C Cone penetration test
K Permeability test

Blows SPT blows for each 75mm increment (35) Undisturbed sample blow count
SPT N N = SPT N value (blows after seating) N*120 = Total blows/penetration including seating
<425 Sample % passing 425 micron sieve

DEPTH All depths, level and thicknesses in metres

Geosphere Environmental Ltd
Brightwell Barns, Ipswich Road
Birghtwell, Suffolk, IP10 0BJ
Telephone: 01603 298 076
Fax: 01603 298 075

HOLE No. BH2.
SHEET 1 OF 1
PROJECT No 995,SI

GEL AGS BH BETA 995,SI - NW HAVERHILL, 31-10-14, LF.SG.GPJ GINT STD AGS 3_1.GDT 11/12/14

CLIENT: c/o Savills	PROJECT: Land to the North West of Haverhill	GROUND LEVEL	HOLE No. BH3
LOGGED BY: AC FIELDWORK BY: AGB TEMPLATE REF: GEL AGS BH BETA CHECKED BY: DATE:	EXCAVATION METHOD: Cable Percussion (shell and auger) 1.50mm cased from 0.0 to 10.0m	COORDINATES E N DATES 21/10/2014 - 21/10/2014	SHEET 1 OF 1 PROJECT NO. 995,SI

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata Leg	Strata Reduced Level	Strata Depth	Graphical Representation SPT 'N' Value (0 10 20 30 40)	Sampling/In-Situ Testing Depths	Type	No.	Blows	SPT N	Laboratory Testing <425 %	WC %	PL %	LL %	ρ Mg/m³	Cu kN/m²	Additional Tests and Notes
21/10 14:00	0.00	Dry		TOPSOIL			0.00		0											Hand pit from GL to 1.2m
				Stiff dark brown slightly silty gravelly CLAY. Gravel of rounded fine to coarse chalk (LOWESTOFT FORMATION)			0.30		0.40-0.80	B	1									
									1.20	D S	1	2 2 4 4 4 6	18							
									2.00	D S	2	1 2 3 4 4 4	15							
									3.00	D S	3	1 2 3 3 5 5	16							
				Stiff to very stiff dark grey gravelly CLAY. Gravel of rounded fine to coarse chalk. (LOWESTOFT FORMATION)			3.70		4.00-4.45	U	1	(60)		90	18	19	48			Moisture content, Atterberg Limit
									4.45	D	4									
									5.00	D S	5	3 5 7 9 10 10	36							
									6.00	D	6									
									6.50-6.95	U	2	(80)								
									6.95 7.00	D D	7 8									
									8.00	D S	9	5 7 8 8 9 10	35							pH and sulphate
									9.00	D	10									
									9.50	D S	11	4 8 9 10 12 13	44							
21/10 17:00	1.50	Dry																		
21/10 17:15	0.00						10.00		10											Borehole completed at 10.0m

*WATER ▼ Standing water level ▽ Water strikes

PIEZOMETER Upper seal / Response zone / Lower seal

SAMPLE AND TEST KEY

D Small disturbed sample
B Bulk disturbed sample
U Undisturbed sample
P Piston sample
J Disturbed jar sample
ES Environmental soil sample
W Water Sample

S Standard penetration test
C Cone penetration test
K Permeability test

Blows SPT blows for each 75mm increment (35) Undisturbed sample blow count

SPT N N = SPT N value (blows after seating) N*120 = Total blows/penetration including seating

<425 Sample % passing 425 micron sieve

DEPTH All depths, level and thicknesses in metres

Geosphere Environmental Ltd
Brightwell Barns, Ipswich Road
Birghtwell, Suffolk, IP10 0BJ
Telephone: 01603 298 076
Fax: 01603 298 075

HOLE No. BH3 . | SHEET 1 OF 1 | PROJECT No 995,SI

GEL AGS BH BETA 995,SI - NW HAVERHILL, 31-10-14, LF,SG.GPJ GINT STD AGS 3_1.GDT 11/12/14

CLIENT: c/o Savills	PROJECT: Land to the North West of Haverhill	GROUND LEVEL	HOLE No. BH4
LOGGED BY: AC FIELDWORK BY: AGB TEMPLATE REF: GEL AGS BH BETA CHECKED BY: DATE:	EXCAVATION METHOD: Cable Percussion (shell and auger) 1.50mm cased from 0.0 to 10.0m	COORDINATES E N DATES 23/10/2014 - 23/10/2014	SHEET 1 OF 1 PROJECT NO. 995,SI

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata Leg	Strata Reduced Level	Strata Depth	Graphical Representation SPT 'N' Value 0 10 20 30 40	Sampling/In-Situ Testing Depths	Type	No.	Blows	SPT N	Laboratory Testing <425 %	WC %	PL %	LL %	ρ Mg/m³	Cu kN/m²	Additional Tests and Notes
23/10 08:30	0.00	Dry		TOPSOIL			0.00		0											
				Stiff orange brown grey mottled gravelly CLAY. Gravel of rounded fine to coarse chalk. (LOWESTOFT FORMATION)			0.20		0.40-0.80	B	1									
									1.20	D S	1	6 10 10 12 8 8	38							
									2.00	D S	2	3 5 6 7 7 7	27							
									3.00-3.45	U	1	(80)			18			2.10	211.4	Triaxial test
				Very stiff to hard dark grey slightly gravelly CLAY. Gravel of rounded fine to coarse chalk. (LOWESTOFT FORMATION)			3.30		3.45	D	3									
									4.00	D S	4	5 7 10 10 12 15	47							
									5.00	D S	D5	3 6 8 10 11 11	40							
									6.00	D	6									
									6.50	D S	7	5 5 8 10 12 12	42							
									7.50	D	8									
									60											
									8.00	D S	9	3 7 11 14 15 10	60*							
									9.00	D	10									
									9.50-9.95	U	2	(90)			16			2.14	349.4	pH and sulphate, Triaxial test
23/10 13:00	1.50	Dry																		
23/10 13:15	0.00						10.00		9.95	D	11									

*WATER ▼ Standing water level ▽ Water strikes PIEZOMETER Upper seal Response zone Lower seal

SAMPLE AND TEST KEY

D Small disturbed sample
B Bulk disturbed sample
U Undisturbed sample
P Piston sample
J Disturbed jar sample
ES Environmental soil sample
W Water Sample
S Standard penetration test
C Cone penetration test
K Permeability test

Blows SPT blows for each 75mm increment (35) Undisturbed sample blow count
SPT N N = SPT N value (blows after seating) N*120 = Total blows/penetration including seating
<425 Sample % passing 425 micron sieve

DEPTH All depths, level and thicknesses in metres

Geosphere Environmental Ltd
Brightwell Barns, Ipswich Road
Birghtwell, Suffolk, IP10 0BJ
Telephone: 01603 298 076
Fax: 01603 298 075

HOLE No. BH4.
SHEET 1 OF 1
PROJECT No 995,SI

GEL AGS BH BETA 995,SI - NW HAVERHILL, 31-10-14, LF,SG,GPJ GINT STD AGS 3 1.GDT 11/12/14

CLIENT: c/o Savills	PROJECT: Land to the North West of Haverhill	GROUND LEVEL	HOLE No. BH5
LOGGED BY: AC FIELDWORK BY: AGB TEMPLATE REF: GEL AGS BH BETA CHECKED BY: DATE:	EXCAVATION METHOD: Cable Percussion (shell and auger) 1.50mm cased from 0.0 to 10.0m	COORDINATES E N DATES 22/10/2014 - 22/10/2014	SHEET 1 OF 1 PROJECT NO. 995,SI

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata: Leg	Strata: Reduced Level	Strata: Depth	Graphical Representation: SPT 'N' Value (0 10 20 30 40)	Sampling/In-Situ Testing: Depths	Type	No.	Blows	SPT N	Laboratory Testing: <425 %	WC %	PL %	LL %	ρ Mg/m³	Cu kN/m²	Additional Tests and Notes
22/10 09:00	0.00	Dry		TOPSOIL			0.00		0											Hand pit from GL to 1.2m
				Stiff orange brown grey mottled slightly gravelly CLAY. Gravel of rounded fine to medium chalk. (LOWESTOFT FORMATION)			0.10		0.40-0.80	B	1									
									1											
									1.20-1.65	U	1	(55)			18			2.11	148.3	Triaxial test
									2	S		2 2	20							
									2.20	D	2	4 5 5 6								
									3.00	D	3	2 4	32							
										S		5 8 11 8								
									4											
									4.00	D	4	3 5	35							
										S		6 8 9 12								
				Stiff to very stiff dark grey slightly gravelly CLAY. Gravel of rounded fine to medium chalk. (LOWESTOFT FORMATION)			4.80		5											
									5.00	D	5	3 5	31							
										S		6 8 8 9								
									6											
									6.00	D	6									
									6.50-6.95	U	2	(80)		93	17	17	42	2.15	312.5	Moisture content, Atterberg Limit, Triaxial test
									7											
									6.95	D	7									
									7.50	D	8									
									8											
									8.00	D	9	2 4	35							
										S		7 8 10 10								
									9											
									9.00	D	10									
									74											
									9.50	D	11	5 19	74*							
										S		38 12								
									10											
22/10 16:00	1.50	Dry																		
22/10 16:15	0.00						10.00													Borehole completed at 10.0m

*WATER ▼ Standing water level ▽ Water strikes PIEZOMETER Upper seal Response zone Lower seal

SAMPLE AND TEST KEY

D Small disturbed sample
B Bulk disturbed sample
U Undisturbed sample
P Piston sample
J Disturbed jar sample
ES Environmental soil sample
W Water Sample
S Standard penetration test
C Cone penetration test
K Permeability test

Blows SPT blows for each 75mm increment (35) Undisturbed sample blow count
SPT N N = SPT N value (blows after seating) N*120 = Total blows/penetration including seating
<425 Sample % passing 425 micron sieve

DEPTH All depths, level and thicknesses in metres

Geosphere Environmental Ltd
Brightwell Barns, Ipswich Road
Birghtwell, Suffolk, IP10 0BJ
Telephone: 01603 298 076
Fax: 01603 298 075

HOLE No. BH5.
SHEET 1 OF 1
PROJECT No 995,SI

GEL AGS BH BETA 995,SI - NW HAVERHILL, 31-10-14, LF,SG.GPJ GINT STD AGS 3 1.GDT 11/12/14

CLIENT: c/o Savills	PROJECT: Land to the North West of Haverhill	GROUND LEVEL	HOLE No. BH6
LOGGED BY: AC FIELDWORK BY: AGB TEMPLATE REF: GEL AGS BH BETA CHECKED BY: DATE:	EXCAVATION METHOD: Cable Percussion (shell and auger) 1.50mm cased from 0.0 to 8.3m	COORDINATES E N DATES 24/10/2014 - 24/10/2014	SHEET 1 OF 1 PROJECT NO. 995,SI

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata Leg	Strata Reduced Level	Strata Depth	Graphical Representation SPT 'N' Value 0 10 20 30 40	Sampling/In-Situ Testing Depths	Type	No.	Blows	SPT N	Laboratory Testing <425 %	WC %	PL %	LL %	ρ Mg/m³	Cu kN/m²	Additional Tests and Notes
24/10 08:30	0.00	Dry		TOPSOIL			0.00													Hand pit from GL to 1.2m
				Firm to stiff orange brown grey mottled gravelly CLAY. Gravel of rounded fine to medium chalk. (LOWESTOFT FORMATION)			0.20		0.40-0.80	B	1									
									1.20	D S	1	5 5 6 7 8 8	29							
									2.00-2.45	U	1	(50)		94	18	19	48	2.09	174.1	Moisture content, Atterberg Limit, Triaxial test
									2.45	D	2									
									3.00	D S	3	2 4 5 5 6 8	24							
				Very stiff to hard dark grey slightly gravelly CLAY. Gravel of rounded fine to medium chalk. (LOWESTOFT FORMATION)			4.00		4.00	D S	4	2 3 5 5 6 7	23							
									5.00-5.45	U	2	(70)								
									5.45	D	5									
									6.00	D	6									
									6.50	D S	7	2 4 5 6 8 10	29							
									7.50	D	8									
24/10 13:00	1.50	Dry							8.00	D S	9	17								
24/10 13:15	0.00						8.30													Borehole completed at 8.3m

*WATER ▼ Standing water level ▽ Water strikes

PIEZOMETER Upper seal, Response zone, Lower seal

SAMPLE AND TEST KEY
D Small disturbed sample
B Bulk disturbed sample
U Undisturbed sample
P Piston sample
J Disturbed jar sample
ES Environmental soil sample
W Water Sample
S Standard penetration test
C Cone penetration test
K Permeability test

Blows SPT blows for each 75mm increment (35) Undisturbed sample blow count
SPT N N = SPT N value (blows after seating) N*120 = Total blows/penetration including seating
<425 Sample % passing 425 micron sieve

DEPTH All depths, level and thicknesses in metres

Geosphere Environmental Ltd
Brightwell Barns, Ipswich Road
Birghtwell, Suffolk, IP10 0BJ
Telephone: 01603 298 076
Fax: 01603 298 075

HOLE No. BH6.
SHEET 1 OF 1
PROJECT No 995,SI

GEL AGS BH BETA 995,SI - NW HAVERHILL, 31-10-14, LF,SG,GPJ GINT STD AGS 3 1.GDT 11/12/14

CLIENT: c/o Savills	PROJECT: Land to the North West of Haverhill	GROUND LEVEL	HOLE No. BH7
LOGGED BY: AC FIELDWORK BY: AGB TEMPLATE REF: GEL AGS BH BETA CHECKED BY: DATE:	EXCAVATION METHOD: Cable Percussion (shell and auger) 1.50mm cased from 0.0 to 8.2m	COORDINATES E N DATES 24/10/2014 - 24/10/2014	SHEET 1 OF 1 PROJECT NO. 995,SI

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata: Leg	Strata: Reduced Level	Strata: Depth	Graphical Representation: SPT 'N' Value (0 10 20 30 40)	Sampling/In-Situ Testing: Depths	Type	No.	Blows	SPT N	Laboratory Testing: <425 %	WC %	PL %	LL %	ρ Mg/m³	Cu kN/m²	Additional Tests and Notes
24/10 14:00	0.00	Dry		TOPSOIL			0.00													Hand pit from GL to 1.2m
				Firm to stiff orange brown grey mottled slightly gravelly CLAY. Gravel of rounded fine to medium chalk. (LOWESTOFT FORMATION)			0.40		0.40-0.80	B	1									
									1.20-1.65	U	1	(40)								
									1.65	D	1									
									2.00	D S	2	1 2 3 4 4 6	17							
									3.00	D S	3	1 3 3 5 5 6	19							
				Very stiff dark grey gravelly CLAY. Gravel of rounded fine to coarse chalk. (LOWESTOFT FORMATION)			3.30													
									4.00-4.45	U	2	(55)		92	20	19	42	2.12	205.6	Moisture content, Atterberg Limit, pH and sulphate, Triaxial test
									4.45	D	4									
									5.00	D S	5	2 4 6 6 7 8	27							
									6.00	D	6									
									6.50	D S	7	2 4 5 6 8 9	28							
									7.50	D	8									pH and sulphate
24/10 17:00 24/10 17:15	1.50 0.00	Dry					8.20			C		25								Borehole completed at 8.20m

*WATER ▼ Standing water level ▽ Water strikes

PIEZOMETER Upper seal / Response zone / Lower seal

SAMPLE AND TEST KEY

D Small disturbed sample
B Bulk disturbed sample
U Undisturbed sample
P Piston sample
J Disturbed jar sample
ES Environmental soil sample
W Water Sample

S Standard penetration test
C Cone penetration test
K Permeability test

Blows SPT blows for each 75mm increment (35) Undisturbed sample blow count

SPT N N = SPT N value (blows after seating) N*120 = Total blows/penetration including seating

<425 Sample % passing 425 micron sieve

DEPTH All depths, level and thicknesses in metres

Geosphere Environmental Ltd
Brightwell Barns, Ipswich Road
Birghtwell, Suffolk, IP10 0BJ
Telephone: 01603 298 076
Fax: 01603 298 075

HOLE No. BH7 . | SHEET 1 OF 1 | PROJECT No 995,SI

GEL AGS BH BETA 995,SI - NW HAVERHILL, 31-10-14, LF,SG,GPJ GINT STD AGS 3 1.GDT 11/12/14

CLIENT: c/o Savills	PROJECT: Land to the North West of Haverhill	GROUND LEVEL	HOLE No. BH8
LOGGED BY: AC FIELDWORK BY: AGB TEMPLATE REF: GEL AGS BH BETA CHECKED BY: DATE:	EXCAVATION METHOD: Cable Percussion (shell and auger) 6.00mm cased from 0.0 to 10.0m	COORDINATES E N DATES 23/10/2014 - 23/10/2014	SHEET 1 OF 1 PROJECT NO. 995,SI

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata: Leg	Strata: Reduced Level	Strata: Depth	Graphical Representation: SPT 'N' Value (0 10 20 30 40)	Sampling/In-Situ Testing: Depths	Type	No.	Blows	SPT N	Laboratory Testing: <425 %	WC %	PL %	LL %	ρ Mg/m³	Cu kN/m²	Additional Tests and Notes
23/10 14:00	0.00	Dry		TOPSOIL			0.00		0											Hand pit from GL to 1.2m
				Firm brown slightly silty CLAY (HEAD DEPOSITS)			0.40		0.40-0.80	B	1									
									1.20	D S	1	1 2 2 3 4 5	14	100	24	20	51			Moisture content, Atterberg Limit
23/10		2.00		Soft brown very sandy CLAY. (HEAD DEPOSITS)			1.80		1.80	D	2									
				Soft to firm brown slightly gravelly sandy CLAY. Gravel of rounded fine to coarse chalk. (HEAD DEPOSITS)			2.20		2.00	D S	3	1 1 1 2 2 3	8							Seepage inflow of water at 2m
									3.00	D S	4	1 2 2 2 2 3	9							
23/10		4.50							4.00	D S	5	1 2 2 3 3 3	11							Seepage inflow of water at 4.5m
				Stiff grey gravelly CLAY. Gravel of rounded fine to coarse chalk. (LOWESTOFT FORMATION)			5.20		5.00	D S	6	1 2 1 2 3 4	10							
									6.00	D	7									Water sealed out at 6.0m.
									6.50	D S	8	1 3 4 5 5 5	19							
				7.50 Becoming very stiff with depth.					7.50	D	9									
									8.00-8.45	U	1	(45)			18			2.16	217.2	Triaxial test
									8.45	D	10									
									9.00	D	11									
23/10 17:00	6.00	Dry							9.50	D S	12	2 3 4 5 6 8	23							
23/10 17:15	0.00						10.00		10											Borehole completed at 10.0m

*WATER ▼ Standing water level ▽ Water strikes

PIEZOMETER Upper seal, Response zone, Lower seal

SAMPLE AND TEST KEY

D Small disturbed sample
B Bulk disturbed sample
U Undisturbed sample
P Piston sample
J Disturbed jar sample
ES Environmental soil sample
W Water Sample

S Standard penetration test
C Cone penetration test
K Permeability test

Blows SPT blows for each 75mm increment (35) Undisturbed sample blow count
SPT N N = SPT N value (blows after seating) N*120 = Total blows/penetration including seating
<425 Sample % passing 425 micron sieve

DEPTH All depths, level and thicknesses in metres

Geosphere Environmental Ltd
Brightwell Barns, Ipswich Road
Birghtwell, Suffolk, IP10 0BJ
Telephone: 01603 298 076
Fax: 01603 298 075

HOLE No. BH8 . | SHEET 1 OF 1 | PROJECT No 995,SI

GEL AGS BH BETA 995,SI - NW HAVERHILL, 31-10-14, LF.SG.GPJ GINT STD AGS 3_1.GDT 11/12/14

CLIENT: c/o Savills	PROJECT: Land to the North West of Haverhill	GROUND LEVEL	HOLE No. WS1
LOGGED BY: LF FIELDWORK BY: GEL TEMPLATE REF: GEL AGS BH BETA CHECKED BY: DATE:	EXCAVATION METHOD: Windowless sampler Uncased to 4.0 m	COORDINATES E N DATES 28/10/2014 - 28/10/2014	SHEET 1 OF 1 PROJECT NO. 995,SI

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata: Leg	Strata: Reduced Level	Strata: Depth	Graphical Representation: SPT 'N' Value (0 10 20 30 40)	Sampling/In-Situ Testing: Depths	Type	No.	Blows	SPT N	Laboratory Testing: <425 %	WC %	PL %	LL %	ρ Mg/m³	Cu kN/m²	Additional Tests and Notes
				TOPSOIL (Dark brown slightly sandy slightly gravelly clay with rootlets. Gravel of angular to subrounded fine to medium flint and infrequent brick fragments)			0.00		0												Groundwater not encountered during drilling
									0.20	J	1									Metals, PAH, TPH, Moisture content, pH and Sulphate
									0.35	J	2									
				Firm becoming stiff brown slightly sandy gravelly CLAY. Gravel of subrounded to rounded chalk and angular to subrounded fine to coarse flint. (LOWESTOFT FORMATION)			0.45													
									0.70	J	3									Metals, PAH, TPH, Moisture content, pH and Sulphate
									0.80	D	1									Shear vane test = 48kN/m²
									1.00	1	D C	2	1 1 2 2 3 4	11						Shear vane test = 50kN/m²
				1.20 Becomes brown grey mottled with depth																
									2.00	2	D C	3	11 5 5 5 5 7	22						Shear vane test = 87kN/m²
									3.00	3	D C	4	4 4 4 6 7 9	26						Collapse of sidewalls at 3.0m depth Shear vane test = 112kN/m²
							4.00		4.00	4	D C	5	5 7 8 10 12 14	44						50mm diameter monitoring well installed to 4.0m Windowless sample hole completed at 4.0m depth

*WATER ▼ Standing water level ▽ Water strikes

PIEZOMETER Upper seal / Response zone / Lower seal

SAMPLE AND TEST KEY

D Small disturbed sample
B Bulk disturbed sample
U Undisturbed sample
P Piston sample
J Disturbed jar sample
ES Environmental soil sample
W Water Sample
S Standard penetration test
C Cone penetration test
K Permeability test

Blows SPT blows for each 75mm increment (35) Undisturbed sample blow count
SPT N N = SPT N value (blows after seating) N*120 = Total blows/penetration including seating
<425 Sample % passing 425 micron sieve

DEPTH All depths, level and thicknesses in metres

Geosphere Environmental Ltd
Brightwell Barns, Ipswich Road,
Bightwell, Suffolk, IP10 0BJ
Telephone: 01603 298 076
Fax: 01603 298 075

HOLE No. WS1. | SHEET 1 OF 1 | PROJECT No 995,SI

GEL AGS BH BETA 995,SI - NW HAVERHILL, 31-10-14, LF,SG,GPJ GINT STD AGS 3_1.GDT 11/12/14

CLIENT: c/o Savills	PROJECT: Land to the North West of Haverhill	GROUND LEVEL	HOLE No. WS2
LOGGED BY: LF FIELDWORK BY: GEL TEMPLATE REF: GEL AGS BH BETA CHECKED BY: DATE:	EXCAVATION METHOD: Windowless sampler Uncased to 4.0 m	COORDINATES E N DATES 28/10/2014 - 28/10/2014	SHEET 1 OF 1 PROJECT NO. 995,SI

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata: Leg	Strata: Reduced Level	Strata: Depth	Graphical Representation: SPT 'N' Value (0 10 20 30 40)	Sampling/In-Situ Testing: Depths	Type	No.	Blows	SPT N	Laboratory Testing: <425 %	WC %	PL %	LL %	ρ Mg/m³	Cu kN/m²	Additional Tests and Notes
				TOPSOIL (Dark brown slightly sandy slightly gravelly clay with rootlets. Gravel of angular to subrounded fine to coarse flint and infrequent fine to medium brick and charcoal fragments)			0.00		0												Groundwater not encountered during drilling
									0.10	J	1									No collapse of sidewalls during drilling
									0.30	J	2									
				Firm becoming stiff brown slightly sandy gravelly CLAY. Gravel of subrounded to rounded chalk and angular to subrounded fine to coarse flint. (LOWESTOFT FORMATION)			0.47													
				0.80 Becomes brown grey mottled with depth					0.70	J	3									
									0.80	D	1									Shear vane test = 70kN/m²
									1.00	D	2									Shear vane test = 76kN/m²
									2.00	D	3									Shear vane test = 82kN/m²
									3.00	D	4									Shear vane test = 91kN/m²
							4.00		4.00	D	5									50mm diameter monitoring well installed to 4.0m Shear vane test = 96kN/m² Windowless sample hole completed at 4.0m depth

*WATER ▼ Standing water level ▽ Water strikes

PIEZOMETER Upper seal / Response zone / Lower seal

SAMPLE AND TEST KEY

D Small disturbed sample
B Bulk disturbed sample
U Undisturbed sample
P Piston sample
J Disturbed jar sample
ES Environmental soil sample
W Water Sample

S Standard penetration test
C Cone penetration test
K Permeability test

Blows SPT blows for each 75mm increment (35) Undisturbed sample blow count
SPT N N = SPT N value (blows after seating) N*120 = Total blows/penetration including seating
<425 Sample % passing 425 micron sieve

DEPTH All depths, level and thicknesses in metres

Geosphere Environmental Ltd
Brightwell Barns, Ipswich Road,
Bightwell, Suffolk, IP10 0BJ
Telephone: 01603 298 076
Fax: 01603 298 075

HOLE No. WS2. | SHEET 1 OF 1 | PROJECT No 995,SI

GEL AGS BH BETA 995,SI - NW HAVERHILL, 31-10-14, LF,SG.GPJ GINT STD AGS 3_1.GDT 11/12/14

CLIENT: c/o Savills	PROJECT: Land to the North West of Haverhill	GROUND LEVEL	HOLE No. WS3
LOGGED BY: LF FIELDWORK BY: GEL TEMPLATE REF: GEL AGS BH BETA CHECKED BY: DATE:	EXCAVATION METHOD: Windowless sampler Uncased to 1.8 m	COORDINATES E N DATES 29/10/2014 - 29/10/2014	SHEET 1 OF 1 PROJECT NO. 995,SI

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata: Leg	Strata: Reduced Level	Strata: Depth	Graphical Representation: SPT 'N' Value (0 10 20 30 40)	Sampling/In-Situ Testing: Depths	Type	No.	Blows	SPT N	Laboratory Testing: <425 %	WC %	PL %	LL %	ρ Mg/m³	Cu kN/m²	Additional Tests and Notes
				TOPSOIL (Dark brown sandy clay with rootlets)			0.00		0											
				TOPSOIL (Brown slightly sandy slightly gravelly clay. Gravel of angular to subrounded fine to medium flint and rare fine brick and charcoal fragments)			0.05		0.10	J	1									Groundwater not encountered during drilling
									0.20	J	2									No collapse of sidewalls during drilling
				Firm becoming stiff brown slightly sandy gravelly CLAY. Gravel of subrounded to rounded chalk and angular to subrounded fine to coarse flint. (LOWESTOFT FORMATION)			0.30													
									0.60	J	3									
									0.80	D	1									Shear vane test = 74kN/m²
									1.00	D	2									Shear vane test = 84kN/m²
							1.80		1.80	D	3									Infiltration test undertaken at 1.48m depth Shear vane test = 96kN/m²
																				Windowless sample hole completed at 1.8m depth

*WATER: Standing water level; Water strikes

PIEZOMETER: Upper seal; Response zone; Lower seal

SAMPLE AND TEST KEY

D Small disturbed sample
B Bulk disturbed sample
U Undisturbed sample
P Piston sample
J Disturbed jar sample
ES Environmental soil sample
W Water Sample
S Standard penetration test
C Cone penetration test
K Permeability test

Blows SPT blows for each 75mm increment (35) Undisturbed sample blow count
SPT N N = SPT N value (blows after seating) N*120 = Total blows/penetration including seating
<425 Sample % passing 425 micron sieve

DEPTH All depths, level and thicknesses in metres

Geosphere Environmental Ltd
Brightwell Barns, Ipswich Road,
Bightwell, Suffolk, IP10 0BJ
Telephone: 01603 298 076
Fax: 01603 298 075

HOLE No. WS3. | SHEET 1 OF 1 | PROJECT No 995,SI

GEL AGS BH BETA 995,SI - NW HAVERHILL, 31-10-14, LF,SG.GPJ GINT STD AGS 3_1.GDT 11/12/14

CLIENT: c/o Savills	PROJECT: Land to the North West of Haverhill	GROUND LEVEL	HOLE No. WS4
LOGGED BY: LF FIELDWORK BY: GEL TEMPLATE REF: GEL AGS BH BETA CHECKED BY: DATE:	EXCAVATION METHOD: Windowless sampler Uncased to 2.0 m	COORDINATES E N DATES 29/10/2014 - 29/10/2014	SHEET 1 OF 1 PROJECT NO. 995,SI

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata: Leg	Strata: Reduced Level	Strata: Depth	Graphical Representation: SPT 'N' Value (0 10 20 30 40)	Sampling/In-Situ Testing: Depths	Type	No.	Blows	SPT N	Laboratory Testing: <425 %	WC %	PL %	LL %	ρ Mg/m³	Cu kN/m²	Additional Tests and Notes
				TOPSOIL (Dark brown slightly gravelly sandy clay with rootlets. Gravel of angular to subrounded fine to medium flint)			0.00		0											Groundwater not encountered during drilling
				TOPSOIL (Dark brown slightly sandy slightly gravelly clay. Gravel of angular to subrounded fine to medium flint and rare fine brick and charcoal fragments)			0.05		0.10	J	1									No collapse of sidewalls during drilling
				Stiff becoming very stiff pale brown grey mottled slightly sandy gravelly CLAY. Gravel of subrounded to rounded fine to coarse chalk and angular to subrounded fine to coarse flint. (LOWESTOFT FORMATION)			0.25		0.50	J	2									
									0.80	D	1									Shear vane test = 68kN/m²
									1.00	D	2									Shear vane test = 82kN/m²
							2.00		2.00	D	3									Shear vane test = 87kN/m² Windowless sample hole completed at 2.0m depth

*WATER ▼ Standing water level ▽ Water strikes

PIEZOMETER Upper seal / Response zone / Lower seal

SAMPLE AND TEST KEY

D Small disturbed sample
B Bulk disturbed sample
U Undisturbed sample
P Piston sample
J Disturbed jar sample
ES Environmental soil sample
W Water Sample

S Standard penetration test
C Cone penetration test
K Permeability test

Blows SPT blows for each 75mm increment (35) Undisturbed sample blow count
SPT N N = SPT N value (blows after seating) N*120 = Total blows/penetration including seating
<425 Sample % passing 425 micron sieve

DEPTH All depths, level and thicknesses in metres

Geosphere Environmental Ltd
Brightwell Barns, Ipswich Road,
Bightwell, Suffolk, IP10 0BJ
Telephone: 01603 298 076
Fax: 01603 298 075

HOLE No. WS4. | SHEET 1 OF 1 | PROJECT No 995,SI

GEL AGS BH BETA 995,SI - NW HAVERHILL, 31-10-14, LF.SG.GPJ GINT STD AGS 3_1.GDT 11/12/14

CLIENT: c/o Savills	PROJECT: Land to the North West of Haverhill	GROUND LEVEL	HOLE No. WS5
LOGGED BY: LF FIELDWORK BY: GEL TEMPLATE REF: GEL AGS BH BETA CHECKED BY: DATE:	EXCAVATION METHOD: Windowless sampler Uncased to 4.0 m	COORDINATES E N DATES 29/10/2014 - 29/10/2014	SHEET 1 OF 1 PROJECT NO. 995,SI

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata: Leg	Strata: Reduced Level	Strata: Depth	Graphical Representation: SPT 'N' Value (0 10 20 30 40)	Sampling/In-Situ Testing: Depths	Type	No.	Blows	SPT N	Laboratory Testing: <425 %	WC %	PL %	LL %	ρ Mg/m³	Cu kN/m²	Additional Tests and Notes
				TOPSOIL (Dark brown slightly gravelly sandy clay with rootlets. Gravel of angular to subrounded fine to medium flint)			0.00		0											Groundwater not encountered during drilling
				TOPSOIL (Dark brown slightly sandy slightly gravelly clay. Gravel of angular to subrounded fine to medium flint and rare fine brick and charcoal fragments)			0.05		0.10	J	1									Metals, PAH, TPH, Moisture content, pH and Sulphate
				Firm becoming stiff pale brown grey mottled slightly sandy gravelly CLAY. Gravel of subrounded to rounded fine to coarse chalk and angular to subrounded fine to coarse flint. (LOWESTOFT FORMATION)			0.40		0.70	D	1									No collapse of sidewalls during drilling
				1.00 Becoming dark yellow brown grey mottled with depth					1	C		2 3 3 4 5 5	17							
									1.60	D	2									
				2.00 Becoming dark brown grey mottled with depth					2	C		3 3 4 4 5 6	19							
									2.60	D	3									
									3	C		4 4 5 5 7 6	23							
				3.50 Occasional iron oxide staining below 3.5m depth					3.60	D	4									
							4.00		4	C		5 5 5 7 7 9	28							Windowless sample hole completed at 4.0m depth

*WATER ▼ Standing water level ▽ Water strikes

PIEZOMETER Upper seal / Response zone / Lower seal

SAMPLE AND TEST KEY

D Small disturbed sample
B Bulk disturbed sample
U Undisturbed sample
P Piston sample
J Disturbed jar sample
ES Environmental soil sample
W Water Sample

S Standard penetration test
C Cone penetration test
K Permeability test

Blows SPT blows for each 75mm increment (35) Undisturbed sample blow count
SPT N N = SPT N value (blows after seating) N*120 = Total blows/penetration including seating
<425 Sample % passing 425 micron sieve

DEPTH All depths, level and thicknesses in metres

Geosphere Environmental Ltd
Brightwell Barns, Ipswich Road,
Bightwell, Suffolk, IP10 0BJ
Telephone: 01603 298 076
Fax: 01603 298 075

HOLE No. WS5. | SHEET 1 OF 1 | PROJECT No 995,SI

GEL AGS BH BETA 995,SI - NW HAVERHILL, 31-10-14, LF,SG.GPJ GINT STD AGS 3_1.GDT 11/12/14

CLIENT: c/o Savills	PROJECT: Land to the North West of Haverhill	GROUND LEVEL	HOLE No. WS6
LOGGED BY: LF FIELDWORK BY: GEL TEMPLATE REF: GEL AGS BH BETA CHECKED BY: DATE:	EXCAVATION METHOD: Windowless sampler Uncased to 1.9 m	COORDINATES E N DATES 29/10/2014 - 29/10/2014	SHEET 1 OF 1 PROJECT NO. 995,SI

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata: Leg	Strata: Reduced Level	Strata: Depth	Graphical Representation: SPT 'N' Value (0 10 20 30 40)	Sampling/In-Situ Testing: Depths	Type	No.	Blows	SPT N	Laboratory Testing: <425 %	WC %	PL %	LL %	ρ Mg/m³	Cu kN/m²	Additional Tests and Notes
				TOPSOIL (Dark brown slightly gravelly sandy clay with rootlets. Gravel of angular to subrounded fine to medium flint)			0.00		0											Groundwater not encountered during drilling
				TOPSOIL (Dark brown slightly sandy slightly gravelly clay. Gravel of angular to subrounded fine to medium flint and rare fine brick and charcoal fragments)			0.05		0.10	J	1									
				Stiff becoming very stiff pale brown grey mottled slightly sandy gravelly CLAY. Gravel of subrounded to rounded fine to coarse chalk and angular to subrounded fine to coarse flint. (LOWESTOFT FORMATION)			0.25		0.60	J	2									No collapse of sidewalls during drilling
									0.80	D	1									
				1.00 Becoming yellow brown grey mottled with depth below 1.0m					1											
																				Infiltration test undertaken at 1.41m depth
									1.80	D	2									
							1.89		2											Windowless sample hole completed at 1.89m depth
									3											
									4											

*WATER ▼ Standing water level ▽ Water strikes

PIEZOMETER Upper seal, Response zone, Lower seal

SAMPLE AND TEST KEY

D Small disturbed sample
B Bulk disturbed sample
U Undisturbed sample
P Piston sample
J Disturbed jar sample
ES Environmental soil sample
W Water Sample
S Standard penetration test
C Cone penetration test
K Permeability test

Blows SPT blows for each 75mm increment (35) Undisturbed sample blow count
SPT N N = SPT N value (blows after seating) N*120 = Total blows/penetration including seating
<425 Sample % passing 425 micron sieve

DEPTH All depths, level and thicknesses in metres

Geosphere Environmental Ltd
Brightwell Barns, Ipswich Road,
Bightwell, Suffolk, IP10 0BJ
Telephone: 01603 298 076
Fax: 01603 298 075

HOLE No. WS6. | SHEET 1 OF 1 | PROJECT No 995,SI

GEL AGS BH BETA 995,SI - NW HAVERHILL, 31-10-14, LF,SG.GPJ GINT STD AGS 3_1.GDT 11/12/14

CLIENT: c/o Savills	PROJECT: Land to the North West of Haverhill	GROUND LEVEL	HOLE No. WS7
LOGGED BY: LF FIELDWORK BY: GEL TEMPLATE REF: GEL AGS BH BETA CHECKED BY: DATE:	EXCAVATION METHOD: Windowless sampler Uncased to 4.0 m	COORDINATES E N DATES 29/10/2014 - 29/10/2014	SHEET 1 OF 1 PROJECT NO. 995,SI

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata: Leg	Strata: Reduced Level	Strata: Depth	Graphical Representation: SPT 'N' Value (0 10 20 30 40)	Sampling/In-Situ Testing: Depths	Type	No.	Blows	SPT N	Laboratory Testing: <425 %	WC %	PL %	LL %	ρ Mg/m³	Cu kN/m²	Additional Tests and Notes
				TOPSOIL (Dark brown slightly gravelly clay. Gravel of angular to subrounded fine to medium flint, rare brick and charcoal fragments)			0.00		0												Groundwater not encountered during drilling
									0.10	J	1									Metals, PAH, TPH, Moisture content, pH and Sulphate
				Firm becoming stiff brown grey mottled slightly sandy gravelly CLAY. Gravel of subrounded to rounded fine to coarse chalk and angular to subrounded fine to coarse flint. (LOWESTOFT FORMATION)			0.30													No collapse of sidewalls during drilling
									0.40	J	2									Metals, PAH, TPH, Moisture content, pH and Sulphate
									0.80	D	1									
				1.00 Occasional iron oxide staining below 1.0m depth					1											Shear vane test = 56kN/m²
									1.80	D	2									
				2.00 Becoming dark yellow brown grey mottled with depth					2											Shear vane test = 82kN/m²
									2.60	D	3									
									3											Shear vane test = 94kN/m²
				3.50 Becoming dark grey with brown mottling with depth					3.60	D	4									
							4.00		4											Shear vane test = 88kN/m² Windowless sample hole completed at 4.0m depth 50mm diameter monitoring well installed to 4.0m

*WATER ▼ Standing water level ▽ Water strikes

PIEZOMETER Upper seal / Response zone / Lower seal

SAMPLE AND TEST KEY

D Small disturbed sample
B Bulk disturbed sample
U Undisturbed sample
P Piston sample
J Disturbed jar sample
ES Environmental soil sample
W Water Sample
S Standard penetration test
C Cone penetration test
K Permeability test

Blows SPT blows for each 75mm increment (35) Undisturbed sample blow count
SPT N N = SPT N value (blows after seating) N*120 = Total blows/penetration including seating
<425 Sample % passing 425 micron sieve

DEPTH All depths, level and thicknesses in metres

Geosphere Environmental Ltd
Brightwell Barns, Ipswich Road,
Bightwell, Suffolk, IP10 0BJ
Telephone: 01603 298 076
Fax: 01603 298 075

HOLE No. WS7. | SHEET 1 OF 1 | PROJECT No 995,SI

GEL AGS BH BETA 995,SI - NW HAVERHILL, 31-10-14, LF,SG.GPJ GINT STD AGS 3 1.GDT 11/12/14

CLIENT: c/o Savills	PROJECT: Land to the North West of Haverhill	GROUND LEVEL	HOLE No. WS8
LOGGED BY: LF FIELDWORK BY: GEL TEMPLATE REF: GEL AGS BH BETA CHECKED BY: DATE:	EXCAVATION METHOD: Windowless sampler Uncased to 2.0 m	COORDINATES E N DATES 29/10/2014 - 29/10/2014	SHEET 1 OF 1 PROJECT NO. 995,SI

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata: Leg	Strata: Reduced Level	Strata: Depth	Graphical Representation: SPT 'N' Value (0 10 20 30 40)	Sampling/In-Situ Testing: Depths	Type	No.	Blows	SPT N	Laboratory Testing: <425 %	WC %	PL %	LL %	ρ Mg/m³	Cu kN/m²	Additional Tests and Notes
				TOPSOIL (Dark brown slightly sandy slightly gravelly clay. Gravel of angular to subrounded fine to medium flint and rare fine brick and charcoal fragments)			0.00		0												Groundwater not encountered during drilling
									0.10	J	1									Metals, PAH, TPH, Moisture content, pH and Sulphate
				Firm becoming stiff yellow brown grey mottled slightly sandy gravelly CLAY. Gravel of subrounded to rounded fine to coarse chalk and angular to subrounded fine to coarse flint. (LOWESTOFT FORMATION)			0.30														No collapse of sidewalls during drilling
									0.40	J	2									
				0.80 - Becoming yellow brown grey mottled with depth					0.80	D	1									
				1.00 - Becoming brown/grey mottled with depth					1											Shear vane test = 78kN/m²
									1.70	D	2									Infiltration test undertaken at 1.58m depth
							2.00		2											Shear vane test = 102kN/m²
																				Windowless sample hole completed at 2.0m depth
									3											
									4											

*WATER ▼ Standing water level ▽ Water strikes

PIEZOMETER Upper seal, Response zone, Lower seal

SAMPLE AND TEST KEY

D Small disturbed sample
B Bulk disturbed sample
U Undisturbed sample
P Piston sample
J Disturbed jar sample
ES Environmental soil sample
W Water Sample
S Standard penetration test
C Cone penetration test
K Permeability test

Blows SPT blows for each 75mm increment (35) Undisturbed sample blow count
SPT N N = SPT N value (blows after seating) N*120 = Total blows/penetration including seating
<425 Sample % passing 425 micron sieve

DEPTH All depths, level and thicknesses in metres

Geosphere Environmental Ltd
Brightwell Barns, Ipswich Road,
Bightwell, Suffolk, IP10 0BJ
Telephone: 01603 298 076
Fax: 01603 298 075

HOLE No. WS8. | SHEET 1 OF 1 | PROJECT No 995,SI

GEL AGS BH BETA 995,SI - NW HAVERHILL, 31-10-14, LF.SG.GPJ GINT STD AGS 3_1.GDT 11/12/14

CLIENT: c/o Savills	PROJECT: Land to the North West of Haverhill	GROUND LEVEL	HOLE No. WS9
LOGGED BY: LF FIELDWORK BY: GEL TEMPLATE REF: GEL AGS BH BETA CHECKED BY: DATE:	EXCAVATION METHOD: Windowless sampler Uncased to 2.0 m	COORDINATES E N DATES 29/10/2014 - 29/10/2014	SHEET 1 OF 1 PROJECT NO. 995,SI

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata: Leg	Strata: Reduced Level	Strata: Depth	Graphical Representation: SPT 'N' Value (0 10 20 30 40)	Sampling/In-Situ Testing: Depths	Type	No.	Blows	SPT N	Laboratory Testing: <425 %	WC %	PL %	LL %	ρ Mg/m³	Cu kN/m²	Additional Tests and Notes
				TOPSOIL (Dark brown slightly sandy slightly gravelly clay. Gravel of angular to subrounded fine to medium flint and rare fine brick and charcoal fragments)			0.00		0												Groundwater not encountered during drilling
									0.10	J	1									No collapse of sidewalls during drilling
				Stiff becoming very stiff yellow brown grey mottled slightly sandy gravelly CLAY. Gravel of subrounded to rounded fine to coarse chalk and angular to subrounded fine to coarse flint. (LOWESTOFT FORMATION)			0.30		0.50	J	2									
									0.80	D	1									
				1.00 - Becoming brown/grey mottled with depth					1	C		3 5 3 5 7 8	23							
									1.60	D	2									
							2.00		2											Windowless sample hole completed at 2.0m depth 50mm diameter monitoring well installed to 2.0m
									3											
									4											

*WATER ▼ Standing water level ▽ Water strikes

PIEZOMETER Upper seal, Response zone, Lower seal

SAMPLE AND TEST KEY

D Small disturbed sample
B Bulk disturbed sample
U Undisturbed sample
P Piston sample
J Disturbed jar sample
ES Environmental soil sample
W Water Sample
S Standard penetration test
C Cone penetration test
K Permeability test

Blows SPT blows for each 75mm increment (35) Undisturbed sample blow count
SPT N N = SPT N value (blows after seating) N*120 = Total blows/penetration including seating
<425 Sample % passing 425 micron sieve

DEPTH All depths, level and thicknesses in metres

Geosphere Environmental Ltd
Brightwell Barns, Ipswich Road,
Bightwell, Suffolk, IP10 0BJ
Telephone: 01603 298 076
Fax: 01603 298 075

HOLE No. WS9.
SHEET 1 OF 1
PROJECT No 995,SI

GEL AGS BH BETA 995,SI - NW HAVERHILL, 31-10-14, LF.SG.GPJ GINT STD AGS 3_1.GDT 11/12/14

CLIENT: c/o Savills	PROJECT: Land to the North West of Haverhill	GROUND LEVEL	HOLE No. WS10
LOGGED BY: BG FIELDWORK BY: GEL TEMPLATE REF: GEL AGS BH BETA CHECKED BY: DATE:	EXCAVATION METHOD: Windowless sampler Uncased to 2.0 m	COORDINATES E N DATES 30/10/2014 - 30/10/2014	SHEET 1 OF 1 PROJECT NO. 995,SI

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata: Leg	Strata: Reduced Level	Strata: Depth	Graphical Representation: SPT 'N' Value (0 10 20 30 40)	Sampling/In-Situ Testing: Depths	Type	No.	Blows	SPT N	Laboratory Testing: <425 %	WC %	PL %	LL %	ρ Mg/m³	Cu kN/m²	Additional Tests and Notes
				TOPSOIL (Dark brown slightly sandy slightly gravelly clay. Gravel of subangular to subrounded fine to medium flint and rare chalk)			0.00		0												Groundwater not encountered during drilling
							0.15		0.10	J	1									Metals, PAH, TPH, Moisture content, pH and Sulphate
				Stiff pale brown gravelly CLAY. Gravel of subangular to rounded fine to coarse chalk. (LOWESTOFT FORMATION)																No collapse of sidewalls during drilling
									0.75	D	1									
									1	C		2 5 3 4 4 5	16							Shear vane test = 108kN/m²
				Stiff dark grey brown mottled gravelly CLAY. Gravel of angular to subrounded fine to coarse chalk. (LOWESTOFT FORMATION)			1.10													
									1.50	D	2									Shear vane test = 116kN/m²
																				Shear vane test = 132kN/m²
							2.00		2											Windowless sample hole completed at 2.0m depth
									3											
									4											

*WATER ▼ Standing water level ▽ Water strikes

PIEZOMETER Upper seal / Response zone / Lower seal

SAMPLE AND TEST KEY

D Small disturbed sample
B Bulk disturbed sample
U Undisturbed sample
P Piston sample
J Disturbed jar sample
ES Environmental soil sample
W Water Sample
S Standard penetration test
C Cone penetration test
K Permeability test

Blows SPT blows for each 75mm increment (35) Undisturbed sample blow count
SPT N N = SPT N value (blows after seating) N*120 = Total blows/penetration including seating
<425 Sample % passing 425 micron sieve

DEPTH All depths, level and thicknesses in metres

Geosphere Environmental Ltd
Brightwell Barns, Ipswich Road,
Bightwell, Suffolk, IP10 0BJ
Telephone: 01603 298 076
Fax: 01603 298 075

HOLE No. WS10 | SHEET 1 OF 1 | PROJECT No 995,SI

GEL AGS BH BETA 995,SI - NW HAVERHILL, 31-10-14, LF,SG.GPJ GINT STD AGS 3_1.GDT 11/12/14

CLIENT: c/o Savills	PROJECT: Land to the North West of Haverhill	GROUND LEVEL	HOLE No. WS11
LOGGED BY: BG FIELDWORK BY: GEL TEMPLATE REF: GEL AGS BH BETA CHECKED BY: DATE:	EXCAVATION METHOD: Windowless sampler Uncased to 4.0 m	COORDINATES E N DATES 30/10/2014 - 30/10/2014	SHEET 1 OF 1 PROJECT NO. 995,SI

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata: Leg	Strata: Reduced Level	Strata: Depth	Graphical Representation: SPT 'N' Value (0 10 20 30 40)	Sampling/In-Situ Testing: Depths	Type	No.	Blows	SPT N	Laboratory Testing: <425 %	WC %	PL %	LL %	ρ Mg/m³	Cu kN/m²	Additional Tests and Notes
				TOPSOIL (Desiccated dark brown sandy slightly gravelly clay with rootlets. Gravel of subangular fine to coarse flint and chalk with very rare brick fragments)			0.00		0												Groundwater not encounterd during drilling
				Stiff pale brown grey mottled gravelly slightly cobbly desiccated CLAY. Gravel of angular to subangular fine to coarse chalk. (LOWESTOFT FORMATION)			0.30		0.20	J	1									No collapse of sidewalls during drilling
									0.75	D	1									
				1.10 Becoming brown dark grey mottled and very stiff to hard with depth					1	C		3 2 4 4 4 6	18							Shear vane test = 104kN/m²
				1.30 Orange brown sandy pockets present with depth					1.50	D	2									Shear vane test = 136kN/m²
									2	C		3 4 4 5 6 6	21							Shear vane test = 136kN/m²
									2.50	D	3									Shear vane test = 120kN/m²
				2.80 Becoming dark brown dark grey mottled with depth																Shear vane test = 128kN/m²
									3	C		4 4 5 6 7	26							Shear vane test = 128kN/m²
																				Shear vane test = 140kN/m²
							4.00		4	C		5 7 7 8 10 12	37							Windowless sample hole completed 4.0m depth 50mm diameter monitorng well installed to 4.0m

*WATER ▼ Standing water level ▽ Water strikes

PIEZOMETER Upper seal, Response zone, Lower seal

SAMPLE AND TEST KEY

D Small disturbed sample
B Bulk disturbed sample
U Undisturbed sample
P Piston sample
J Disturbed jar sample
ES Environmental soil sample
W Water Sample

S Standard penetration test
C Cone penetration test
K Permeability test

Blows SPT blows for each 75mm increment (35) Undisturbed sample blow count
SPT N N = SPT N value (blows after seating) N*120 = Total blows/penetration including seating
<425 Sample % passing 425 micron sieve

DEPTH All depths, level and thicknesses in metres

Geosphere Environmental Ltd
Brightwell Barns, Ipswich Road,
Bightwell, Suffolk, IP10 0BJ
Telephone: 01603 298 076
Fax: 01603 298 075

HOLE No. WS11 | SHEET 1 OF 1 | PROJECT No 995,SI

GEL AGS BH BETA 995,SI - NW HAVERHILL, 31-10-14, LF,SG,GPJ GINT STD AGS 3_1.GDT 11/12/14

CLIENT: c/o Savills	PROJECT: Land to the North West of Haverhill	GROUND LEVEL	HOLE No. WS12
LOGGED BY: BG FIELDWORK BY: GEL TEMPLATE REF: GEL AGS BH BETA CHECKED BY: DATE:	EXCAVATION METHOD: Windowless sampler Uncased to 1.7 m	COORDINATES E N DATES 30/10/2014 - 30/10/2014	SHEET 1 OF 1 PROJECT NO. 995,SI

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata: Leg	Strata: Reduced Level	Strata: Depth	Graphical Representation: SPT 'N' Value (0 10 20 30 40)	Sampling/In-Situ Testing: Depths	Type	No.	Blows	SPT N	Laboratory Testing: <425 %	WC %	PL %	LL %	ρ Mg/m³	Cu kN/m²	Additional Tests and Notes
				TOPSOIL (Dark brown slightly gravelly clay. Gravel of subangular to subrounded fine to coarse flint with fragments of brick)			0.00		0											Groundwater not encontered during drilling
							0.10		0.10	J	1									Metals, PAH, TPH, Moisture content, pH and Sulphate Infiltration test undertaken at 0.15m depth No collapse of sidewalls during drilling Shear vane test = 72kN/m²
				Firm brown slightly gravelly CLAY. Gravel of subangular fine chalk. (LOWESTOFT FORMATION)					1											Shear vane test = 60kN/m²
																				Shear vane test = 52kN/m²
									1.50	D	1									Shear vane test = 72kN/m²
							1.68													Windowless sample hole completed at 1.68m depth
									2											
									3											
									4											

*WATER ▼ Standing water level ▽ Water strikes

PIEZOMETER Upper seal, Response zone, Lower seal

SAMPLE AND TEST KEY
D Small disturbed sample
B Bulk disturbed sample
U Undisturbed sample
P Piston sample
J Disturbed jar sample
ES Environmental soil sample
W Water Sample
S Standard penetration test
C Cone penetration test
K Permeability test

Blows SPT blows for each 75mm increment (35) Undisturbed sample blow count
SPT N N = SPT N value (blows after seating) N*120 = Total blows/penetration including seating
<425 Sample % passing 425 micron sieve

DEPTH All depths, level and thicknesses in metres

Geosphere Environmental Ltd
Brightwell Barns, Ipswich Road,
Bightwell, Suffolk, IP10 0BJ
Telephone: 01603 298 076
Fax: 01603 298 075

HOLE No. WS12 | SHEET 1 OF 1 | PROJECT No 995,SI

GEL AGS BH BETA 995,SI - NW HAVERHILL, 31-10-14, LF.SG.GPJ GINT STD AGS 3_1.GDT 11/12/14

CLIENT: c/o Savills	PROJECT: Land to the North West of Haverhill	GROUND LEVEL	HOLE No. WS13
LOGGED BY: BG FIELDWORK BY: GEL TEMPLATE REF: GEL AGS BH BETA CHECKED BY: DATE:	EXCAVATION METHOD: Windowless sampler Uncased to 4.0 m	COORDINATES E N DATES 30/10/2014 - 30/10/2014	SHEET 1 OF 1 PROJECT NO. 995,SI

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata: Leg	Strata: Reduced Level	Strata: Depth	Graphical Representation: SPT 'N' Value (0 10 20 30 40)	Sampling/In-Situ Testing: Depths	Type	No.	Blows	SPT N	Laboratory Testing: <425 %	WC %	PL %	LL %	ρ Mg/m³	Cu kN/m²	Additional Tests and Notes
				TOPSOIL (Dark brown slightly silty slightly sandy slightly gravelly clay with rootlets. Gravel of subangular to subrounded fine to medium flint)			0.00		0											Groundwater not encountered during drilling
									0.20	J	1									No collapse of sidewalls with depth
				Stiff to very stiff gravelly CLAY. Gravel of subangular fine to coarse chalk and flint. (LOWESTOFT FORMATION)			0.40													
									0.75	D	1									
				Soft to firm brown and orange brown mottled slightly sandy slightly gravelly CLAY. Gravel of subangular coarse flint. (LOWESTOFT FORMATION)			1.00		1											
																				Shear vane test = 52kN/m²
				Very stiff to hard pale brown grey mottled gravelly CLAY. Gravel of subangular to subrounded fine to coarse chalk. (LOWESTOFT FORMATION)			1.50		1.50	D	2									
																				Shear vane test = 52kN/m²
									2											Shear vane test = 68kN/m²
																				Shear vane test = 128kN/m²
									3											
									3.50	D	3									
							4.00		4											Windowless sample hole completed at 4.0m depth 50mm diameter monitorng well installed to 4.0m

*WATER ▼ Standing water level ▽ Water strikes

PIEZOMETER Upper seal, Response zone, Lower seal

SAMPLE AND TEST KEY
D Small disturbed sample
B Bulk disturbed sample
U Undisturbed sample
P Piston sample
J Disturbed jar sample
ES Environmental soil sample
W Water Sample
S Standard penetration test
C Cone penetration test
K Permeability test

Blows SPT blows for each 75mm increment (35) Undisturbed sample blow count
SPT N N = SPT N value (blows after seating) N*120 = Total blows/penetration including seating
<425 Sample % passing 425 micron sieve

DEPTH All depths, level and thicknesses in metres

Geosphere Environmental Ltd
Brightwell Barns, Ipswich Road,
Bightwell, Suffolk, IP10 0BJ
Telephone: 01603 298 076
Fax: 01603 298 075

HOLE No. WS13 | SHEET 1 OF 1 | PROJECT No 995,SI

CLIENT: c/o Savills	PROJECT: Land to the North West of Haverhill	GROUND LEVEL	HOLE No. WS14
LOGGED BY: BG FIELDWORK BY: GEL TEMPLATE REF: GEL AGS BH BETA CHECKED BY: DATE:	EXCAVATION METHOD: Windowless sampler Uncased to 2.0 m	COORDINATES E N DATES 30/10/2014 - 30/10/2014	SHEET 1 OF 1 PROJECT NO. 995,SI

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata: Leg	Strata: Reduced Level	Strata: Depth	Graphical Representation: SPT 'N' Value (0 10 20 30 40)	Sampling/In-Situ Testing: Depths	Type	No.	Blows	SPT N	Laboratory Testing: <425 %	WC %	PL %	LL %	ρ Mg/m³	Cu kN/m²	Additional Tests and Notes
				TOPSOIL (Dark brown slightly silty slightly sandy slightly gravelly CLAY with rootlets. Gravel of subangular fine to medium flint and chalk)			0.00		0											Groundwater not encountered during drilling
									0.15	J	1									Metals, PAH, TPH, Moisture content, pH and Sulphate
				Stiff pale brown slightly gravelly CLAY. Gravel of subangular to subrounded fine to coarse chalk. (LOWESTOFT FORMATION)			0.30													No collapse of sidewalls during drilling
				Stiff dark brown and dark grey mottled gravelly CLAY. Gravel of subangular to subrounded fine to coarse chalk. (LOWESTOFT FORMATION)			0.60													Shear vane test = 88kN/m²
																				Infiltration test undertaken at 0.70m depth
				1.10 Becoming hard with depth					1											Shear vane test = 132kN/m²
																				Shear vane test = 140kN/m²
									1.50	D	1									
				1.70 Orange brown sandy clay pocket present																Shear vane test = 100kN/m²
							1.97		2											Windowless sample hole completed at 1.97m depth
									3											
									4											

*WATER ▼ Standing water level ▽ Water strikes

PIEZOMETER Upper seal, Response zone, Lower seal

SAMPLE AND TEST KEY
D Small disturbed sample
B Bulk disturbed sample
U Undisturbed sample
P Piston sample
J Disturbed jar sample
ES Environmental soil sample
W Water Sample
S Standard penetration test
C Cone penetration test
K Permeability test

Blows SPT blows for each 75mm increment (35) Undisturbed sample blow count
SPT N N = SPT N value (blows after seating) N*120 = Total blows/penetration including seating
<425 Sample % passing 425 micron sieve

DEPTH All depths, level and thicknesses in metres

Geosphere Environmental Ltd
Brightwell Barns, Ipswich Road,
Bightwell, Suffolk, IP10 0BJ
Telephone: 01603 298 076
Fax: 01603 298 075

HOLE No. WS14 | SHEET 1 OF 1 | PROJECT No 995,SI

GEL AGS BH BETA 995,SI - NW HAVERHILL, 31-10-14, LF,SG.GPJ GINT STD AGS 3_1.GDT 11/12/14

CLIENT: c/o Savills	PROJECT: Land to the North West of Haverhill	GROUND LEVEL	HOLE No. WS15
LOGGED BY: BG FIELDWORK BY: GEL TEMPLATE REF: GEL AGS BH BETA CHECKED BY: DATE:	EXCAVATION METHOD: Windowless sampler Uncased to 2.0 m	COORDINATES E N DATES 30/10/2014 - 30/10/2014	SHEET 1 OF 1 PROJECT NO. 995,SI

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata: Leg	Strata: Reduced Level	Strata: Depth	Graphical Representation: SPT 'N' Value (0 10 20 30 40)	Sampling/In-Situ Testing: Depths	Type	No.	Blows	SPT N	Laboratory Testing: <425 %	WC %	PL %	LL %	ρ Mg/m³	Cu kN/m²	Additional Tests and Notes
				TOPSOIL (Desiccated dark brown slightly silty slightly gravelly desiccated CLAY with rootlets. Gravel of subangular to subrounded fine to coarse flint)			0.00		0												Groundwater not encountered during drilling
				Stiff to desiccated pale brown and grey mottled gravelly slightly cobbly desiccated CLAY. Gravel of subangular to rounded fine to coarse chalk (LOWESTOFT FORMATION)			0.20		0.10	J	1									No collapse of sidewalls during drilling
									0.75	D	1									Infiltration test undertaken at 0.9m depth
				1.00 Becoming hard and dark grey with depth					1											
									1.50	D	2									
							2.00		2											Windowless sample hole completed at 2.0m depth
									3											
									4											

*WATER: Standing water level; Water strikes

PIEZOMETER: Upper seal; Response zone; Lower seal

SAMPLE AND TEST KEY

D Small disturbed sample
B Bulk disturbed sample
U Undisturbed sample
P Piston sample
J Disturbed jar sample
ES Environmental soil sample
W Water Sample
S Standard penetration test
C Cone penetration test
K Permeability test

Blows SPT blows for each 75mm increment (35) Undisturbed sample blow count
SPT N N = SPT N value (blows after seating) N*120 = Total blows/penetration including seating
<425 Sample % passing 425 micron sieve

DEPTH All depths, level and thicknesses in metres

Geosphere Environmental Ltd
Brightwell Barns, Ipswich Road,
Bightwell, Suffolk, IP10 0BJ
Telephone: 01603 298 076
Fax: 01603 298 075

HOLE No. WS15 | SHEET 1 OF 1 | PROJECT No 995,SI

GEL AGS BH BETA 995,SI - NW HAVERHILL, 31-10-14, LF,SG.GPJ GINT STD AGS 3_1.GDT 11/12/14

CLIENT: c/o Savills	PROJECT: Land to the North West of Haverhill	GROUND LEVEL	HOLE No. WS16
LOGGED BY: SG FIELDWORK BY: GEL TEMPLATE REF: GEL AGS BH BETA CHECKED BY: DATE:	EXCAVATION METHOD: Windowless sampler Uncased to 4.0 m	COORDINATES E N DATES 31/10/2014 - 31/10/2014	SHEET 1 OF 1 PROJECT NO. 995,SI

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata: Leg	Strata: Reduced Level	Strata: Depth	Graphical Representation: SPT 'N' Value (0 10 20 30 40)	Sampling/In-Situ Testing: Depths	Type	No.	Blows	SPT N	Laboratory Testing: <425 %	WC %	PL %	LL %	ρ Mg/m³	Cu kN/m²	Additional Tests and Notes
				TOPSOIL (Dark grey brown slightly gravelly clay. Gravel of fine to medium flint with occasional brick).			0.00		0											Groundwater not encountered during drilling
									0.10	J	1									No collapse of sidewalls during drilling
				Firm becoming stiff dark yellow brown slightly gravelly desiccated CLAY. Gravel of fine to medium flint with occasional medium chalk. (LOWESTOFT FORMATION) 0.50 Rootlets present			0.30													
									1											
				1.50 No desiccation below 1.5m and becoming slightly sandy and firm with depth																
									2											
				2.20 Becoming gravelly and pale grey orange brown mottled below 2.2m. Gravel is fine to coarse chalk and flint																
									3											
							4.00		4											Windowless sample hole completed at 4.0m

*WATER ▼ Standing water level ▽ Water strikes

PIEZOMETER Upper seal / Response zone / Lower seal

SAMPLE AND TEST KEY

D Small disturbed sample
B Bulk disturbed sample
U Undisturbed sample
P Piston sample
J Disturbed jar sample
ES Environmental soil sample
W Water Sample
S Standard penetration test
C Cone penetration test
K Permeability test

Blows SPT blows for each 75mm increment (35) Undisturbed sample blow count
SPT N N = SPT N value (blows after seating) N*120 = Total blows/penetration including seating
<425 Sample % passing 425 micron sieve

DEPTH All depths, level and thicknesses in metres

Geosphere Environmental Ltd
Brightwell Barns, Ipswich Road,
Bightwell, Suffolk, IP10 0BJ
Telephone: 01603 298 076
Fax: 01603 298 075

HOLE No. WS16 | SHEET 1 OF 1 | PROJECT No 995,SI

GEL AGS BH BETA 995,SI - NW HAVERHILL, 31-10-14, LF,SG,GPJ GINT STD AGS 3_1.GDT 11/12/14

CLIENT: c/o Savills	PROJECT: Land to the North West of Haverhill	GROUND LEVEL	HOLE No. WS17
LOGGED BY: SG FIELDWORK BY: GEL TEMPLATE REF: GEL AGS BH BETA CHECKED BY: DATE:	EXCAVATION METHOD: Windowless sampler Uncased to 2.0 m	COORDINATES E N DATES 31/10/2014 - 31/10/2014	SHEET 1 OF 1 PROJECT NO. 995,SI

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata: Leg	Strata: Reduced Level	Strata: Depth	Graphical Representation: SPT 'N' Value (0 10 20 30 40)	Sampling/In-Situ Testing: Depths	Type	No.	Blows	SPT N	Laboratory Testing: <425 %	WC %	PL %	LL %	ρ Mg/m³	Cu kN/m²	Additional Tests and Notes
				TOPSOIL (Dark brown slightly gravelly clay. Gravel is fine to medium flint with occasional brick).			0.00		0											Groundwater not encountered with depth
									0.10	J	1									No collapse of sidewalls during drilling
				Firm dark brown slightly gravelly CLAY. Gravel of fine to coarse flint and chalk. (HEAD DEPOSITS)			0.35													
				Firm becoming stiff dark yellow brown gravelly CLAY. Gravel of fine to coarse flint and chalk. (LOWESTOFT FORMATION)			0.80		1											
				1.30 Becoming dark grey and dark orange brown mottled with depth																
				1.65 Cobbles of chalk present																
							2.00		2											Windowless sample hole completed at 2.0m
									3											
									4											

*WATER ▼ Standing water level ▽ Water strikes

PIEZOMETER Upper seal / Response zone / Lower seal

SAMPLE AND TEST KEY
D Small disturbed sample
B Bulk disturbed sample
U Undisturbed sample
P Piston sample
J Disturbed jar sample
ES Environmental soil sample
W Water Sample
S Standard penetration test
C Cone penetration test
K Permeability test

Blows SPT blows for each 75mm increment (35) Undisturbed sample blow count
SPT N N = SPT N value (blows after seating) N*120 = Total blows/penetration including seating
<425 Sample % passing 425 micron sieve

DEPTH All depths, level and thicknesses in metres

Geosphere Environmental Ltd
Brightwell Barns, Ipswich Road,
Bightwell, Suffolk, IP10 0BJ
Telephone: 01603 298 076
Fax: 01603 298 075

HOLE No. WS17 | SHEET 1 OF 1 | PROJECT No 995,SI

GEL AGS BH BETA 995,SI - NW HAVERHILL, 31-10-14, LF,SG.GPJ GINT STD AGS 3_1.GDT 11/12/14

CLIENT: c/o Savills	PROJECT: Land to the North West of Haverhill	GROUND LEVEL	HOLE No. WS18
LOGGED BY: LF FIELDWORK BY: GEL TEMPLATE REF: GEL AGS BH BETA CHECKED BY: DATE:	EXCAVATION METHOD: Windowless sampler Uncased to 4.0 m	COORDINATES E N DATES 31/10/2014 - 31/10/2014	SHEET 1 OF 1 PROJECT NO. 995,SI

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata: Leg	Strata: Reduced Level	Strata: Depth	Graphical Representation: SPT 'N' Value (0 10 20 30 40)	Sampling/In-Situ Testing: Depths	Type	No.	Blows	SPT N	Laboratory Testing: <425 %	WC %	PL %	LL %	ρ Mg/m³	Cu kN/m²	Additional Tests and Notes
				TOPSOIL (Dark brown slightly gravelly clay with rootlets. Gravel of angular to subrounded fine to medium flint and infrequent charcoal fragments).			0.00		0											No collapse of sidewalls during drilling
				Firm becoming stiff dark brown slightly gravelly CLAY. Gravel of angular to subrounded fine to medium flint. (HEAD DEPOSITS)			0.30													
31/10		1.00							0.80	D	1									
									1											Seepage inflow of water at 1m
									1.20	D	2									
				Firm becoming stiff orange brown gravelly CLAY. Gravel of subrounded to rounded fine to coarse chalk and angular to subrounded fine to coarse flint. (LOWESTOFT FORMATION)			1.50													
				2.20 Becoming brown grey mottled with depth					2											
									3.00	D	3									
									3											
							4.00		4											Windowless sample hole completed at 4.0m

*WATER: Standing water level; Water strikes

PIEZOMETER: Upper seal; Response zone; Lower seal

SAMPLE AND TEST KEY

D Small disturbed sample
B Bulk disturbed sample
U Undisturbed sample
P Piston sample
J Disturbed jar sample
ES Environmental soil sample
W Water Sample
S Standard penetration test
C Cone penetration test
K Permeability test

Blows SPT blows for each 75mm increment (35) Undisturbed sample blow count
SPT N N = SPT N value (blows after seating) N*120 = Total blows/penetration including seating
<425 Sample % passing 425 micron sieve

DEPTH All depths, level and thicknesses in metres

Geosphere Environmental Ltd
Brightwell Barns, Ipswich Road,
Bightwell, Suffolk, IP10 0BJ
Telephone: 01603 298 076
Fax: 01603 298 075

HOLE No. WS18 | SHEET 1 OF 1 | PROJECT No 995,SI

GEL AGS BH BETA 995,SI - NW HAVERHILL, 31-10-14, LF,SG.GPJ GINT STD AGS 3_1.GDT 11/12/14

CLIENT: c/o Savills	PROJECT: Land to the North West of Haverhill	GROUND LEVEL	HOLE No. WS19
LOGGED BY: SG FIELDWORK BY: GEL TEMPLATE REF: GEL AGS BH BETA CHECKED BY: DATE:	EXCAVATION METHOD: Windowless sampler Uncased to 4.0 m	COORDINATES E N DATES 31/10/2014 - 31/10/2014	SHEET 1 OF 1 PROJECT NO. 995,SI

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata: Leg	Strata: Reduced Level	Strata: Depth	Graphical Representation: SPT 'N' Value (0 10 20 30 40)	Sampling/In-Situ Testing: Depths	Type	No.	Blows	SPT N	Laboratory Testing: <425 %	WC %	PL %	LL %	ρ Mg/m³	Cu kN/m²	Additional Tests and Notes
				TOPSOIL (Dark brown gravelly very desiccated clay. Gravel of frequent fine to coarse flint and chalk).			0.00		0											Groundwater not encountered during drilling No collapse of sidewalls during drilling
				Dark brown pale grey mottled gravelly cobbly very desiccated CLAY. Gravel of fine to coarse flint and chalk with frequent cobbles of chalk. (LOWESTOFT FORMATION)			0.40		1											
				2.80 Becoming dark grey with depth 3.00 No desiccation below 3.0m					2											
							4.00		3											
									4											Windowless sample hole completed at 4.0m 50mm diameter monitorng well installed to 4.0m

*WATER ▼ Standing water level ▽ Water strikes

PIEZOMETER Upper seal / Response zone / Lower seal

SAMPLE AND TEST KEY

D Small disturbed sample
B Bulk disturbed sample
U Undisturbed sample
P Piston sample
J Disturbed jar sample
ES Environmental soil sample
W Water Sample

S Standard penetration test
C Cone penetration test
K Permeability test

Blows SPT blows for each 75mm increment (35) Undisturbed sample blow count
SPT N N = SPT N value (blows after seating) N*120 = Total blows/penetration including seating
<425 Sample % passing 425 micron sieve

DEPTH All depths, level and thicknesses in metres

Geosphere Environmental Ltd
Brightwell Barns, Ipswich Road,
Bightwell, Suffolk, IP10 0BJ
Telephone: 01603 298 076
Fax: 01603 298 075

HOLE No. WS19 | SHEET 1 OF 1 | PROJECT No 995,SI

GEL AGS BH BETA 995,SI - NW HAVERHILL, 31-10-14, LF,SG,GPJ GINT STD AGS 3_1.GDT 11/12/14

CLIENT: c/o Savills	PROJECT: Land to the North West of Haverhill	GROUND LEVEL	HOLE No. WSA
LOGGED BY: LF FIELDWORK BY: GEL TEMPLATE REF: GEL AGS BH BETA CHECKED BY: DATE:	EXCAVATION METHOD: Windowless sampler Uncased to 4.0 m	COORDINATES E N DATES 18/11/2014 - 18/11/2014	SHEET 1 OF 1 PROJECT NO. 995,SI

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata: Leg	Strata: Reduced Level	Strata: Depth	Graphical Representation: SPT 'N' Value (0 10 20 30 40)	Sampling/In-Situ Testing: Depths	Type	No.	Blows	SPT N	Laboratory Testing: <425 %	WC %	PL %	LL %	ρ Mg/m³	Cu kN/m²	Additional Tests and Notes
				TOPSOIL (Dark brown gravelly slightly silty clayey sand with occasional rootlets. Gravel is angular to subrounded fine to medium flint)			0.00		0												
				Firm becoming very stiff yellow brown gravelly CLAY. Gravel of angular to subrounded fine to coarse flint and subrounded to rounded fine to coarse chalk (LOWESTOFT FORMATION) 0.50 - Becoming desiccated with depth 0.60 - 1.00 - Becoming dark grey brown with depth			0.25		0.10	J	1								Groundwater not encountered during drilling No collapse of sidewalls during drilling Metals, PAH, TPH, Moisture content, pH and Sulphate
									0.30	J	2									
				1.00 - 4.00 - Becoming grey brown mottled with depth					1	C		11 12 9 8 8 9	34							
									2	C		6 6 7 7 8 9	31							
									3	C		6 8 9 9 10 12	40							
							4.00		4	C		8 9 10 12 13 14	49							Windowless sample hole completed at 4.0m

*WATER ▼ Standing water level ▽ Water strikes

PIEZOMETER Upper seal, Response zone, Lower seal

SAMPLE AND TEST KEY

D Small disturbed sample
B Bulk disturbed sample
U Undisturbed sample
P Piston sample
J Disturbed jar sample
ES Environmental soil sample
W Water Sample
S Standard penetration test
C Cone penetration test
K Permeability test

Blows SPT blows for each 75mm increment (35) Undisturbed sample blow count
SPT N N = SPT N value (blows after seating) N*120 = Total blows/penetration including seating
<425 Sample % passing 425 micron sieve

DEPTH All depths, level and thicknesses in metres

Geosphere Environmental Ltd
Brightwell Barns, Ipswich Road,
Bightwell, Suffolk, IP10 0BJ
Telephone: 01603 298 076
Fax: 01603 298 075

HOLE No. WSA. | SHEET 1 OF 1 | PROJECT No 995,SI

GEL AGS BH BETA 995,SI - NW HAVERHILL, 31-10-14, LF.SG.GPJ GINT STD AGS 3_1.GDT 11/12/14

CLIENT: c/o Savills	PROJECT: Land to the North West of Haverhill	GROUND LEVEL	HOLE No. WSB
LOGGED BY: LF FIELDWORK BY: GEL TEMPLATE REF: GEL AGS BH BETA CHECKED BY: DATE:	EXCAVATION METHOD: Windowless sampler Uncased to 2.0 m	COORDINATES E N DATES 18/11/2014 - 18/11/2014	SHEET 1 OF 1 PROJECT NO. 995,SI

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata: Leg	Strata: Reduced Level	Strata: Depth	Graphical Representation: SPT 'N' Value (0 10 20 30 40)	Sampling/In-Situ Testing: Depths	Type	No.	Blows	SPT N	Laboratory Testing: <425 %	WC %	PL %	LL %	ρ Mg/m³	Cu kN/m²	Additional Tests and Notes
				TOPSOIL (Dark brown slightly gravelly clay with rootlets. Gravel of angular to subrounded fine to medium flint)			0.00		0											Groundwater not encountered during drilling No collapse of sidewalls during drilling
				Firm becoming stiff light orange brown gravelly CLAY. Gravel of angular to subrounded fine to coarse flint and subrounded fine to coarse chalk (LOWESTOFT FORMATION)			0.30		0.20	J	1									Metals, PAH, TPH, Moisture content, pH and Sulphate
									0.40	J	2									Metals, PAH, TPH, Moisture content, pH and Sulphate
				0.80 - Becoming brown grey mottled with depth					1											Infiltration test undertaken at 0.69m depth
							2.00		2											Windowless sample hole completed at 2.00m depth
									3											
									4											

*WATER: Standing water level; Water strikes

PIEZOMETER: Upper seal; Response zone; Lower seal

SAMPLE AND TEST KEY

D Small disturbed sample
B Bulk disturbed sample
U Undisturbed sample
P Piston sample
J Disturbed jar sample
ES Environmental soil sample
W Water Sample
S Standard penetration test
C Cone penetration test
K Permeability test

Blows SPT blows for each 75mm increment (35) Undisturbed sample blow count
SPT N N = SPT N value (blows after seating) N*120 = Total blows/penetration including seating
<425 Sample % passing 425 micron sieve

DEPTH All depths, level and thicknesses in metres

Geosphere Environmental Ltd
Brightwell Barns, Ipswich Road,
Bightwell, Suffolk, IP10 0BJ
Telephone: 01603 298 076
Fax: 01603 298 075

HOLE No. WSB. | SHEET 1 OF 1 | PROJECT No 995,SI

GEL AGS BH BETA 995,SI - NW HAVERHILL, 31-10-14, LF.SG.GPJ GINT STD AGS 3_1.GDT 11/12/14

CLIENT: c/o Savills	PROJECT: Land to the North West of Haverhill	GROUND LEVEL	HOLE No. WSC
LOGGED BY: LF FIELDWORK BY: GEL TEMPLATE REF: GEL AGS BH BETA CHECKED BY: DATE:	EXCAVATION METHOD: Windowless sampler Uncased to 4.0 m	COORDINATES E N DATES 18/11/2014 - 18/11/2014	SHEET 1 OF 1 PROJECT NO. 995,SI

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata: Leg	Strata: Reduced Level	Strata: Depth	Graphical Representation: SPT 'N' Value (0 10 20 30 40)	Sampling/In-Situ Testing: Depths	Type	No.	Blows	SPT N	Laboratory Testing: <425 %	WC %	PL %	LL %	ρ Mg/m³	Cu kN/m²	Additional Tests and Notes
				TOPSOIL (Dark brown slightly gravelly clay with occasional rootlets. Gravel of angular to subrounded fine to medium flint and occasional fine brick fragments)			0.00		0												
				Firm brown slightly gravelly CLAY. Gravel of angular to subrounded fine to medium flint (HEAD DEPOSITS)			0.30		0.20	J	1										No collapse of sidewalls during drilling
				0.60 - Becoming slightly sandy with depth					0.40	J	2									
				1.00 - 1.50 - Becoming soft with depth					1	C		1 1 1 1 2 2	6							
				Firm becoming stiff yellow brown/grey mottled gravelly CLAY. Gravel of angular to subrounded fine to coarse flint and frequent subrounded to rounded fine to coarse chalk (LOWESTOFT FORMATION)			1.50		2	C		4 3 4 3 5 5	17							
									3	C		3 3 4 4 5 6	19							50mm diameter monitoring well installed to 3.0m
18/11		3.50																		Inflow of water at 3.5m
							4.00		4	C		4 4 6 6 6 8	26							Windowless sample hole completed at 4.00m depth

*WATER ▼ Standing water level ▽ Water strikes

PIEZOMETER Upper seal, Response zone, Lower seal

SAMPLE AND TEST KEY

D Small disturbed sample
B Bulk disturbed sample
U Undisturbed sample
P Piston sample
J Disturbed jar sample
ES Environmental soil sample
W Water Sample
S Standard penetration test
C Cone penetration test
K Permeability test

Blows SPT blows for each 75mm increment (35) Undisturbed sample blow count
SPT N N = SPT N value (blows after seating) N*120 = Total blows/penetration including seating
<425 Sample % passing 425 micron sieve

DEPTH All depths, level and thicknesses in metres

Geosphere Environmental Ltd
Brightwell Barns, Ipswich Road,
Bightwell, Suffolk, IP10 0BJ
Telephone: 01603 298 076
Fax: 01603 298 075

HOLE No. WSC. | SHEET 1 OF 1 | PROJECT No 995,SI

GEL AGS BH BETA 995,SI - NW HAVERHILL, 31-10-14, LF,SG,GPJ GINT STD AGS 3_1.GDT 11/12/14

CLIENT: c/o Savills	PROJECT: Land to the North West of Haverhill	GROUND LEVEL	HOLE No. WSD
LOGGED BY: SG FIELDWORK BY: GEL TEMPLATE REF: GEL AGS BH BETA CHECKED BY: DATE:	EXCAVATION METHOD: Windowless sampler Uncased to 2.0 m	COORDINATES E N DATES 18/11/2014 - 18/11/2014	SHEET 1 OF 1 PROJECT NO. 995,SI

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata: Leg	Strata: Reduced Level	Strata: Depth	Graphical Representation: SPT 'N' Value (0 10 20 30 40)	Sampling/In-Situ Testing: Depths	Type	No.	Blows	SPT N	Laboratory Testing: <425 %	WC %	PL %	LL %	ρ Mg/m³	Cu kN/m²	Additional Tests and Notes
				TOPSOIL (Brown slightly sandy clay with occasional fine to medium gravel of flint)			0.00		0											Groundwater not encountered during drilling No collapse of sidewalls during drilling Metals, PAH, TPH, Moisture content, pH and Sulphate
				Firm becoming stiff yellow brown CLAY with occasional fine to coarse gravel of flint and chalk (LOWESTOFT FORMATION)			0.30		0.20	J	1									
									0.40	J	2									Infiltration test undertaken at 0.55m depth
				0.70 - 2.00 - Becoming pale grey/orange brown mottled.					1											
							2.00		2											Windowless sample hole completed at 2.00m depth
									3											
									4											

*WATER ▼ Standing water level ▽ Water strikes

PIEZOMETER Upper seal / Response zone / Lower seal

SAMPLE AND TEST KEY

D Small disturbed sample
B Bulk disturbed sample
U Undisturbed sample
P Piston sample
J Disturbed jar sample
ES Environmental soil sample
W Water Sample
S Standard penetration test
C Cone penetration test
K Permeability test

Blows SPT blows for each 75mm increment (35) Undisturbed sample blow count
SPT N N = SPT N value (blows after seating) N*120 = Total blows/penetration including seating
<425 Sample % passing 425 micron sieve

DEPTH All depths, level and thicknesses in metres

Geosphere Environmental Ltd
Brightwell Barns, Ipswich Road,
Bightwell, Suffolk, IP10 0BJ
Telephone: 01603 298 076
Fax: 01603 298 075

HOLE No. WSD. | SHEET 1 OF 1 | PROJECT No 995,SI

GEL AGS BH BETA 995,SI - NW HAVERHILL, 31-10-14, LF,SG.GPJ GINT STD AGS 3_1.GDT 11/12/14

CLIENT: c/o Savills	PROJECT: Land to the North West of Haverhill	GROUND LEVEL	HOLE No. WSE
LOGGED BY: SG FIELDWORK BY: GEL TEMPLATE REF: GEL AGS BH BETA CHECKED BY: DATE:	EXCAVATION METHOD: Windowless sampler Uncased to 4.0 m	COORDINATES E N DATES 18/11/2014 - 18/11/2014	SHEET 1 OF 1 PROJECT NO. 995,SI

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata: Leg	Strata: Reduced Level	Strata: Depth	Graphical Representation: SPT 'N' Value (0 10 20 30 40)	Sampling/In-Situ Testing: Depths	Type	No.	Blows	SPT N	Laboratory Testing: <425 %	WC %	PL %	LL %	ρ Mg/m³	Cu kN/m²	Additional Tests and Notes
				TOPSOIL (Dark grey slightly sandy clay with occasional fine gravel of flint and brick)			0.00		0											No collapse of sidewalls during drilling
				Firm yellow brown sandy CLAY with occasional black speckling (HEAD DEPOSITS)			0.40													
				Stiff dark brown/pale grey mottled gravelly CLAY. Gravel is fine to coarse flint and chalk (HEAD DEPOSITS)			1.20		1	C		1 1 2 3 2 3	10							Rising to 0.8m on completion
18/11 + 20 mins		1.80 0.80																		
				Orange brown fine to medium gravelly SAND. Gravel is fine to medium flint (HEAD DEPOSITS)			1.80													Moderate inflow of water at 1.8m
				Stiff dark brown/pale grey mottled gravelly CLAY. Gravel is fine flint and chalk (LOWESTOFT FORMATION) 2.25 - becoming dark grey			2.00		2	C		3 4 4 5 5 5	19							
																				50mm diameter monitoring well installed to 2.6m
									3	C		3 3 4 4 5 7	20							
							4.00		4	C		3 3 4 5 5 9	23							Windowless sample hole completed at 4.0m depth

*WATER: Standing water level; Water strikes

PIEZOMETER: Upper seal; Response zone; Lower seal

SAMPLE AND TEST KEY

D Small disturbed sample
B Bulk disturbed sample
U Undisturbed sample
P Piston sample
J Disturbed jar sample
ES Environmental soil sample
W Water Sample

S Standard penetration test
C Cone penetration test
K Permeability test

Blows SPT blows for each 75mm increment (35) Undisturbed sample blow count
SPT N N = SPT N value (blows after seating) N*120 = Total blows/penetration including seating
<425 Sample % passing 425 micron sieve

DEPTH All depths, level and thicknesses in metres

Geosphere Environmental Ltd
Brightwell Barns, Ipswich Road,
Bightwell, Suffolk, IP10 0BJ
Telephone: 01603 298 076
Fax: 01603 298 075

HOLE No. WSE. | SHEET 1 OF 1 | PROJECT No 995,SI

GEL AGS BH BETA 995,SI - NW HAVERHILL, 31-10-14, LF,SG.GPJ GINT STD AGS 3_1.GDT 11/12/14

CLIENT: c/o Savills	PROJECT: Land to the North West of Haverhill	GROUND LEVEL	HOLE No. WSF
LOGGED BY: SG FIELDWORK BY: GEL TEMPLATE REF: GEL AGS BH BETA CHECKED BY: DATE:	EXCAVATION METHOD: Windowless sampler Uncased to 2.0 m	COORDINATES E N DATES 18/11/2014 - 18/11/2014	SHEET 1 OF 1 PROJECT NO. 995,SI

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata: Leg	Strata: Reduced Level	Strata: Depth	Graphical Representation: SPT 'N' Value (0 10 20 30 40)	Sampling/In-Situ Testing: Depths	Type	No.	Blows	SPT N	Laboratory Testing: <425 %	WC %	PL %	LL %	ρ Mg/m³	Cu kN/m²	Additional Tests and Notes
				TOPSOIL (Dark grey slightly sandy clay with occasional fine gravel of flint and brick)			0.00		0											No collapse of sidewalls during drilling Metals, PAH, TPH, Moisture content, pH and Sulphate
				Firm becoming soft orange brown sandy CLAY with occasional fine to medium gravel of flint (HEAD DEPOSITS)			0.25		0.20	J	1									
									0.45	J	2									
18/11		1.30							1											Inflow of water at 1.3m
				Stiff dark brown/pale grey mottled slightly gravelly CLAY. Gravel is fine to medium flint and chalk (LOWESTOFT FORMATION)			1.60													
							2.00		2											Window sample hole completed at 2.00m depth
									3											
									4											

*WATER ▼ Standing water level ▽ Water strikes

PIEZOMETER Upper seal / Response zone / Lower seal

SAMPLE AND TEST KEY
D Small disturbed sample
B Bulk disturbed sample
U Undisturbed sample
P Piston sample
J Disturbed jar sample
ES Environmental soil sample
W Water Sample
S Standard penetration test
C Cone penetration test
K Permeability test

Blows SPT blows for each 75mm increment (35) Undisturbed sample blow count
SPT N N = SPT N value (blows after seating) N*120 = Total blows/penetration including seating
<425 Sample % passing 425 micron sieve

DEPTH All depths, level and thicknesses in metres

Geosphere Environmental Ltd
Brightwell Barns, Ipswich Road,
Bightwell, Suffolk, IP10 0BJ
Telephone: 01603 298 076
Fax: 01603 298 075

HOLE No. WSF.
SHEET 1 OF 1
PROJECT No 995,SI

GEL AGS BH BETA 995,SI - NW HAVERHILL, 31-10-14, LF,SG.GPJ GINT STD AGS 3_1.GDT 11/12/14

CLIENT: c/o Savills	PROJECT: Land to the North West of Haverhill	GROUND LEVEL	HOLE No. WSG
LOGGED BY: LF FIELDWORK BY: GEL TEMPLATE REF: GEL AGS BH BETA CHECKED BY: DATE:	EXCAVATION METHOD: Windowless sampler Uncased to 2.0 m	COORDINATES E N DATES 19/11/2014 - 19/11/2014	SHEET 1 OF 1 PROJECT NO. 995,SI

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata: Leg	Strata: Reduced Level	Strata: Depth	Graphical Representation: SPT 'N' Value (0 10 20 30 40)	Sampling/In-Situ Testing: Depths	Type	No.	Blows	SPT N	Laboratory Testing: <425 %	WC %	PL %	LL %	ρ Mg/m³	Cu kN/m²	Additional Tests and Notes
				TOPSOIL (Dark brown slightly gravelly slightly sandy clay with occasional rootlets. Gravel of angular to subrounded fine to medium flint)			0.00		0											Groundwater not encountered during drilling Metals, PAH, TPH, Moisture content, pH and Sulphate No collapse of sidewalls during drilling
				Dark orange brown fine to medium SAND (HEAD DEPOSITS)			0.40													
				Firm dark orange brown very sandy slightly gravelly CLAY. Gravel of angular to subrounded fine to medium flint (HEAD DEPOSITS) 1.00 - Becoming gravelly with depth. Gravel is coarse flint 1.10 - 1.70 - Becoming black speckled			0.70												Shear vane test = 70kN/m² Infiltration test undertaken at 0.73m depth
									1											Shear vane test = 50kN/m²
				Orange brown clayey gravelly SAND. Gravel of angular to rounded fine to coarse chalk and flint (HEAD DEPOSITS)			1.70													
							2.00		2											Windowless sample hole completed at 2.00m depth
									3											
									4											

*WATER ▼ Standing water level ▽ Water strikes

PIEZOMETER Upper seal / Response zone / Lower seal

SAMPLE AND TEST KEY

D Small disturbed sample
B Bulk disturbed sample
U Undisturbed sample
P Piston sample
J Disturbed jar sample
ES Environmental soil sample
W Water Sample

S Standard penetration test
C Cone penetration test
K Permeability test

Blows SPT blows for each 75mm increment (35) Undisturbed sample blow count
SPT N N = SPT N value (blows after seating) N*120 = Total blows/penetration including seating
<425 Sample % passing 425 micron sieve

DEPTH All depths, level and thicknesses in metres

Geosphere Environmental Ltd
Brightwell Barns, Ipswich Road,
Bightwell, Suffolk, IP10 0BJ
Telephone: 01603 298 076
Fax: 01603 298 075

HOLE No. WSG. | SHEET 1 OF 1 | PROJECT No 995,SI

GEL AGS BH BETA 995,SI - NW HAVERHILL, 31-10-14, LF.SG.GPJ GINT STD AGS 3_1.GDT 11/12/14

CLIENT: c/o Savills	PROJECT: Land to the North West of Haverhill	GROUND LEVEL	HOLE No. WSH
LOGGED BY: LF FIELDWORK BY: GEL TEMPLATE REF: GEL AGS BH BETA CHECKED BY: DATE:	EXCAVATION METHOD: Windowless sampler Uncased to 2.0 m	COORDINATES E N DATES 19/11/2014 - 19/11/2014	SHEET 1 OF 1 PROJECT NO. 995,SI

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata: Leg	Strata: Reduced Level	Strata: Depth	Graphical Representation: SPT 'N' Value (0 10 20 30 40)	Sampling/In-Situ Testing: Depths	Type	No.	Blows	SPT N	Laboratory Testing: <425 %	WC %	PL %	LL %	ρ Mg/m³	Cu kN/m²	Additional Tests and Notes
				TOPSOIL (Dark brown slightly gravelly clay. Gravel of angular to subrounded fine to medium flint)			0.00		0											Groundwater not encountered during drilling
				Firm orange brown slightly gravelly CLAY with occasional sandy pockets. Gravel of angular to subrounded fine to medium flint (HEAD DEPOSITS) 0.40 - Becoming orange brown/grey mottled with depth			0.30		0.20	J	1									Borehole collapsed to 1.7m on completion Infiltration test undertaken at 0.24m depth
				0.90 - Becoming slightly sandy with depth					0.40	J	2									Shear vane test = 61kN/m²
				1.70 - 2.00 - With a sandy clay pocket					1											Shear vane test = 40kN/m²
				Soft yellow brown/grey mottled sandy gravelly CLAY. Gravel of angular to rounded fine to coarse flint and chalk (LOWESTOFT FORMATION)			1.80 2.00													Shear vane test = 36kN/m² Shear vane test = 23kN/m² Windowless sample hole completed at 2.0m depth
									2											
									3											
									4											

*WATER ▼ Standing water level ▽ Water strikes

PIEZOMETER Upper seal / Response zone / Lower seal

SAMPLE AND TEST KEY

D Small disturbed sample
B Bulk disturbed sample
U Undisturbed sample
P Piston sample
J Disturbed jar sample
ES Environmental soil sample
W Water Sample
S Standard penetration test
C Cone penetration test
K Permeability test

Blows SPT blows for each 75mm increment (35) Undisturbed sample blow count
SPT N N = SPT N value (blows after seating) N*120 = Total blows/penetration including seating
<425 Sample % passing 425 micron sieve

DEPTH All depths, level and thicknesses in metres

Geosphere Environmental Ltd
Brightwell Barns, Ipswich Road,
Bightwell, Suffolk, IP10 0BJ
Telephone: 01603 298 076
Fax: 01603 298 075

HOLE No. WSH | SHEET 1 OF 1 | PROJECT No 995,SI

GEL AGS BH BETA 995,SI - NW HAVERHILL, 31-10-14, LF.SG.GPJ GINT STD AGS 3_1.GDT 11/12/14

CLIENT: c/o Savills	PROJECT: Land to the North West of Haverhill	GROUND LEVEL	HOLE No. WSI
LOGGED BY: LF FIELDWORK BY: GEL TEMPLATE REF: GEL AGS BH BETA CHECKED BY: DATE:	EXCAVATION METHOD: Windowless sampler Uncased to 2.0 m	COORDINATES E N DATES 19/11/2014 - 19/11/2014	SHEET 1 OF 1 PROJECT NO. 995,SI

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata: Leg	Strata: Reduced Level	Strata: Depth	Graphical Representation: SPT 'N' Value (0 10 20 30 40)	Sampling/In-Situ Testing: Depths	Type	No.	Blows	SPT N	Laboratory Testing: <425 %	WC %	PL %	LL %	ρ Mg/m³	Cu kN/m²	Additional Tests and Notes
				TOPSOIL (Dark brown slightly gravelly clay. Gravel of angular to subrounded fine to medium flint)			0.00		0											Groundwater not encountered during drilling
									0.10	J	1									Metals, PAH, TPH, Moisture content, pH and Sulphate
				Firm brown slightly sandy slightly gravelly CLAY. Gravel of angular to subrounded fine to medium flint (HEAD DEPOSITS)			0.25		0.30	J	2									No collapse of sidewalls during drilling
																				Shear vane test = 62kN/m²
				Firm becoming stiff brown/grey mottled gravelly CLAY. Gravel of angular to subrounded fine to coarse flint and subrounded to rounded chalk (LOWESTOFT FORMATION)			0.90		1	C		2 2 2 2 2 3	9							Shear vane test = 78kN/m²
																				Shear vane test = 80kN/m²
							2.00		2											Shear vane test = 76kN/m²
																				Widow sample hole completed at 2.0m depth
									3											
									4											

*WATER ▼ Standing water level ▽ Water strikes

PIEZOMETER Upper seal / Response zone / Lower seal

SAMPLE AND TEST KEY

D Small disturbed sample
B Bulk disturbed sample
U Undisturbed sample
P Piston sample
J Disturbed jar sample
ES Environmental soil sample
W Water Sample
S Standard penetration test
C Cone penetration test
K Permeability test

Blows SPT blows for each 75mm increment (35) Undisturbed sample blow count
SPT N N = SPT N value (blows after seating) N*120 = Total blows/penetration including seating
<425 Sample % passing 425 micron sieve

DEPTH All depths, level and thicknesses in metres

Geosphere Environmental Ltd
Brightwell Barns, Ipswich Road,
Bightwell, Suffolk, IP10 0BJ
Telephone: 01603 298 076
Fax: 01603 298 075

HOLE No. WSI.
SHEET 1 OF 1
PROJECT No 995,SI

GEL AGS BH BETA 995,SI - NW HAVERHILL, 31-10-14, LF.SG.GPJ GINT STD AGS 3_1.GDT 11/12/14

Geosphere Environmental Ltd
Brightwell Barns, Ipswich Road
Birghtwell, Suffolk, IP10 0BJ
Telephone: 01603 298 076
Fax: 01603 298 075

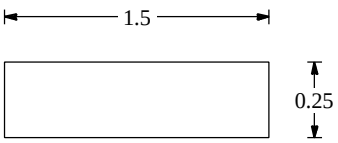
TRIAL PIT LOG

Project	Client	TRIAL PIT No
Land to the North West of Haverhill	c/o Savills	TP1

Job No	Date	Ground Level (m)	Co-Ordinates ()
995,SI	28-10-14 28-10-14		

Fieldwork By	Logged By	Sheet
GEL	SG	1 of 1

Depth	DESCRIPTION	Legend	Depth	No	Remarks/Tests
0.00-0.35	TOPSOIL (Dark brown slightly gravelly clay. Gravel is fine to medium flint with occasional fine to medium brick fragments)				Groundwater not encountered during excavation No collapse of sidewalls during excavation
0.35-1.50	Stiff dark yellow brown slightly gravelly CLAY. Gravel is fine to medium flint and chalk (LOWESTOFT FORMATION)				
	0.80 - 1.50 - Becoming gravelly				
	1.00 - 1.50 - Becoming dark grey with occasional cobble of flint and chalk				
					Trial pit completed at 1.5m depth



Shoring/Support: NONE
Stability: STABLE

All dimensions in metres Scale 1:20.8333333333333	Method Trial Pit/trench	Plant Used MECHANICAL EXCAVATOR	Checked By AD

GEL AGS TP BETA 995,SI - NW HAVERHILL, 31-10-14, LF,SG.GPJ GINT STD AGS 3_1.GDT 11/12/14

Geosphere Environmental Ltd
Brightwell Barns, Ipswich Road
Birghtwell, Suffolk, IP10 0BJ
Telephone: 01603 298 076
Fax: 01603 298 075

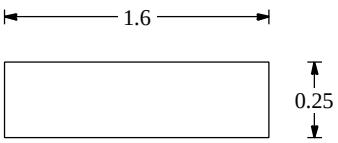
TRIAL PIT LOG

Project	Client	TRIAL PIT No
Land to the North West of Haverhill	c/o Savills	TP2

Job No	Date	Ground Level (m)	Co-Ordinates ()
995,SI	28-10-14 28-10-14		

Fieldwork By	Logged By	Sheet
GEL	SG	1 of 1

Depth	DESCRIPTION	Legend	Depth	No	Remarks/Tests
0.00-0.30	TOPSOIL (Dark brown clay with occasional medium gravel of flint				Groundwater not encountered during excavation No collapse of sidewalls during excavation
0.30-1.40	Firm becoming stiff dark yellow brown slightly gravelly CLAY. Gravel of fine to coarse flint and chalk with occasional cobble of chalk and flint (LOWESTOFT FORMATION)				
	0.60 - Becoming pale grey/orange brown mottled		0.60-0.80	1B	CBR
	1.00 - Becoming very gravelly				
					Trial pit completed at 1.4m depth



Shoring/Support: NONE
Stability: STABLE

All dimensions in metres Scale 1:20.8333333333333	Method Trial Pit/trench	Plant Used MECHANICAL EXCAVATOR	Checked By AD

GEL AGS TP BETA 995,SI - NW HAVERHILL, 31-10-14, LF,SG.GPJ GINT STD AGS 3_1.GDT 11/12/14

Geosphere Environmental Ltd
Brightwell Barns, Ipswich Road
Birghtwell, Suffolk, IP10 0BJ
Telephone: 01603 298 076
Fax: 01603 298 075

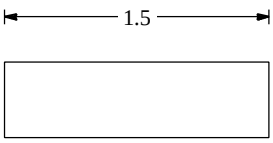
TRIAL PIT LOG

Project	Client	TRIAL PIT No
Land to the North West of Haverhill	c/o Savills	TP3

Job No	Date	Ground Level (m)	Co-Ordinates ()
995,SI	28-10-14 28-10-14		

Fieldwork By	Logged By	Sheet
GEL	SG	1 of 1

Depth	DESCRIPTION	Legend	Depth	No	Remarks/Tests
0.00-0.25	TOPSOIL (Dark brown clay with occasional medium gravel of flint)				Groundwater not encountered during excavation
0.25-1.50	Firm becoming stiff dark yellow brown CLAY with frequent fine to coarse gravel of flint and chalk and occasional roots (2mm) (LOWESTOFT FORMATION)				No collapse of sidewalls during excavation
	0.65 - Becoming gravelly				
	0.90 - Becoming pale grey/orange brown mottled				
					Trial pit completed at 1.5m depth



Shoring/Support: NONE
Stability: STABLE

All dimensions in metres Scale 1:20.8333333333333	Method Trial Pit/trench	Plant Used MECHANICAL EXCAVATOR	Checked By AD

GEL AGS TP BETA 995,SI - NW HAVERHILL, 31-10-14, LF,SG.GPJ GINT STD AGS 3_1.GDT 11/12/14

Geosphere Environmental Ltd
Brightwell Barns, Ipswich Road
Birghtwell, Suffolk, IP10 0BJ
Telephone: 01603 298 076
Fax: 01603 298 075

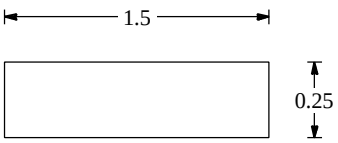
TRIAL PIT LOG

Project	Client	TRIAL PIT No
Land to the North West of Haverhill	c/o Savills	TP4

Job No	Date	Ground Level (m)	Co-Ordinates ()
995,SI	28-10-14 28-10-14		

Fieldwork By	Logged By	Sheet
GEL	SG	1 of 1

Depth	DESCRIPTION	Legend	Depth	No	Remarks/Tests
0.00-0.25	TOPSOIL (Dark grey brown clay with frequent fine to medium gravel of chalk, flint and occasional coarse gravel of brick fragments)				Groundwater not encountered during excavation
0.25-1.50	Firm becoming stiff dark yellow brown slightly gravelly CLAY. Gravel is fine to coarse chalk and flint (LOWESTOFT FORMATION)				No collapse of sidewalls during excavation
	0.55 - Becoming gravelly		0.60-0.70	1B	Moisture content, CBR
	0.90 - Becoming pale grey with occasional cobbles of chalk, flint and ironstone				
					Trial pit completed at 1.5m depth



Shoring/Support: NONE
Stability: STABLE

All dimensions in metres Scale 1:20.8333333333333	Method Trial Pit/trench	Plant Used MECHANICAL EXCAVATOR	Checked By AD

GEL AGS TP BETA 995,SI - NW HAVERHILL, 31-10-14, LF,SG.GPJ GINT STD AGS 3_1.GDT 11/12/14

Geosphere Environmental Ltd
Brightwell Barns, Ipswich Road
Birghtwell, Suffolk, IP10 0BJ
Telephone: 01603 298 076
Fax: 01603 298 075

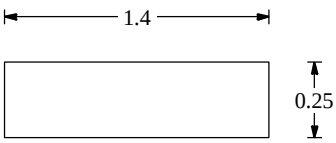
TRIAL PIT LOG

Project	Client	TRIAL PIT No
Land to the North West of Haverhill	c/o Savills	TP5

Job No	Date	Ground Level (m)	Co-Ordinates ()
995,SI	28-10-14 28-10-14		

Fieldwork By	Logged By	Sheet
GEL	SG	1 of 1

Depth	DESCRIPTION	Legend	Depth	No	Remarks/Tests
0.00-0.30	TOPSOIL (Dark grey brown clay with frequent fine to medium gravel of flint, chalk and occasional coarse gravel of brick fragments)				Groundwater not encountered during excavation No collapse of sidewalls during excavation
0.30-1.50	Firm becoming stiff dark yellow brown CLAY with occasional fine to medium gravel of flint and chalk (LOWESTOFT FORMATION) 0.60 - Becoming gravelly 0.90 - Becoming pale grey with occasional cobbles of flint and chalk				Trial pil completed at 1.5m depth



Shoring/Support: NONE
Stability: STABLE

All dimensions in metres Scale 1:20.8333333333333	Method Trial Pit/trench	Plant Used MECHANICAL EXCAVATOR	Checked By AD

GEL AGS TP BETA 995,SI - NW HAVERHILL, 31-10-14, LF,SG.GPJ GINT STD AGS 3_1.GDT 11/12/14

Geosphere Environmental Ltd
Brightwell Barns, Ipswich Road
Birghtwell, Suffolk, IP10 0BJ
Telephone: 01603 298 076
Fax: 01603 298 075

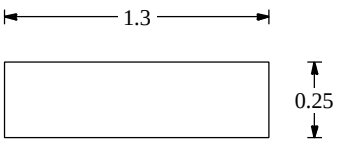
TRIAL PIT LOG

Project	Client	TRIAL PIT No
Land to the North West of Haverhill	c/o Savills	TP6

Job No	Date	Ground Level (m)	Co-Ordinates ()
995,SI	29-10-14 29-10-14		

Fieldwork By	Logged By	Sheet
GEL	SG	1 of 1

Depth	DESCRIPTION	Legend	Depth	No	Remarks/Tests
0.00-0.30	TOPSOIL (Dark grey brown clay with frequent fine to medium gravel of flint, chalk and occasional coarse gravel of brick fragments)				No collapse of sidewalls during excavation
0.30-1.50	Firm becoming stiff dark yellow brown very gravelly CLAY. Gravel is fine to coarse flint, chalk and occasionalvcobble of chalk (LOWESTOFT FORMATION)		0.70-1.00	1B	
	1.05 - Becoming pale grey				Very slow inflow of water at 1.5 m Rising to 1.45m after 20 minutes Trial pit completed at 1.5m depth



Shoring/Support: NONE
Stability: STABLE

All dimensions in metres Scale 1:20.8333333333333	Method Trial Pit/trench	Plant Used MECHANICAL EXCAVATOR	Checked By AD

GEL AGS TP BETA 995,SI - NW HAVERHILL, 31-10-14, LF,SG.GPJ GINT STD AGS 3_1.GDT 11/12/14

Geosphere Environmental Ltd
Brightwell Barns, Ipswich Road
Birghtwell, Suffolk, IP10 0BJ
Telephone: 01603 298 076
Fax: 01603 298 075

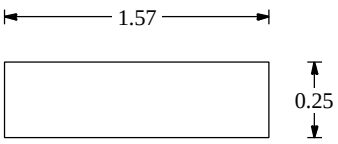
TRIAL PIT LOG

Project	Client	TRIAL PIT No
Land to the North West of Haverhill	c/o Savills	TP7

Job No	Date	Ground Level (m)	Co-Ordinates ()
995,SI	30-10-14 30-10-14		

Fieldwork By	Logged By	Sheet
GEL	SG	1 of 1

Depth	DESCRIPTION	Legend	Depth	No	Remarks/Tests
0.00-0.30	TOPSOIL (Dark grey brown clay with frequent fine to medium gravel of flint, chalk and occasionalcoarse gravel of brick fragments				No collapse of sidewalls during excavation
0.30-1.20	Firm dark yellow brown very gravelly CLAY. Gravel is fine to coarse flint, chalk and occasional cobble of flint (HEAD DEPOSITS) 0.80 - Becoming pale grey				Moisture content, CBR
1.20-1.80	Soft orange brown very gravelly sandy CLAY. Gravel is fine to coarse chalk and flint (HEAD DEPOSITS)				
1.80-1.90	Stiff dark grey CLAY with frequent fine to coarse gravel of chalk and flint (LOWESTOFT FORMATION)				Slight seepage inflow of water at 1.8 m Trial pit completed at 1.9m depth



Shoring/Support: NONE
Stability: STABLE

All dimensions in metres Scale 1:20.8333333333333	Method Trial Pit/trench	Plant Used MECHANICAL EXCAVATOR	Checked By AD

GEL AGS TP BETA 995,SI - NW HAVERHILL, 31-10-14, LF,SG.GPJ GINT STD AGS 3_1.GDT 11/12/14

Geosphere Environmental Ltd
Brightwell Barns, Ipswich Road
Birghtwell, Suffolk, IP10 0BJ
Telephone: 01603 298 076
Fax: 01603 298 075

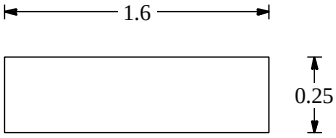
TRIAL PIT LOG

Project	Client	TRIAL PIT No
Land to the North West of Haverhill	c/o Savills	TP8

Job No	Date	Ground Level (m)	Co-Ordinates ()
995,SI	30-10-14 30-10-14		

Fieldwork By	Logged By	Sheet
GEL	SG	1 of 1

Depth	DESCRIPTION	Legend	Depth	No	Remarks/Tests
0.00-0.30	TOPSOIL (Dark grey brown clay with frequent fine to medium gravel of flint, chalk and occasional gravel of brick fragments)				Groundwater not encountered during excavation No collapse of sidewalls during excavation
0.30-1.05	Firm becoming stiff dark yellow brown gravelly CLAY. Gravel is fine to coarse flint and chalk (LOWESTOFT FORMATION) 0.60 - Becoming dark yellow brown/pale grey mottled with occasional cobble of chalk 0.80 - Becoming pale grey				Trial pit completed at 1.05m depth



Shoring/Support: NONE
Stability: STABLE

All dimensions in metres Scale 1:20.8333333333333	Method Trial Pit/trench	Plant Used MECHANICAL EXCAVATOR	Checked By AD

GEL AGS TP BETA 995,SI - NW HAVERHILL, 31-10-14, LF,SG.GPJ GINT STD AGS 3_1.GDT 11/12/14

Geosphere Environmental Ltd
Brightwell Barns, Ipswich Road
Birghtwell, Suffolk, IP10 0BJ
Telephone: 01603 298 076
Fax: 01603 298 075

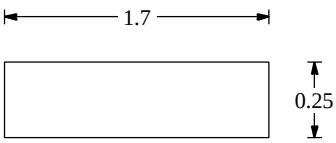
TRIAL PIT LOG

Project	Client	TRIAL PIT No
Land to the North West of Haverhill	c/o Savills	TP9

Job No	Date	Ground Level (m)	Co-Ordinates ()
995,SI	30-10-14 30-10-14		

Fieldwork By	Logged By	Sheet
GEL	SG	1 of 1

Depth	DESCRIPTION	Legend	Depth	No	Remarks/Tests
0.00-0.30	TOPSOIL (Dark grey brown clay with frequent fine to medium gravel of flint, chalk and occasional coarse gravel of brick fragments)				Groundwater not encountered during excavation No collapse of sidewalls during excavation
0.30-0.70	Firm dark brown CLAY with occasional fine to coarse gravel of flint (HEAD DEPOSITS)				
0.70-1.50	Firm becoming stiff dark yellow brown gravelly CLAY. Gravel of fine to coarse flint and chalk (LOWESTOFT FORMATION)				Trial pit completed at 1.5m depth



Shoring/Support: NONE
Stability: STABLE

All dimensions in metres Scale 1:20.8333333333333	Method Trial Pit/trench	Plant Used MECHANICAL EXCAVATOR	Checked By AD

GEL AGS TP BETA 995,SI - NW HAVERHILL, 31-10-14, LF,SG.GPJ GINT STD AGS 3_1.GDT 11/12/14

Geosphere Environmental Ltd
Brightwell Barns, Ipswich Road
Birghtwell, Suffolk, IP10 0BJ
Telephone: 01603 298 076
Fax: 01603 298 075

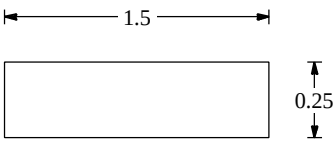
TRIAL PIT LOG

Project	Client	TRIAL PIT No
Land to the North West of Haverhill	c/o Savills	TP10

Job No	Date	Ground Level (m)	Co-Ordinates ()
995,SI	30-10-14 30-10-14		

Fieldwork By	Logged By	Sheet
GEL	SG	1 of 1

Depth	DESCRIPTION	Legend	Depth	No	Remarks/Tests
0.00-0.30	TOPSOIL (Dark grey brown clay with frequent fine to medium gravel of flint, chalk and occasional coarse gravel of brick)				Groundwater not encountered during excavation No collapse of sidewalls during excavation
0.30-0.70	Firm dark brown CLAY with occasional fine to coarse gravel of flint (HEAD DEPOSITS)				
0.70-1.40	Firm becoming stiff dark yellow brown gravelly CLAY. Gravel is fine to coarse flint and chalk (LOWESTOFT FORMATION) 0.95 - Becoming pale grey/dark yellow brown mottled				Trial pit completed at 1.4m depth



Shoring/Support: NONE
Stability: STABLE

All dimensions in metres Scale 1:20.8333333333333	Method Trial Pit/trench	Plant Used MECHANICAL EXCAVATOR	Checked By AD

GEL AGS TP BETA 995,SI - NW HAVERHILL, 31-10-14, LF,SG.GPJ GINT STD AGS 3_1.GDT 11/12/14

Geosphere Environmental Ltd
Brightwell Barns, Ipswich Road
Birghtwell, Suffolk, IP10 0BJ
Telephone: 01603 298 076
Fax: 01603 298 075

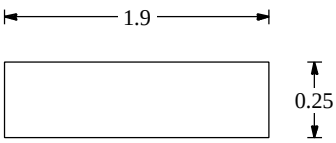
TRIAL PIT LOG

Project	Client	TRIAL PIT No
Land to the North West of Haverhill	c/o Savills	TP11

Job No	Date	Ground Level (m)	Co-Ordinates ()
995,SI	30-10-14 30-10-14		

Fieldwork By	Logged By	Sheet
GEL	SG	1 of 1

Depth	DESCRIPTION	Legend	Depth	No	Remarks/Tests
0.00-0.30	TOPSOIL (Dark grey brown clay with frequent fine to medium gravel of flint, chalk and occasional coarse gravel of brick fragments)				Groundwater not encountered during excavation No collapse of sidewalls during excavation
0.30-1.30	Firm becoming stiff dark yellow brown CLAY with frequent fine to coarse gravel of flint and chalk (LOWESTOFT FORMATION)				Trial pit completed at 1.3m depth



Shoring/Support: NONE
Stability: STABLE

All dimensions in metres Scale 1:20.8333333333333	Method Trial Pit/trench	Plant Used MECHANICAL EXCAVATOR	Checked By AD

GEL AGS TP BETA 995,SI - NW HAVERHILL, 31-10-14, LF,SG.GPJ GINT STD AGS 3_1.GDT 11/12/14

Geosphere Environmental Ltd
Brightwell Barns, Ipswich Road
Birghtwell, Suffolk, IP10 0BJ
Telephone: 01603 298 076
Fax: 01603 298 075

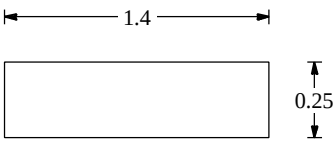
TRIAL PIT LOG

Project	Client	TRIAL PIT No
Land to the North West of Haverhill	c/o Savills	TP12

Job No	Date	Ground Level (m)	Co-Ordinates ()
995,SI	30-10-14 30-10-14		

Fieldwork By	Logged By	Sheet
GEL	SG	1 of 1

Depth	DESCRIPTION	Legend	Depth	No	Remarks/Tests
0.00-0.35	TOPSOIL (Dark grey brown clay with frequent fine to medium gravel of flint, chalk and occasional coarse gravel of brick fragments)				Groundwater not encountered during excavation No collapse of sidewalls during excavation
0.35-1.40	Firm becoming stiff dark yellow brown gravelly CLAY. Gravel is fine to coarse flint and chalk (LOWESTOFT FORMATION) 0.80 - Becoming dark yellow brown/pale grey mottled				Trial pit completed at 1.4m depth



Shoring/Support: NONE
Stability: STABLE

All dimensions in metres Scale 1:20.8333333333333	Method Trial Pit/trench	Plant Used MECHANICAL EXCAVATOR	Checked By AD

GEL AGS TP BETA 995,SI - NW HAVERHILL, 31-10-14, LF,SG.GPJ GINT STD AGS 3_1.GDT 11/12/14

Geosphere Environmental Ltd
Brightwell Barns, Ipswich Road
Birghtwell, Suffolk, IP10 0BJ
Telephone: 01603 298 076
Fax: 01603 298 075

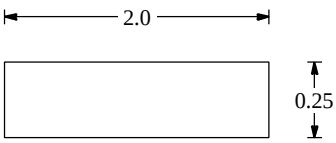
TRIAL PIT LOG

Project	Client	TRIAL PIT No
Land to the North West of Haverhill	c/o Savills	TP13

Job No	Date	Ground Level (m)	Co-Ordinates ()
995,SI	30-10-14 30-10-14		

Fieldwork By	Logged By	Sheet
GEL	SG	1 of 1

Depth	DESCRIPTION	Legend	Depth	No	Remarks/Tests
0.00-0.25	TOPSOIL (Dark grey brown clay with frequent fine to medium gravel of flint, chalk and occasional coarse gravel of brick fragments)				Groundwater not encountered during excavation
0.25-1.40	Firm becoming stiff dark yellow brown CLAY with frequent fine to coarse gravel of chalk and flint (LOWESTOFT FORMATION)				No collapse of sidewalls during excavation
			0.70-0.80	1B	Moisture content, CBR
	0.80 - Becoming dark grey/dark yellow brown mottled				
	0.90 - With occasional cobble of flint and chalk				
					Trial pit completed at 1.4m depth



Shoring/Support: NONE
Stability: STABLE

All dimensions in metres Scale 1:20.8333333333333	Method Trial Pit/trench	Plant Used MECHANICAL EXCAVATOR	Checked By AD

GEL AGS TP BETA 995,SI - NW HAVERHILL, 31-10-14, LF,SG.GPJ GINT STD AGS 3_1.GDT 11/12/14

Geosphere Environmental Ltd
Brightwell Barns, Ipswich Road
Birghtwell, Suffolk, IP10 0BJ
Telephone: 01603 298 076
Fax: 01603 298 075

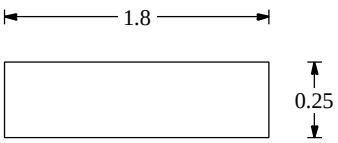
TRIAL PIT LOG

Project	Client	TRIAL PIT No
Land to the North West of Haverhill	c/o Savills	TP14

Job No	Date	Ground Level (m)	Co-Ordinates ()
995,SI	31-10-14 31-10-14		

Fieldwork By	Logged By	Sheet
GEL	LF	1 of 1

Depth	DESCRIPTION	Legend	Depth	No	Remarks/Tests
0.00-0.30	TOPSOIL (Dark brown slightly gravelly clay with occasional rootlets. Gravel of angular to subrounded fine to coarse flint and occasional fine brick and charcoal fragments)				Groundwater not encountered during excavation No collapse of sidewalls during excavation
0.30-1.40	Firm becoming stiff orange brown gravelly CLAY. Gravel of subrounded to rounded fine to coarse chalk and angular to subrounded fine to coarse flint (LOWESTOFT FORMATION)				
	1.00 - Becoming pale brown				
					Trial pit completed at 1.4m depth



Shoring/Support: NONE
Stability: STABLE

All dimensions in metres Scale 1:20.8333333333333	Method Trial Pit/trench	Plant Used MECHANICAL EXCAVATOR	Checked By AD

GEL AGS TP BETA 995,SI - NW HAVERHILL, 31-10-14, LF,SG.GPJ GINT STD AGS 3_1.GDT 11/12/14

Geosphere Environmental Ltd
Brightwell Barns, Ipswich Road
Birghtwell, Suffolk, IP10 0BJ
Telephone: 01603 298 076
Fax: 01603 298 075

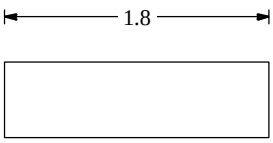
TRIAL PIT LOG

Project	Client	TRIAL PIT No
Land to the North West of Haverhill	c/o Savills	TP15

Job No	Date	Ground Level (m)	Co-Ordinates ()
995,SI	31-10-14 31-10-14		

Fieldwork By	Logged By	Sheet
GEL	LF	1 of 1

Depth	DESCRIPTION	Legend	Depth	No	Remarks/Tests
0.00-0.25	TOPSOIL (Dark brown slightly gravelly clay with occasional rootlets. Gravel of angular to subrounded fine to coarse flint and occasional fine brick and charcoal fragments				Groundwater not encountered during excavation No collapse of sidewalls during excavation
0.25-1.10	Firm becoming stiff brown gravelly CLAY. Gravel of subrounded to rounded fine to coarse chalk and angular to subrounded fine to coarse flint (LOWESTOFT FORMATION) 0.50 - With occasional cobbles of chalk 0.70 - Becoming brown/grey mottled				Trial pit completed at 1.1m depth



Shoring/Support: NONE
Stability: STABLE

All dimensions in metres Scale 1:20.8333333333333	Method Trial Pit/trench	Plant Used MECHANICAL EXCAVATOR	Checked By AD

GEL AGS TP BETA 995,SI - NW HAVERHILL, 31-10-14, LF,SG.GPJ GINT STD AGS 3_1.GDT 11/12/14

Geosphere Environmental Ltd
Brightwell Barns, Ipswich Road
Birghtwell, Suffolk, IP10 0BJ
Telephone: 01603 298 076
Fax: 01603 298 075

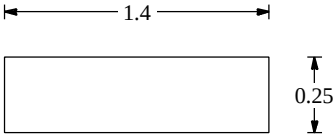
TRIAL PIT LOG

Project	Client	TRIAL PIT No
Land to the North West of Haverhill	c/o Savills	TP16

Job No	Date	Ground Level (m)	Co-Ordinates ()
995,SI	31-10-14 31-10-14		

Fieldwork By	Logged By	Sheet
GEL	LF	1 of 1

Depth	DESCRIPTION	Legend	Depth	No	Remarks/Tests
0.00-0.30	TOPSOIL (Dark brown slightly gravelly clay with occasional rootlets. Gravel of angular to subrounded fine to coarse flint and occasional fine brick and charcoal fragments				Groundwater not encountered during excavation No collapse of sidewalls during excavation
0.30-1.40	Firm becoming stiff orange brown gravelly CLAY. Gravel of subrounded to rounded fine to coarse chalk and angular to subrounded fine to coarse flint (LOWESTOFT FORMATION) 0.70 - With a cobble of metamorphic material 0.90 - Becoming brown/grey mottled 1.00 - With occasional iron oxide staining				Trial pit completed at 1.4m depth



Shoring/Support: NONE
Stability: STABLE

All dimensions in metres Scale 1:20.8333333333333	Method Trial Pit/trench	Plant Used MECHANICAL EXCAVATOR	Checked By AD

GEL AGS TP BETA 995,SI - NW HAVERHILL, 31-10-14, LF,SG.GPJ GINT STD AGS 3_1.GDT 11/12/14

Geosphere Environmental Ltd
Brightwell Barns, Ipswich Road
Birghtwell, Suffolk, IP10 0BJ
Telephone: 01603 298 076
Fax: 01603 298 075

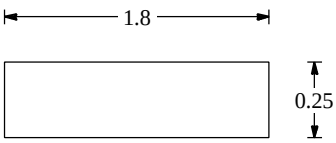
TRIAL PIT LOG

Project	Client	TRIAL PIT No
Land to the North West of Haverhill	c/o Savills	TP17

Job No	Date	Ground Level (m)	Co-Ordinates ()
995,SI	31-10-14 31-10-14		

Fieldwork By	Logged By	Sheet
GEL	LF	1 of 1

Depth	DESCRIPTION	Legend	Depth	No	Remarks/Tests
0.00-0.30	TOPSOIL (Dark brown slightly gravelly clay with occasional rootlets. Gravel of fine to coarse angular to subrounded flint and occasional fine charcoal fragments)				Groundwater not encountered during excavation No collapse of sidewalls during excavation
0.30-1.40	Firm becoming stiff yellow brown gravelly CLAY. Gravel of subrounded to rounded fine to coarse chalk and angular to subrounded fine to coarse flint (LOWESTOFT FORMATION) 0.80 - Becoming yellow brown/grey mottled				Trial pit completed at 1.4m depth



Shoring/Support: NONE
Stability: STABLE

All dimensions in metres Scale 1:20.8333333333333	Method Trial Pit/trench	Plant Used MECHANICAL EXCAVATOR	Checked By AD

GEL AGS TP BETA 995,SI - NW HAVERHILL, 31-10-14, LF,SG.GPJ GINT STD AGS 3_1.GDT 11/12/14

Geosphere Environmental Ltd
Brightwell Barns, Ipswich Road
Birghtwell, Suffolk, IP10 0BJ
Telephone: 01603 298 076
Fax: 01603 298 075

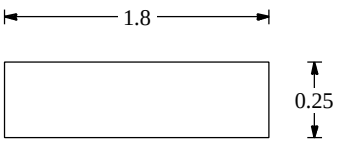
TRIAL PIT LOG

Project	Client	TRIAL PIT No
Land to the North West of Haverhill	c/o Savills	TP18

Job No	Date	Ground Level (m)	Co-Ordinates ()
995,SI	31-10-14 31-10-14		

Fieldwork By	Logged By	Sheet
GEL	LF	1 of 1

Depth	DESCRIPTION	Legend	Depth	No	Remarks/Tests
0.00-0.30	TOPSOIL (Dark brown slightly gravelly clay with occasional rootlets. Gravel of fine to coarse angular to subrounded flint and occasional fine charcoal fragments				Groundwater not encountered during excavation No collapse of sidewalls during excavation
0.30-1.50	Firm becoming stiff yellow brown gravelly CLAY. Gravel of fine to coarse subrounded to rounded chalk and angular to subrounded fine to coarse flint (LOWESTOFT FORMATION)				Trial pit completed at 1.5m depth



Shoring/Support: NONE
Stability: STABLE

All dimensions in metres Scale 1:20.8333333333333	Method Trial Pit/trench	Plant Used MECHANICAL EXCAVATOR	Checked By AD

GEL AGS TP BETA 995,SI - NW HAVERHILL, 31-10-14, LF,SG.GPJ GINT STD AGS 3_1.GDT 11/12/14

Geosphere Environmental Ltd
Brightwell Barns, Ipswich Road
Birghtwell, Suffolk, IP10 0BJ
Telephone: 01603 298 076
Fax: 01603 298 075

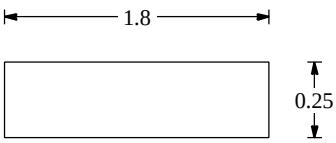
TRIAL PIT LOG

Project	Client	TRIAL PIT No
Land to the North West of Haverhill	c/o Savills	TP19

Job No	Date	Ground Level (m)	Co-Ordinates ()
995,SI	31-10-14 31-10-14		

Fieldwork By	Logged By	Sheet
GEL	LF	1 of 1

Depth	DESCRIPTION	Legend	Depth	No	Remarks/Tests
0.00-0.25	TOPSOIL (Dark brown slightly gravelly clay with occasional rootlets. Gravel of fine to coarse angular to subrounded flint and occasional fine charcoal fragments)				Groundwater not encountered during excavation No collapse of sidewalls during excavation
0.25-1.50	Firm becoming stiff yellow brown gravelly CLAY. Gravel of subrounded to rounded fine to coarse chalk and angular to subrounded fine to coarse flint (LOWESTOFT FORMATION) 0.90 - Becoming grey/brown mottled				Trial completed at 1.5m depth



Shoring/Support: NONE
Stability: STABLE

All dimensions in metres Scale 1:20.8333333333333	Method Trial Pit/trench	Plant Used MECHANICAL EXCAVATOR	Checked By AD

GEL AGS TP BETA 995,SI - NW HAVERHILL, 31-10-14, LF,SG.GPJ GINT STD AGS 3_1.GDT 11/12/14

Geosphere Environmental Ltd
Brightwell Barns, Ipswich Road
Birghtwell, Suffolk, IP10 0BJ
Telephone: 01603 298 076
Fax: 01603 298 075

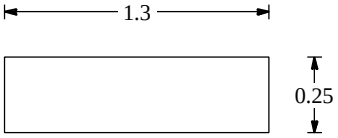
TRIAL PIT LOG

Project	Client	TRIAL PIT No
Land to the North West of Haverhill	c/o Savills	TP20

Job No	Date	Ground Level (m)	Co-Ordinates ()
995,SI	18-11-14 18-11-14		

Fieldwork By	Logged By	Sheet
GEL	LF	1 of 1

Depth	DESCRIPTION	Legend	Depth	No	Remarks/Tests
0.00-0.30	TOPSOIL (Dark grey brown slightly gravelly silty clay. Gravel of fine to coarse angular to sub rounded flint)				No collapse of sidewalls during excavation
0.30-1.45	Firm yellow brown grey CLAY. Gravel of angular to subrounded fine to coarse flint and subrounded fine to coarse chalk (LOWESTOFT FORMATION)				
	0.60 - Becoming brown/grey mottled				
	1.00 - With frequent iron oxide staining				
					Seepage inflow of water at 1.45 m Trial completed at 1.45m depth



Shoring/Support: NONE
Stability: STABLE

All dimensions in metres Scale 1:20.8333333333333	Method Trial Pit/trench	Plant Used MECHANICAL EXCAVATOR	Checked By AD

GEL AGS TP BETA 995,SI - NW HAVERHILL, 31-10-14, LF.SG.GPJ GINT STD AGS 3_1.GDT 11/12/14

Geosphere Environmental Ltd
Brightwell Barns, Ipswich Road
Birghtwell, Suffolk, IP10 0BJ
Telephone: 01603 298 076
Fax: 01603 298 075

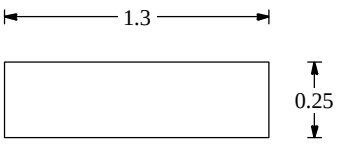
TRIAL PIT LOG

Project	Client	TRIAL PIT No
Land to the North West of Haverhill	c/o Savills	TP21

Job No	Date	Ground Level (m)	Co-Ordinates ()
995,SI	18-11-14 18-11-14		

Fieldwork By	Logged By	Sheet
GEL	LF	1 of 1

Depth	DESCRIPTION	Legend	Depth	No	Remarks/Tests
0.00-0.30	TOPSOIL (Dark grey brown slightly gravelly silty clay. Gravel of fine to coarse angular to sub rounded flint)				Groundwater not encountered during excavation No collapse of sidewalls during excavation
0.30-1.35	Firm becoming stiff brown gravelly CLAY. Gravel of angular to subrounded fine to coarse flint and subrounded to rounded fine to coarse chalk (LOWESTOFT FORMATION)				
	1.00 - Becoming light brown				
					Trial completed at 1.35m depth



Shoring/Support: NONE
Stability: STABLE

All dimensions in metres Scale 1:20.8333333333333	Method Trial Pit/trench	Plant Used MECHANICAL EXCAVATOR	Checked By AD

GEL AGS TP BETA 995,SI - NW HAVERHILL, 31-10-14, LF.SG.GPJ GINT STD AGS 3_1.GDT 11/12/14

Geosphere Environmental Ltd
Brightwell Barns, Ipswich Road
Birghtwell, Suffolk, IP10 0BJ
Telephone: 01603 298 076
Fax: 01603 298 075

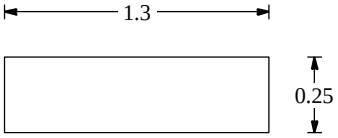
TRIAL PIT LOG

Project	Client	TRIAL PIT No
Land to the North West of Haverhill	c/o Savills	TP22

Job No	Date	Ground Level (m)	Co-Ordinates ()
995,SI	18-11-14 18-11-14		

Fieldwork By	Logged By	Sheet
GEL	LF	1 of 1

Depth	DESCRIPTION	Legend	Depth	No	Remarks/Tests
0.00-0.30	TOPSOIL (Dark grey brown slightly gravelly silty clay. Gravel of fine to coarse angular to sub rounded flint)				Groundwater not encountered during excavation No collapse of sidewalls during excavation
0.30-1.45	Firm orange brown Clay (HEAD DEPOSITS) 1.30 - Becoming sandy				Trial completed at 1.45m depth



Shoring/Support: NONE
Stability: STABLE

All dimensions in metres Scale 1:20.8333333333333	Method Trial Pit/trench	Plant Used MECHANICAL EXCAVATOR	Checked By AD

GEL AGS TP BETA 995,SI - NW HAVERHILL, 31-10-14, LF.SG.GPJ GINT STD AGS 3_1.GDT 11/12/14

Geosphere Environmental Ltd
Brightwell Barns, Ipswich Road
Birghtwell, Suffolk, IP10 0BJ
Telephone: 01603 298 076
Fax: 01603 298 075

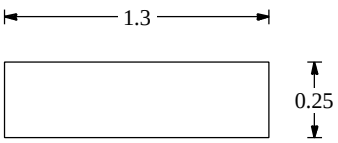
TRIAL PIT LOG

Project	Client	TRIAL PIT No
Land to the North West of Haverhill	c/o Savills	TP23

Job No	Date	Ground Level (m)	Co-Ordinates ()
995,SI	18-11-14 18-11-14		

Fieldwork By	Logged By	Sheet
GEL	LF	1 of 1

Depth	DESCRIPTION	Legend	Depth	No	Remarks/Tests
0.00-0.30	TOPSOIL (Dark brown slightly gravelly clay with rootlets. Gravel of angular to subrounded fine to medium flint)				
					No collapse of sidewalls during excavation
0.30-1.50	Firm orange brown slightly gravelly CLAY. Gravel of angular to subrounded fine to medium flint and chalk (LOWESTOFT FORMATION)				
	1.00 - Becoming slightly sandy with frequent gravel				
					Seepage inflow of water at 1.2 m
					Trial completed at 1.5m depth



Shoring/Support: NONE
Stability: STABLE

All dimensions in metres Scale 1:20.8333333333333	Method Trial Pit/trench	Plant Used MECHANICAL EXCAVATOR	Checked By AD

GEL AGS TP BETA 995,SI - NW HAVERHILL, 31-10-14, LF.SG.GPJ GINT STD AGS 3_1.GDT 11/12/14

Geosphere Environmental Ltd
Brightwell Barns, Ipswich Road
Birghtwell, Suffolk, IP10 0BJ
Telephone: 01603 298 076
Fax: 01603 298 075

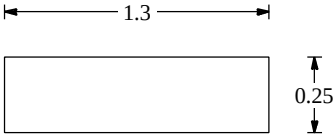
TRIAL PIT LOG

Project	Client	TRIAL PIT No
Land to the North West of Haverhill	c/o Savills	TP24

Job No	Date	Ground Level (m)	Co-Ordinates ()
995,SI	18-11-14 18-11-14		

Fieldwork By	Logged By	Sheet
GEL	LF	1 of 1

Depth	DESCRIPTION	Legend	Depth	No	Remarks/Tests
0.00-0.28	TOPSOIL (Dark brown slightly gravelly clay with rootlets. Gravel of angular to subrounded fine to medium flint)				Groundwater not encountered during excavation No collapse of sidewalls during excavation
0.28-1.20	Firm becoming stiff brown gravelly CLAY. Gravel of angular to subrounded fine to coarse flint with frequent subrounded fine to coarse chalk (LOWESTOFT FORMATION)				
	1.00 - Becoming grey/brown mottled				
					Trial completed at 1.2m depth



Shoring/Support: NONE
Stability: STABLE

All dimensions in metres Scale 1:20.8333333333333	Method Trial Pit/trench	Plant Used MECHANICAL EXCAVATOR	Checked By AD

GEL AGS TP BETA 995,SI - NW HAVERHILL, 31-10-14, LF,SG.GPJ GINT STD AGS 3_1.GDT 11/12/14

Geosphere Environmental Ltd
Brightwell Barns, Ipswich Road
Birghtwell, Suffolk, IP10 0BJ
Telephone: 01603 298 076
Fax: 01603 298 075

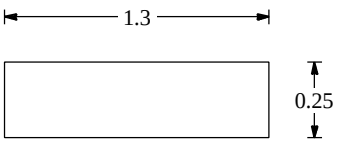
TRIAL PIT LOG

Project	Client	TRIAL PIT No
Land to the North West of Haverhill	c/o Savills	TP25

Job No	Date	Ground Level (m)	Co-Ordinates ()
995,SI	18-11-14 18-11-14		

Fieldwork By	Logged By	Sheet
GEL	SG	1 of 1

Depth	DESCRIPTION	Legend	Depth	No	Remarks/Tests
0.00-0.30	TOPSOIL (Brown slightly sandy clay with occasional fine to medium gravel of flint and flint)				
0.30-1.40	Firm becoming stiff brown CLAY with occasional fine to coarse gravel of flint and chalk (LOWESTOFT FORMATION)				No collapse of sidewalls during excavation Perched inflow of water at 0.3 m
	0.80 - Becoming pale grey/orange brown mottled				
					Trial completed at 1.4m depth



Shoring/Support: NONE
Stability: STABLE

All dimensions in metres Scale 1:20.8333333333333	Method Trial Pit/trench	Plant Used MECHANICAL EXCAVATOR	Checked By AD

GEL AGS TP BETA 995,SI - NW HAVERHILL, 31-10-14, LF,SG.GPJ GINT STD AGS 3_1.GDT 11/12/14

Geosphere Environmental Ltd
Brightwell Barns, Ipswich Road
Birghtwell, Suffolk, IP10 0BJ
Telephone: 01603 298 076
Fax: 01603 298 075

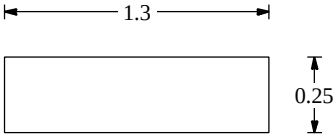
TRIAL PIT LOG

Project	Client	TRIAL PIT No
Land to the North West of Haverhill	c/o Savills	TP26

Job No	Date	Ground Level (m)	Co-Ordinates ()
995,SI	18-11-14 18-11-14		

Fieldwork By	Logged By	Sheet
GEL	LF	1 of 1

Depth	DESCRIPTION	Legend	Depth	No	Remarks/Tests
0.00-0.20	TOPSOIL (Brown slightly sandy clay with occasional fine to medium gravel of flint and flint)				
0.20-1.20	Firm becoming stiff orange brown gravelly CLAY. Gravel of angular to rounded fine to coarse flint with frequent chalk (LOWESTOFT FORMATION)				No collapse of sidewalls during excavation
	0.90 - Becoming grey/brown mottled				
					Perched inflow of water at 1.2 m Trial completed at 1.2m depth



Shoring/Support: NONE
Stability: STABLE

All dimensions in metres Scale 1:20.8333333333333	Method Trial Pit/trench	Plant Used MECHANICAL EXCAVATOR	Checked By AD

GEL AGS TP BETA 995,SI - NW HAVERHILL, 31-10-14, LF.SG.GPJ GINT STD AGS 3_1.GDT 11/12/14

Geosphere Environmental Ltd
Brightwell Barns, Ipswich Road
Birghtwell, Suffolk, IP10 0BJ
Telephone: 01603 298 076
Fax: 01603 298 075

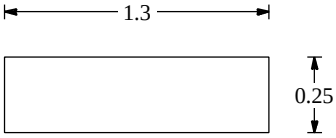
TRIAL PIT LOG

Project	Client	TRIAL PIT No
Land to the North West of Haverhill	c/o Savills	TP27

Job No	Date	Ground Level (m)	Co-Ordinates ()
995,SI	18-11-14 18-11-14		

Fieldwork By	Logged By	Sheet
GEL	LF	1 of 1

Depth	DESCRIPTION	Legend	Depth	No	Remarks/Tests
0.00-0.20	TOPSOIL (Brown slightly sandy clay with occasional fine to medium gravel of flint and flint)				Groundwater not encountered during excavation
0.20-1.45	Firm becoming stiff yellow brown gravelly CLAY. Gravel of angular to subrounded fine to coarse flint with frequent subrounded to rounded fine to coarse gravel and cobbles of chalk (LOWESTOFT FORMATION)				No collapse of sidewalls during excavation
	0.80 - Becoming grey/brown mottled				
					Trial completed at 1.45m depth



Shoring/Support: NONE
Stability: STABLE

All dimensions in metres Scale 1:20.8333333333333	Method Trial Pit/trench	Plant Used MECHANICAL EXCAVATOR	Checked By AD

GEL AGS TP BETA 995,SI - NW HAVERHILL, 31-10-14, LF.SG.GPJ GINT STD AGS 3_1.GDT 11/12/14

Geosphere Environmental Ltd
Brightwell Barns, Ipswich Road
Birghtwell, Suffolk, IP10 0BJ
Telephone: 01603 298 076
Fax: 01603 298 075

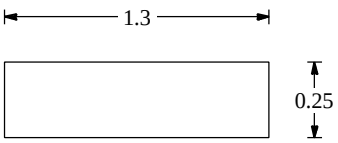
TRIAL PIT LOG

Project	Client	TRIAL PIT No
Land to the North West of Haverhill	c/o Savills	TP28

Job No	Date	Ground Level (m)	Co-Ordinates ()
995,SI	19-11-14 19-11-14		

Fieldwork By	Logged By	Sheet
GEL	SG	1 of 1

Depth	DESCRIPTION	Legend	Depth	No	Remarks/Tests
0.00-0.30	TOPSOIL (Dark grey brown slightly sandy clay with occasional fine gravel of flint)				Groundwater not encountered during excavation No collapse of sidewalls during excavation
0.30-1.50	Firm dark orange brown gravelly CLAY. Gravel of fine to coarse flint and chalk (HEAD DEPOSITS) 0.60 - becoming very gravelly 1.10 - with cobble of flint				Trial completed at 1.5m depth



Shoring/Support: NONE
Stability: STABLE

All dimensions in metres Scale 1:20.8333333333333	Method Trial Pit/trench	Plant Used MECHANICAL EXCAVATOR	Checked By AD

GEL AGS TP BETA 995,SI - NW HAVERHILL, 31-10-14, LF,SG.GPJ GINT STD AGS 3_1.GDT 11/12/14

Geosphere Environmental Ltd
Brightwell Barns, Ipswich Road
Birghtwell, Suffolk, IP10 0BJ
Telephone: 01603 298 076
Fax: 01603 298 075

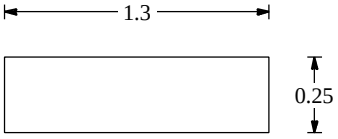
TRIAL PIT LOG

Project	Client	TRIAL PIT No
Land to the North West of Haverhill	c/o Savills	TP29

Job No	Date	Ground Level (m)	Co-Ordinates ()
995,SI	19-11-14 19-11-14		

Fieldwork By	Logged By	Sheet
GEL	SG	1 of 1

Depth	DESCRIPTION	Legend	Depth	No	Remarks/Tests
0.00-0.25	TOPSOIL (Dark grey brown slightly sandy clay with occasional fine gravel of flint)				Groundwater not encountered during excavation
0.25-0.60	Firm dark orange brown slightly sandy CLAY with occasional fine to coarse gravel of chalk and flint (HEAD DEPOSITS)				No collapse of sidewalls during excavation
0.60-1.20	Firm becoming stiff pale grey brown/orange brown mottled very gravelly CLAY. Gravel of fine to coarse flint and chalk (HEAD DEPOSITS)		0.70-0.80	1B	CBR
1.20-1.50	Stiff pale grey/pale orange brown mottled gravelly CLAY. Gravel of fine to coarse chalk (LOWESTOFT FORMATION)				
					Trial completed at 1.5m depth



Shoring/Support: NONE
Stability: STABLE

All dimensions in metres Scale 1:20.8333333333333	Method Trial Pit/trench	Plant Used MECHANICAL EXCAVATOR	Checked By AD

GEL AGS TP BETA 995,SI - NW HAVERHILL, 31-10-14, LF,SG.GPJ GINT STD AGS 3_1.GDT 11/12/14

Geosphere Environmental Ltd
Brightwell Barns, Ipswich Road
Birghtwell, Suffolk, IP10 0BJ
Telephone: 01603 298 076
Fax: 01603 298 075

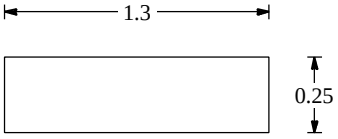
TRIAL PIT LOG

Project	Client	TRIAL PIT No
Land to the North West of Haverhill	c/o Savills	TP30

Job No	Date	Ground Level (m)	Co-Ordinates ()
995,SI	19-11-14 19-11-14		

Fieldwork By	Logged By	Sheet
GEL	SG	1 of 1

Depth	DESCRIPTION	Legend	Depth	No	Remarks/Tests
0.00-0.20	TOPSOIL (Dark grey brown slightly sandy clay with occasional fine gravel of flint)				Groundwater not encountered during excavation
0.20-0.60	Firm dark orange brown slightly sandy CLAY (HEAD DEPOSITS)		0.20 0.40	1J 2J	No collapse of sidewalls during excavation
0.60-1.50	Stiff pale grey/dark orange brown mottled gravelly CLAY. Gravel of fine to coarse chalk with occasional fine to medium flint (LOWESTOFT FORMATION)				
					Trial completed at 1.5m depth



Shoring/Support: NONE
Stability: STABLE

All dimensions in metres Scale 1:20.8333333333333	Method Trial Pit/trench	Plant Used MECHANICAL EXCAVATOR	Checked By AD

GEL AGS TP BETA 995,SI - NW HAVERHILL, 31-10-14, LF,SG.GPJ GINT STD AGS 3_1.GDT 11/12/14

Geosphere Environmental Ltd
Brightwell Barns, Ipswich Road
Birghtwell, Suffolk, IP10 0BJ
Telephone: 01603 298 076
Fax: 01603 298 075

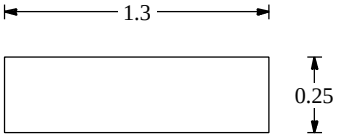
TRIAL PIT LOG

Project	Client	TRIAL PIT No
Land to the North West of Haverhill	c/o Savills	TP31

Job No	Date	Ground Level (m)	Co-Ordinates ()
995,SI	19-11-14 19-11-14		

Fieldwork By	Logged By	Sheet
GEL	SG	1 of 1

Depth	DESCRIPTION	Legend	Depth	No	Remarks/Tests
0.00-0.30	TOPSOIL (Dark grey brown slightly sandy clay with occasional fine gravel of flint)				Groundwater not encountered during excavation
			0.20	1J	No collapse of sidewalls during excavation
0.30-0.65	Firm becoming stiff pale grey/yellow brown mottled gravelly CLAY. Gravel of fine to medium chalk and flint (LOWESTOFT FORMATION)				
0.65-1.50	Stiff dark grey gravelly CLAY. Gravel of fine to medium flint (LOWESTOFT FORMATION)		0.70	2J	
					Trial completed at 1.5m depth



Shoring/Support: NONE
Stability: STABLE

All dimensions in metres Scale 1:20.8333333333333	Method Trial Pit/trench	Plant Used MECHANICAL EXCAVATOR	Checked By AD

GEL AGS TP BETA 995,SI - NW HAVERHILL, 31-10-14, LF,SG.GPJ GINT STD AGS 3_1.GDT 11/12/14

Geosphere Environmental Ltd
Brightwell Barns, Ipswich Road
Birghtwell, Suffolk, IP10 0BJ
Telephone: 01603 298 076
Fax: 01603 298 075

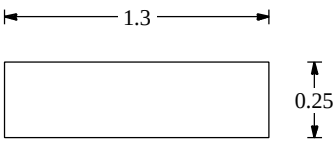
TRIAL PIT LOG

Project	Client	TRIAL PIT No
Land to the North West of Haverhill	c/o Savills	TP32

Job No	Date	Ground Level (m)	Co-Ordinates ()
995,SI	19-11-14 19-11-14		

Fieldwork By	Logged By	Sheet
GEL	SG	1 of 1

Depth	DESCRIPTION	Legend	Depth	No	Remarks/Tests
0.00-0.35	TOPSOIL (Dark grey brown slightly sandy clay with occasional fine gravel of flint)				Groundwater not encountered during excavation No collapse of sidewalls during excavation
0.35-1.50	Firm becoming stiff pale grey/yellow brown mottled gravelly CLAY. Gravel is fine to medium chalk with occasional fine to medium flint (LOWESTOFT FORMATION)				
					Trial completed at 1.5m depth



Shoring/Support: NONE
Stability: STABLE

All dimensions in metres Scale 1:20.8333333333333	Method Trial Pit/trench	Plant Used MECHANICAL EXCAVATOR	Checked By AD

GEL AGS TP BETA 995,SI - NW HAVERHILL, 31-10-14, LF,SG.GPJ GINT STD AGS 3_1.GDT 11/12/14

Geosphere Environmental Ltd
Brightwell Barns, Ipswich Road
Birghtwell, Suffolk, IP10 0BJ
Telephone: 01603 298 076
Fax: 01603 298 075

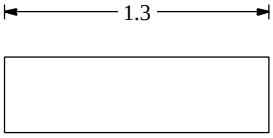
TRIAL PIT LOG

Project	Client	TRIAL PIT No
Land to the North West of Haverhill	c/o Savills	TP33

Job No	Date	Ground Level (m)	Co-Ordinates ()
995,SI	19-11-14 19-11-14		

Fieldwork By	Logged By	Sheet
GEL	SG	1 of 1

Depth	DESCRIPTION	Legend	Depth	No	Remarks/Tests
0.00-0.25	TOPSOIL (Dark grey brown slightly sandy clay with occasional fine gravel of flint)				Groundwater not encountered during excavation No collapse of sidewalls during excavation
0.25-1.50	Firm becoming stiff pale grey/yellow brown gravelly CLAY. Gravel is fine to medium chalk with occasional fine to medium flint (LOWESTOFT FORMATION)				
					Trial completed at 1.5m depth



Shoring/Support: NONE
Stability: STABLE

All dimensions in metres Scale 1:20.8333333333333	Method Trial Pit/trench	Plant Used MECHANICAL EXCAVATOR	Checked By AD

GEL AGS TP BETA 995,SI - NW HAVERHILL, 31-10-14, LF,SG.GPJ GINT STD AGS 3_1.GDT 11/12/14

APPENDIX 7 – INFILTRATION TEST RESULTS

DRAFT

BOREHOLE INFILTRATIOIN TEST - BRE DIGEST 365

geosphere environmental ltd
Geosphere Environmental Ltd, Brightwell Barns, Ipswich Road, Brightwell, Suffolk, IP10 0BJ
T 01603 298 076 E info@geosphere-environmental.co.uk

Time [min]	Depth to Water [mbgl]
0	1.48
1	1.48
2	1.48
3	1.48
4	1.48
5	1.48
10	1.48
15	1.48
20	1.48
30	1.48
45	1.48
60	1.48
90	1.48
120	1.48

Borehole Dimensions [m]	
Diameter	Depth
0.101	1.80

Infiltration Rate Calculations		
Parameter	Unit	Result
height		
h_{25}	[m]	1.5600
h_{75}	[m]	1.7200
h_{75}-h_{25}	[m]	0.160
time		
t_{75}	[s]	N/A
t_{25}	[s]	N/A
t_{75} - t_{25}	[s]	N/A
effective volume		
v_{75-25}	[m^3]	1.28E-03
effective area		
ap_{50}	[m^2]	5.88E-02
infiltration rate		
f	[m/s]	N/A

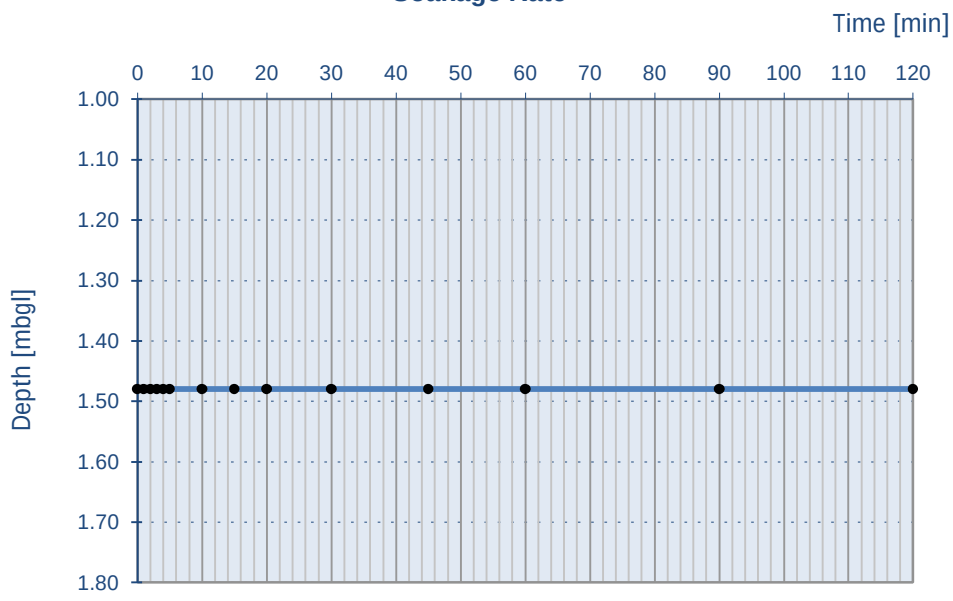
Borehole WS3

Run 1 of 1

Test Date 29/10/2014

Groundwater Encountered at: n/a

Soakage Rate



mbgl - metres below ground level

SITE	CLIENT	REPORT NO	SITE SUPERVISION	CALCULATIONS	CHECKED BY	DATE
NW Haverhill	Savills	995,GI	LF	SG	AD	05 December 2014

C:\Geocloud\Shared\GeoCloud\Reports\995,SI, NW Haverhill, Savills, 08-10-14, SG\GEL Report\Soak\995,SI - BHFH Soak - WS3

BOREHOLE INFILTRATIOIN TEST - BRE DIGEST 365

geosphere environmental ltd
Geosphere Environmental Ltd, Brightwell Barns, Ipswich Road, Brightwell, Suffolk, IP10 0BJ
T 01603 298 076 E info@geosphere-environmental.co.uk

Time [min]	Depth to Water [mbgl]
0	1.41
1	1.41
2	1.41
3	1.41
4	1.41
5	1.41
10	1.41
15	1.41
20	1.41
30	1.41
45	1.41
60	1.41
90	1.41
120	1.41

Borehole Dimensions [m]	
Diameter	Depth
0.101	1.89

Infiltration Rate Calculations		
Parameter	Unit	Result
height		
h_{25}	[m]	1.5300
h_{75}	[m]	1.7700
h_{75}-h_{25}	[m]	0.240
time		
t_{75}	[s]	N/A
t_{25}	[s]	N/A
t_{75} - t_{25}	[s]	N/A
effective volume		
v_{75-25}	[m^3]	1.93E-03
effective area		
ap_{50}	[m^2]	8.41E-02
infiltration rate		
f	[m/s]	N/A

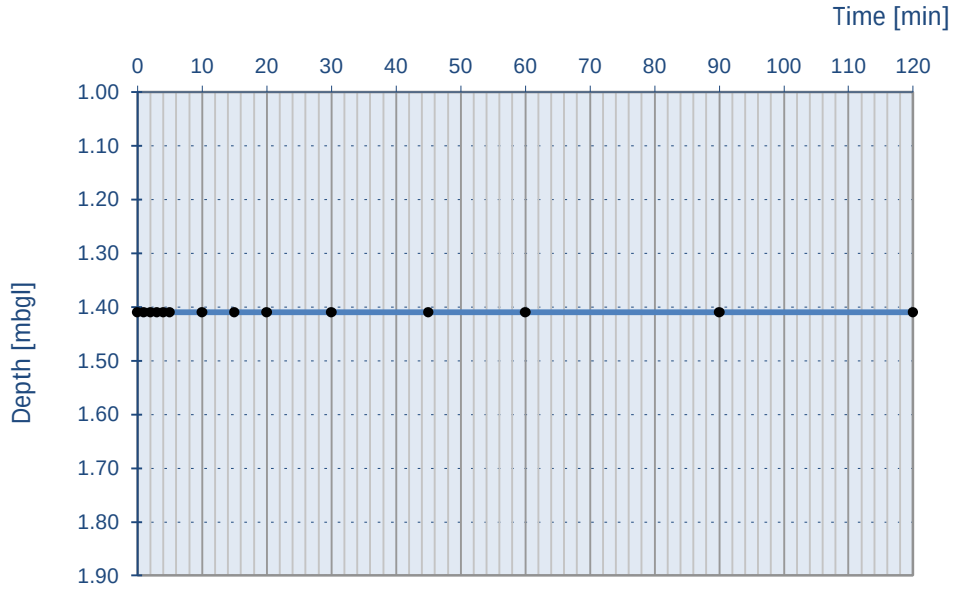
Borehole WS6

Run 1 of 1

Test Date 29/10/2014

Groundwater Encountered at: n/a

Soakage Rate



mbgl - metres below ground level

SITE	CLIENT	REPORT NO	SITE SUPERVISION	CALCULATIONS	CHECKED BY	DATE
NW Haverhill	Savills	995,GI	LF	SG	AD	05 December 2014

C:\Geocloud\Shared\GeoCloud\Reports\995,SI, NW Haverhill, Savills, 08-10-14, SG\GEL Report\Soak\995,SI - BHFH Soak - WS6

BOREHOLE INFILTRATIOIN TEST - BRE DIGEST 365

geosphere environmental ltd
Geosphere Environmental Ltd, Brightwell Barns, Ipswich Road, Brightwell, Suffolk, IP10 0BJ
T 01603 298 076 E info@geosphere-environmental.co.uk

Time [min]	Depth to Water [mbgl]
0	1.58
1	1.58
2	1.56
3	1.56
4	1.56
5	1.56
10	1.56
15	1.56
20	1.56
30	1.56
45	1.56
60	1.56
90	1.56
120	1.56

Borehole Dimensions [m]	
Diameter	Depth
0.101	2.00

Infiltration Rate Calculations		
Parameter	Unit	Result
height		
h_{25}	[m]	1.6500
h_{75}	[m]	1.8500
h_{75}-h_{25}	[m]	0.200
time		
t_{75}	[s]	N/A
t_{25}	[s]	N/A
t_{75} - t_{25}	[s]	N/A
effective volume		
v_{75-25}	[m^3]	1.61E-03
effective area		
ap_{50}	[m^2]	8.73E-02
infiltration rate		
f	[m/s]	N/A

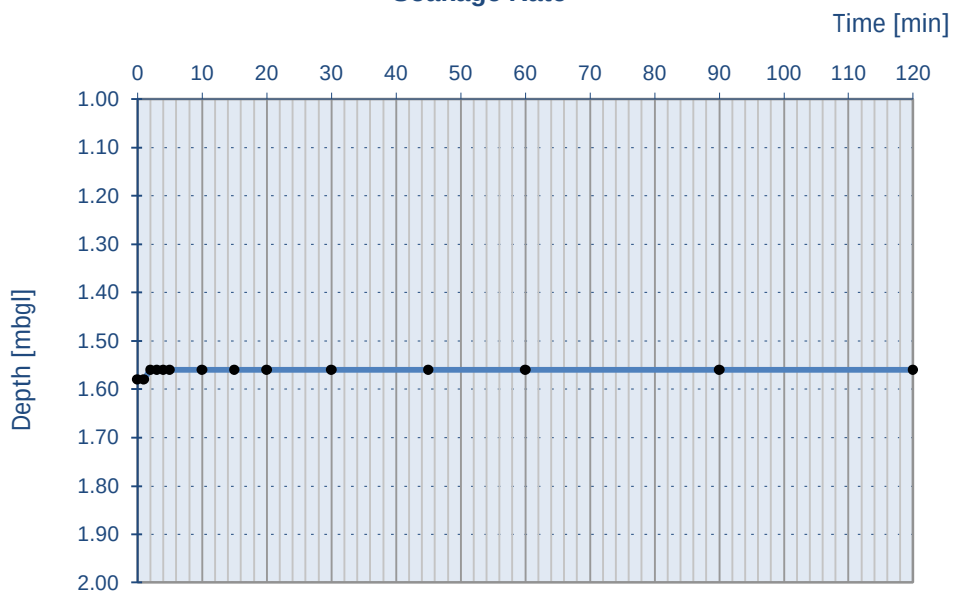
Borehole WS8

Run 1 of 1

Test Date 29/10/2014

Groundwater Encountered at: n/a

Soakage Rate



mbgl - metres below ground level

SITE	CLIENT	REPORT NO	SITE SUPERVISION	CALCULATIONS	CHECKED BY	DATE
NW Haverhill	Savills	995,GI	LF	SG	AD	05 December 2014

C:\Geocloud\Shared\GeoCloud\Reports\995,SI, NW Haverhill, Savills, 08-10-14, SG\GEL Report\Soak\995,SI - BHFH Soak - WS8

BOREHOLE INFILTRATIOIN TEST - BRE DIGEST 365

geosphere environmental ltd
Geosphere Environmental Ltd, Brightwell Barns, Ipswich Road, Brightwell, Suffolk, IP10 0BJ
T 01603 298 076 E info@geosphere-environmental.co.uk

Time [min]	Depth to Water [mbgl]
0	0.15
1	0.15
2	0.15
3	0.15
4	0.15
5	0.15
10	0.15
15	0.15
20	0.15
30	0.15
45	0.15
60	0.15
90	0.15
120	0.15

Borehole Dimensions [m]	
Diameter	Depth
0.101	1.68

Infiltration Rate Calculations		
Parameter	Unit	Result
height		
h_{25}	[m]	0.5325
h_{75}	[m]	1.2975
h_{75}-h_{25}	[m]	0.765
time		
t_{75}	[s]	N/A
t_{25}	[s]	N/A
t_{75} - t_{25}	[s]	N/A
effective volume		
v_{75-25}	[m^3]	6.14E-03
effective area		
ap_{50}	[m^2]	2.51E-01
infiltration rate		
f	[m/s]	N/A

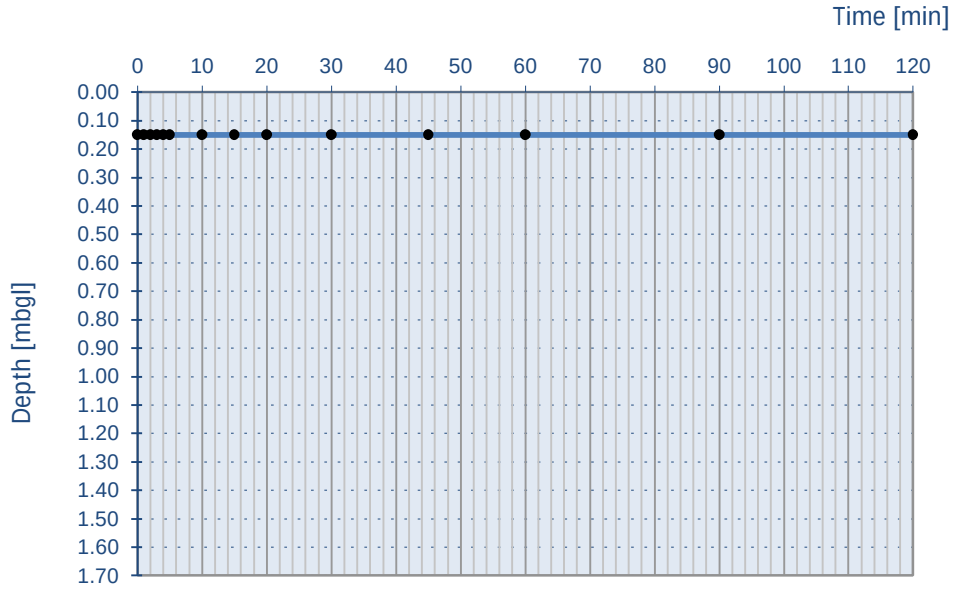
Borehole WS12

Run 1 of 1

Test Date 30/10/2014

Groundwater Encountered at: n/a

Soakage Rate



mbgl - metres below ground level

SITE	CLIENT	REPORT NO	SITE SUPERVISION	CALCULATIONS	CHECKED BY	DATE
NW Haverhill	Savills	995,GI	LF	SG	AD	05 December 2014

C:\Geocloud\Shared\GeoCloud\Reports\995,SI, NW Haverhill, Savills, 08-10-14, SG\GEL Report\Soak\995,SI - BHFH Soak - WS12

BOREHOLE INFILTRATIOIN TEST - BRE DIGEST 365

geosphere environmental ltd
Geosphere Environmental Ltd, Brightwell Barns, Ipswich Road, Brightwell, Suffolk, IP10 0BJ
T 01603 298 076 E info@geosphere-environmental.co.uk

Time [min]	Depth to Water [mbgl]
0	0.70
1	0.70
2	0.70
3	0.70
4	0.70
5	0.70
10	0.70
15	0.70
20	0.70
30	0.70
45	0.70
60	0.70
90	0.70
120	0.70

Borehole Dimensions [m]	
Diameter	Depth
0.101	1.97

Infiltration Rate Calculations		
Parameter	Unit	Result
height		
h_{25}	[m]	1.0250
h_{75}	[m]	1.6750
h_{75}-h_{25}	[m]	0.650
time		
t_{75}	[s]	N/A
t_{25}	[s]	N/A
t_{75} - t_{25}	[s]	N/A
effective volume		
v_{75-25}	[m^3]	5.22E-03
effective area		
ap_{50}	[m^2]	2.05E-01
infiltration rate		
f	[m/s]	N/A

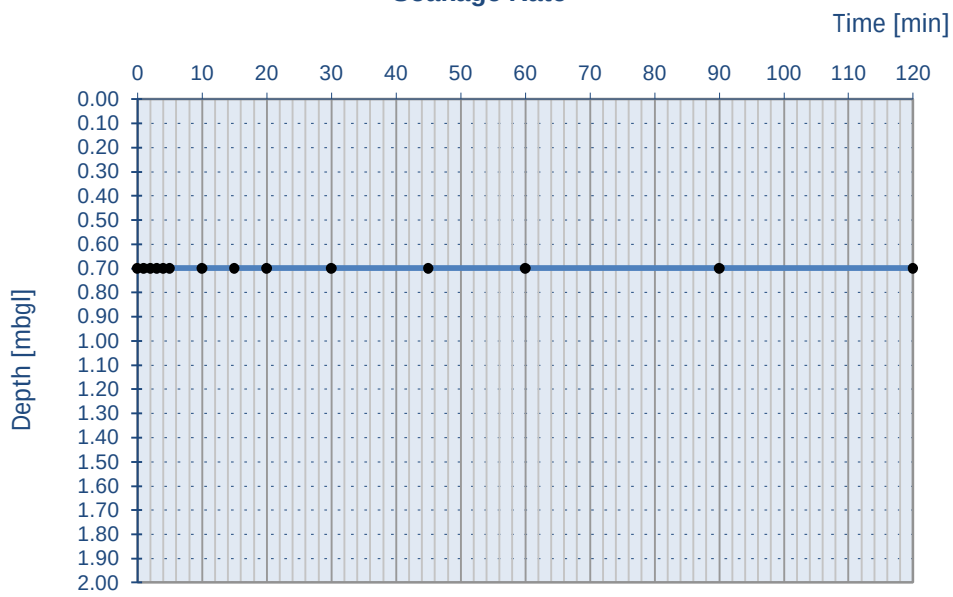
Borehole WS14

Run 1 of 1

Test Date 30/10/2014

Groundwater Encountered at: n/a

Soakage Rate



mbgl - metres below ground level

SITE	CLIENT	REPORT NO	SITE SUPERVISION	CALCULATIONS	CHECKED BY	DATE
NW Haverhill	Savills	995,GI	LF	SG	AD	05 December 2014

C:\Geocloud\Shared\GeoCloud\Reports\995,SI, NW Haverhill, Savills, 08-10-14, SG\GEL Report\Soak\995,SI - BHFH Soak - WS14

BOREHOLE INFILTRATIOIN TEST - BRE DIGEST 365

geosphere environmental ltd
Geosphere Environmental Ltd, Brightwell Barns, Ipswich Road, Brightwell, Suffolk, IP10 0BJ
T 01603 298 076 E info@geosphere-environmental.co.uk

Time [min]	Depth to Water [mbgl]
0	0.900
1	0.900
2	0.900
3	0.900
4	0.900
5	0.900
10	0.900
15	0.900
20	0.905
30	0.905
45	0.905
60	0.905
90	0.905
120	0.905

Borehole Dimensions [m]	
Diameter	Depth
0.101	2.00

Infiltration Rate Calculations		
Parameter	Unit	Result
height		
h_{25}	[m]	1.1737
h_{75}	[m]	1.7250
h_{75}-h_{25}	[m]	0.551
time		
t_{75}	[s]	N/A
t_{25}	[s]	N/A
t_{75} - t_{25}	[s]	N/A
effective volume		
v_{75-25}	[m^3]	4.43E-03
effective area		
ap_{50}	[m^2]	1.83E-01
infiltration rate		
f	[m/s]	N/A

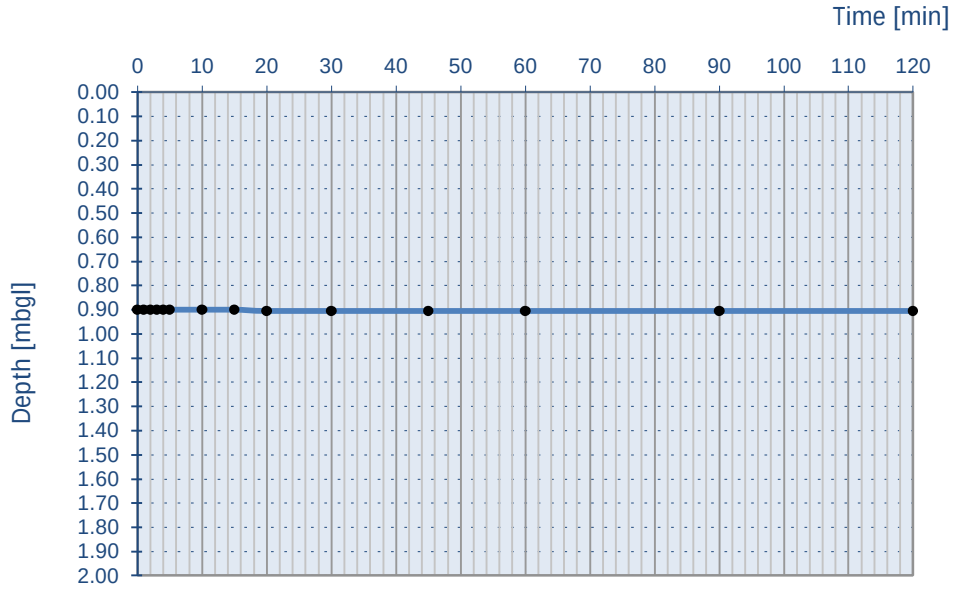
Borehole WS15

Run 1 of 1

Test Date 30/10/2014

Groundwater Encountered at: n/a

Soakage Rate



mbgl - metres below ground level

SITE	CLIENT	REPORT NO	SITE SUPERVISION	CALCULATIONS	CHECKED BY	DATE
NW Haverhill	Savills	995,GI	LF	SG	AD	05 December 2014

C:\Geocloud\Shared\GeoCloud\Reports\995,SI, NW Haverhill, Savills, 08-10-14, SG\GEL Report\Soak\995,SI - BHFH Soak - WS15

BOREHOLE INFILTRATIOIN TEST - BRE DIGEST 365

geosphere environmental ltd
Geosphere Environmental Ltd, Brightwell Barns, Ipswich Road, Brightwell, Suffolk, IP10 0BJ
T 01603 298 076 E info@geosphere-environmental.co.uk

Time [min]	Depth to Water [mbgl]
0	0.69
1	0.69
2	0.69
3	0.69
4	0.69
5	0.69
10	0.69
15	0.69
20	0.69
30	0.69
45	0.69
60	0.69
90	0.69
120	0.69

Borehole Dimensions [m]	
Diameter	Depth
0.101	2.00

Infiltration Rate Calculations		
Parameter	Unit	Result
height		
h_{25}	[m]	1.0175
h_{75}	[m]	1.6725
h_{75}-h_{25}	[m]	0.655
time		
t_{75}	[s]	N/A
t_{25}	[s]	N/A
t_{75} - t_{25}	[s]	N/A
effective volume		
$v_{75\text{-}25}$	[m^3]	5.26E-03
effective area		
ap_{50}	[m^2]	2.16E-01
infiltration rate		
f	[m/s]	N/A

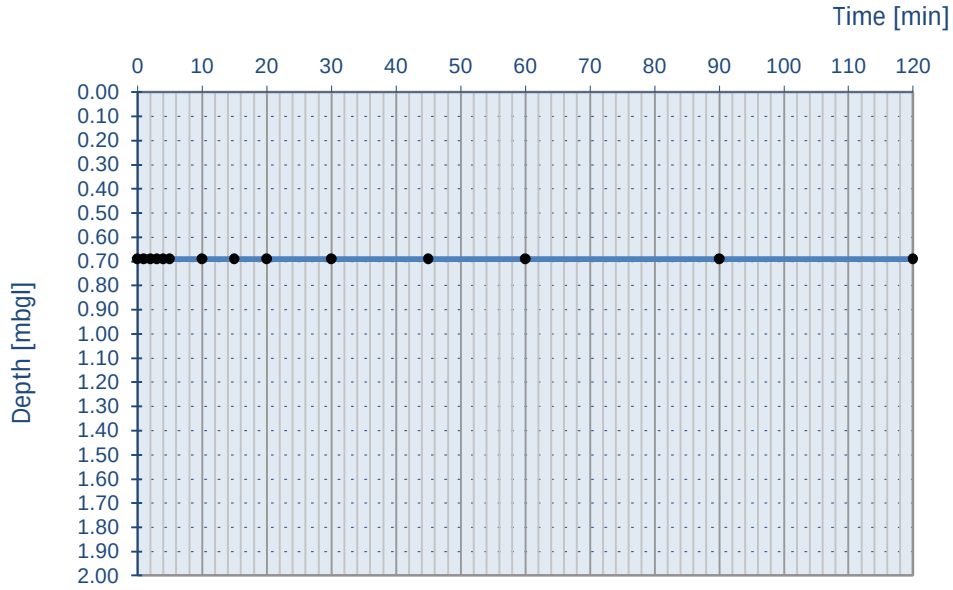
Borehole WSB

Run 1 of 1

Test Date 18/11/2014

Groundwater Encountered at: n/a

Soakage Rate



mbgl - metres below ground level

SITE	CLIENT	REPORT NO	SITE SUPERVISION	CALCULATIONS	CHECKED BY	DATE
NW Haverhill	Savills	995,GI	LF	SG	AD	05 December 2014

C:\Geocloud\Shared\GeoCloud\Reports\995,SI, NW Haverhill, Savills, 08-10-14, SG\GEL Report\Soak\995,SI - BHFH Soak - WSB

BOREHOLE INFILTRATIOIN TEST - BRE DIGEST 365

geosphere environmental ltd
Geosphere Environmental Ltd, Brightwell Barns, Ipswich Road, Brightwell, Suffolk, IP10 0BJ
T 01603 298 076 E info@geosphere-environmental.co.uk

Time [min]	Depth to Water [mbgl]
0	0.550
1	0.550
2	0.550
3	0.560
4	0.560
5	0.560
10	0.560
15	0.560
20	0.570
30	0.580
45	0.595
60	0.600
90	0.610
120	0.620

Borehole Dimensions [m]	
Diameter	Depth
0.101	2.00

Infiltration Rate Calculations		
Parameter	Unit	Result
height		
h_{25}	[m]	0.9125
h_{75}	[m]	1.6375
h_{75}-h_{25}	[m]	0.725
time		
t_{75}	[s]	N/A
t_{25}	[s]	N/A
t_{75} - t_{25}	[s]	N/A
effective volume		
v_{75-25}	[m^3]	5.82E-03
effective area		
ap_{50}	[m^2]	2.38E-01
infiltration rate		
f	[m/s]	N/A

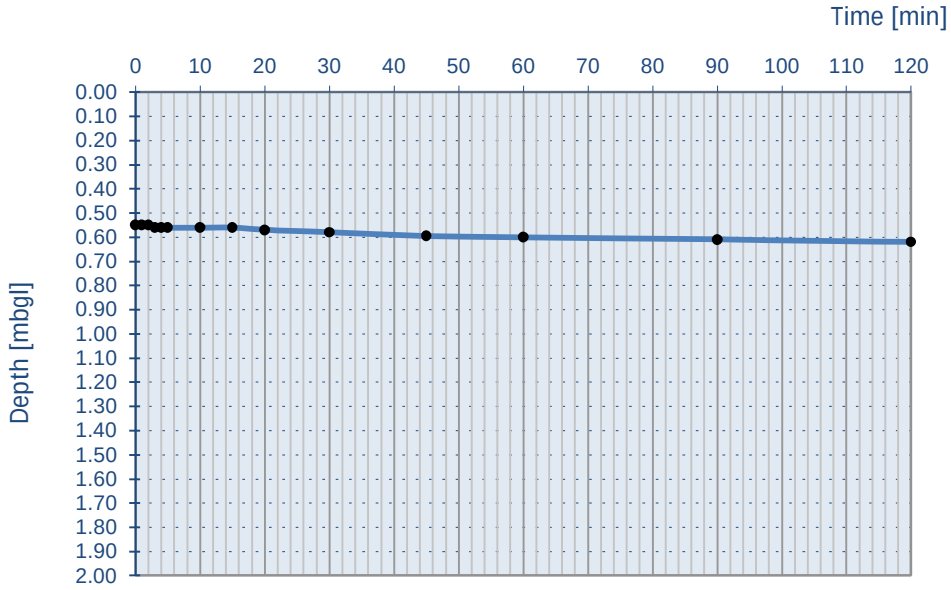
Borehole WSD

Run 1 of 1

Test Date 18/11/2014

Groundwater Encountered at: n/a

Soakage Rate



mbgl - metres below ground level

SITE	CLIENT	REPORT NO	SITE SUPERVISION	CALCULATIONS	CHECKED BY	DATE
NW Haverhill	Savills	995,GI	LF	SG	AD	05 December 2014

C:\Geocloud\Shared\GeoCloud\Reports\995,SI, NW Haverhill, Savills, 08-10-14, SG\GEL Report\Soak\995,SI - BHFH Soak - WSD

BOREHOLE INFILTRATIOIN TEST - BRE DIGEST 365

geosphere environmental ltd
Geosphere Environmental Ltd, Brightwell Barns, Ipswich Road, Brightwell, Suffolk, IP10 0BJ
T 01603 298 076 E info@geosphere-environmental.co.uk

Time [min]	Depth to Water [mbgl]
0	0.730
1	0.750
2	0.760
3	0.765
4	0.765
5	0.770
10	0.790
15	0.800
20	0.810
30	0.830
60	0.870
90	0.900
120	0.930
180	0.970

Borehole Dimensions [m]	
Diameter	Depth
0.090	2.00

Infiltration Rate Calculations		
Parameter	Unit	Result
height		
h_{25}	[m]	1.0475
h_{75}	[m]	1.6825
h_{75}-h_{25}	[m]	0.635
time		
t_{75}	[s]	N/A
t_{25}	[s]	N/A
t_{75} - t_{25}	[s]	N/A
effective volume		
v_{75-25}	[m^3]	4.05E-03
effective area		
ap_{50}	[m^2]	1.86E-01
infiltration rate		
f	[m/s]	N/A

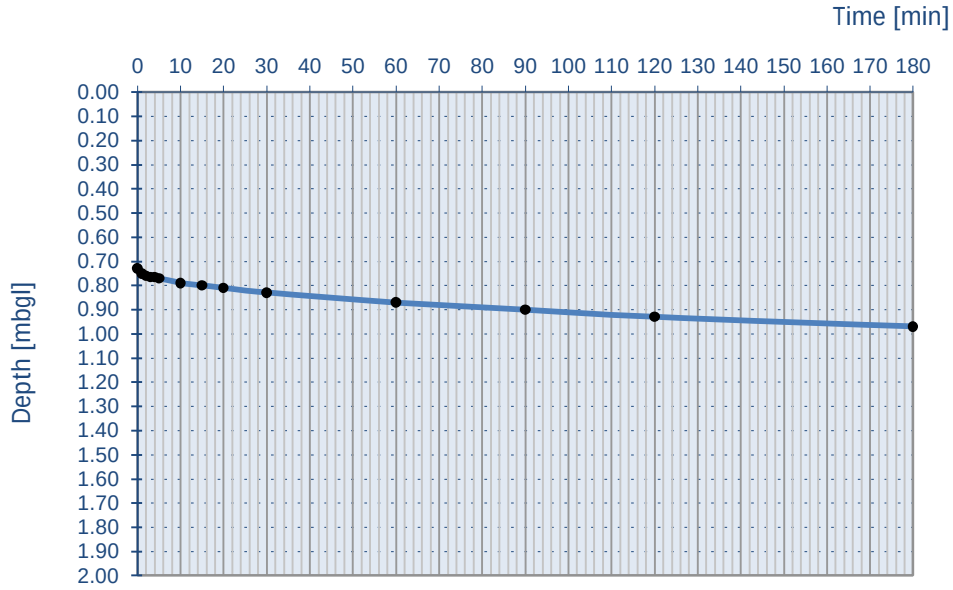
Borehole WSG

Run 1 of 1

Test Date 19/11/2014

Groundwater Encountered at: n/a

Soakage Rate



mbgl - metres below ground level

SITE	CLIENT	REPORT NO	SITE SUPERVISION	CALCULATIONS	CHECKED BY	DATE
NW Haverhill	Savills	995,GI	LF	SG	AD	05 December 2014

C:\Geocloud\Shared\GeoCloud\Reports\995,SI, NW Haverhill, Savills, 08-10-14, SG\GEL Report\Soak\995,SI - BHFH Soak - WSG

BOREHOLE INFILTRATIOIN TEST - BRE DIGEST 365

geosphere environmental ltd
Geosphere Environmental Ltd, Brightwell Barns, Ipswich Road, Brightwell, Suffolk, IP10 0BJ
T 01603 298 076 E info@geosphere-environmental.co.uk

Time [min]	Depth to Water [mbgl]
0	0.24
1	0.26
2	0.36
3	0.43
5	0.48
10	0.63
20	0.68
30	0.69
60	0.68
90	0.68
120	0.68

Borehole Dimensions [m]	
Diameter	Depth
0.090	2.00

Infiltration Rate Calculations		
Parameter	Unit	Result
height		
h_{25}	[m]	0.6050
h_{75}	[m]	1.3350
h_{75}-h_{25}	[m]	0.730
time		
t_{75}	[s]	N/A
t_{25}	[s]	540.00
t_{75} - t_{25}	[s]	N/A
effective volume		
v_{75-25}	[m^3]	4.65E-03
effective area		
ap_{50}	[m^2]	2.97E-01
infiltration rate		
f	[m/s]	N/A

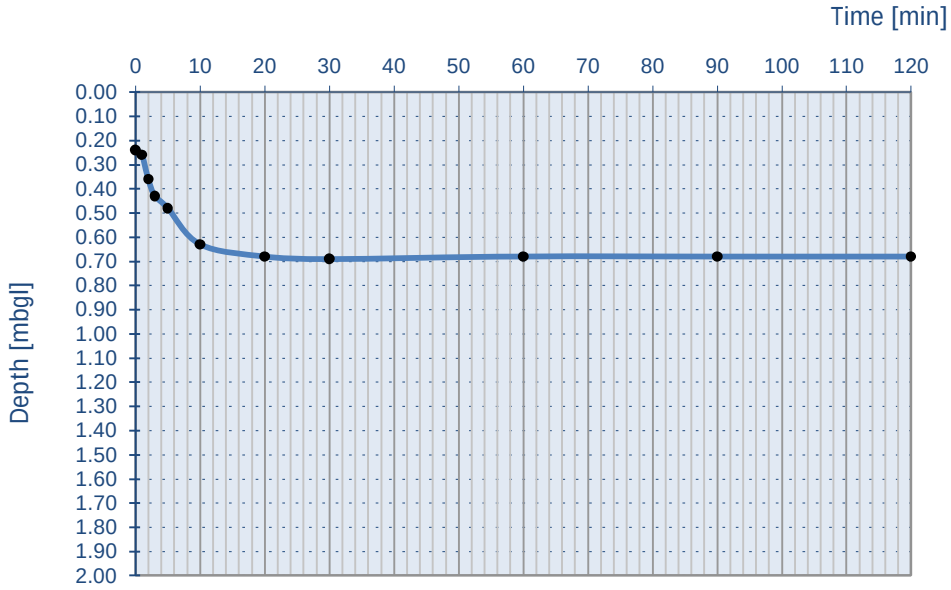
Borehole WSH

Run 1 of 1

Test Date 19/11/2014

Groundwater Encountered at: n/a

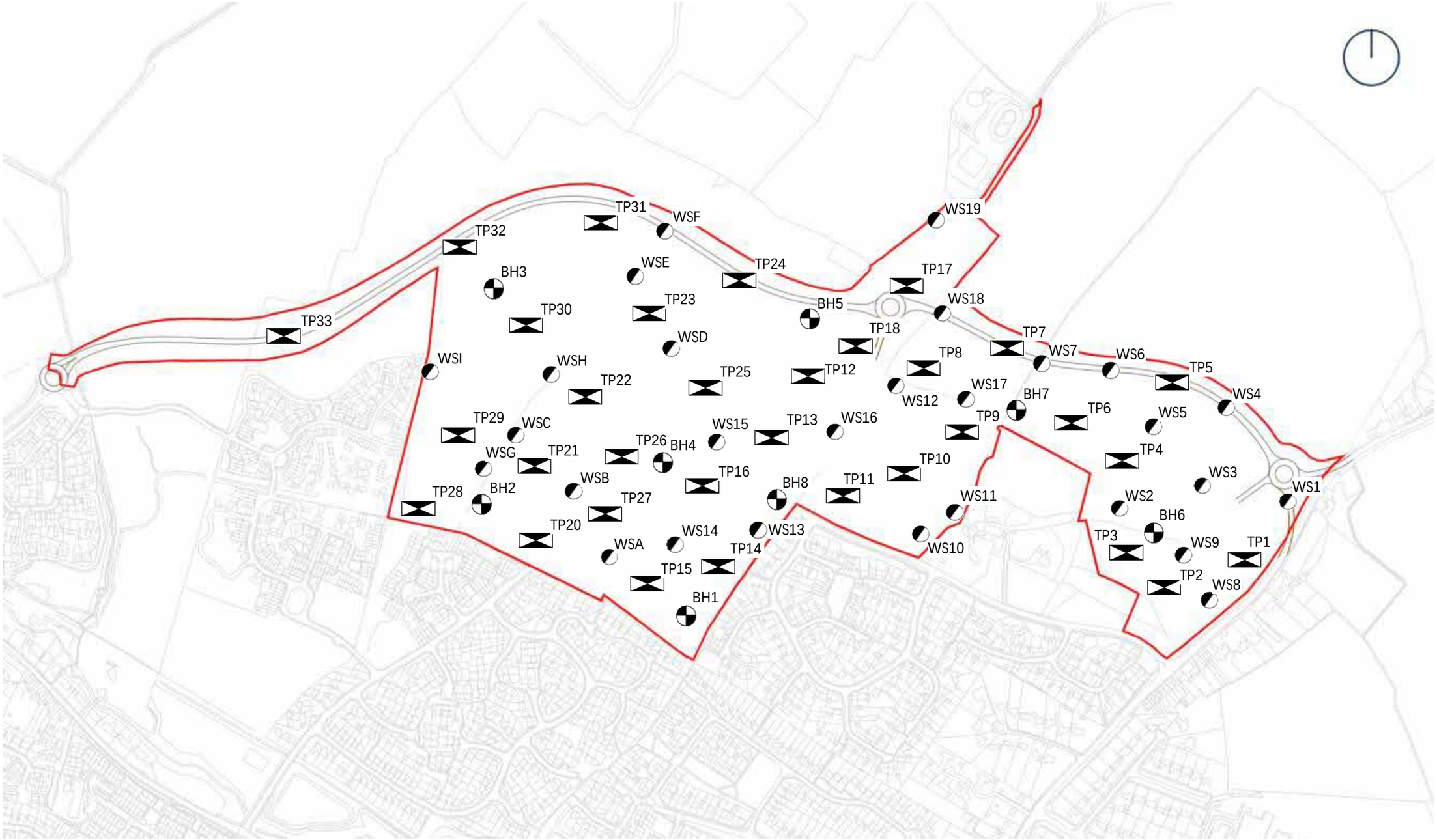
Soakage Rate



mbgl - metres below ground level

SITE	CLIENT	REPORT NO	SITE SUPERVISION	CALCULATIONS	CHECKED BY	DATE
NW Haverhill	Savills	995,GI	LF	SG	AD	05 December 2014

C:\Geocloud\Shared\GeoCloud\Reports\995,SI, NW Haverhill, Savills, 08-10-14, SG\GEL Report\Soak\995,SI - BHFH Soak - WSH



LEGEND:

- Proposed borehole locations
- Proposed window sample locations
- Proposed Trial Pit Locations
- Site Boundary

geosphere environmental ltd

Brightwell Barns, Ipswich Road, Brightwell, Suffolk. IP10 0BJ
T 01603 298 076 E info@geosphere-environmental.co.uk

SITE	TITLE	Ref.	DRAWING NO.	DATE
Land to the north west of Haverhill, Suffolk	Exploratory Hole Location Plan	995,SI	995,SI / Rev 0	December 2014
	CLIENT: c/o Savills	DRAWN BY: SG	CHECKED: AD	SCALE: Not to scale

geosphere environmental ltd

Appendix G

Wormald Burrows Partnership Limited
Civil Engineering Consultants
12a-18a Hitchin Street, Biggleswade, SG18 8AX Tel: (01767) 317244 Fax: (01767) 315434

Haverhill North

Drainage Maintenance Proposals

Road Gullies

The highway drainage system will be offered to Suffolk County Council for adoption. They will then be responsible for the regular maintenance of road gullies and connecting pipework and ensuring that the public highway drains properly.

Any sections of highway which are not adopted will be maintained by either a private management company who will be responsible for the regular maintenance of gullies and connecting pipework and ensuring that that these areas of private highway drain properly or the eventual owners of the properties.

Sewers and Flow Control

The main surface and foul water drainage systems will be offered to Anglian Water for adoption. This will include the flow control devices which will limit surface water flows to an agreed greenfield rate.

Anglian Water will then be responsible for the regular maintenance of these systems which receive flows from all parts of the development.

Attenuation Tank (Geocellular crates)

The attenuation tank is located within the Local Centre parking areas. This element of the sustainable drainage system will be managed by a private management company. The geocellular crates will be fitted with a central access pipe to allow for CCTV surveys and jetting out of the tank. Access manholes are provided at either end for easy access.

The tank has been designed for easy maintenance which will comprise:

Inspect inlet manhole on a monthly basis for the first 6 months, and then 6 monthly after that and identify any areas which are not operating correctly.

Occasional tasks – clean out silt traps and CCTV survey tank annually

Remedial work - repairing damage where necessary

Directors:
G M Burrows
N Kolhi

Associate:
T J Wilson
T J Burrows

Associate Directors:
A C Chipchase
P Whitlock

e-mail: engineer@wormburp.com
Web: http://www.wormburp.com

VAT No. 126 1179 33

Registered office: First Floor Offices, 99 Bancroft, Hitchin, Hertfordshire, SG5 1NQ

Registered in England No. 07838026

afaq ISO 9001 Quality
UKAS MANAGEMENT SYSTEMS 022
Certified by Afnor UK

Attenuation Ponds

The surface water attenuation ponds will ordinarily be dry and should only fill during heavy rainfall events, so will more than often appear as a grassed depression in he public open space rather than a water feature. However, as it is difficult to predict when a heavy rainfall event is likely to occur it is important that the ponds are maintained all year round.

Maintenance will be the responsibility of a private management company and will comprise of the following:

Undertake an inspection of the ponds at annual intervals to assess the stability of the ponds banks and remedial activities carries out when necessary.

Regular litter picking and grass cutting and checking of inlet and outlet headwalls.

De-silting of the inlet and outlet pipes and headwalls should be carried out during a period of low rainfall, at a time that it can be anticipated that major storms will not occur. It should always be noted that the ponds will fill up rapidly over a period of a few hours in the event that a critical storm occurs.

Headwalls

There shall be a pre-cast headwall at each inlet and outlet of each pond, as the ponds; and headwalls form part of a combined system, one headwall being blocked up could prevent the entire system from drainage as desired therefore it is imperative that flows are not impeded by blocked up headwalls.

Maintenance of the headwalls will be the responsibility of a private management company and will comprise of the following:

At quarterly intervals and following extreme storm events; check each headwall and grill for signs of blockage.

At annual intervals; the inlets, connecting pipework and outlets from the pond should be checked and all ends of the pipes are clear of weed growth, silt and debris. Also check that the outfall into the ordinary watercourse is clear and unobstructed.

Remove any accumulated vegetation and rubbish off site.

At annual intervals and following extreme storm events, undertake an assessment of the structural integrity of the headwalls and safety grille and fittings; repair or replace as necessary.