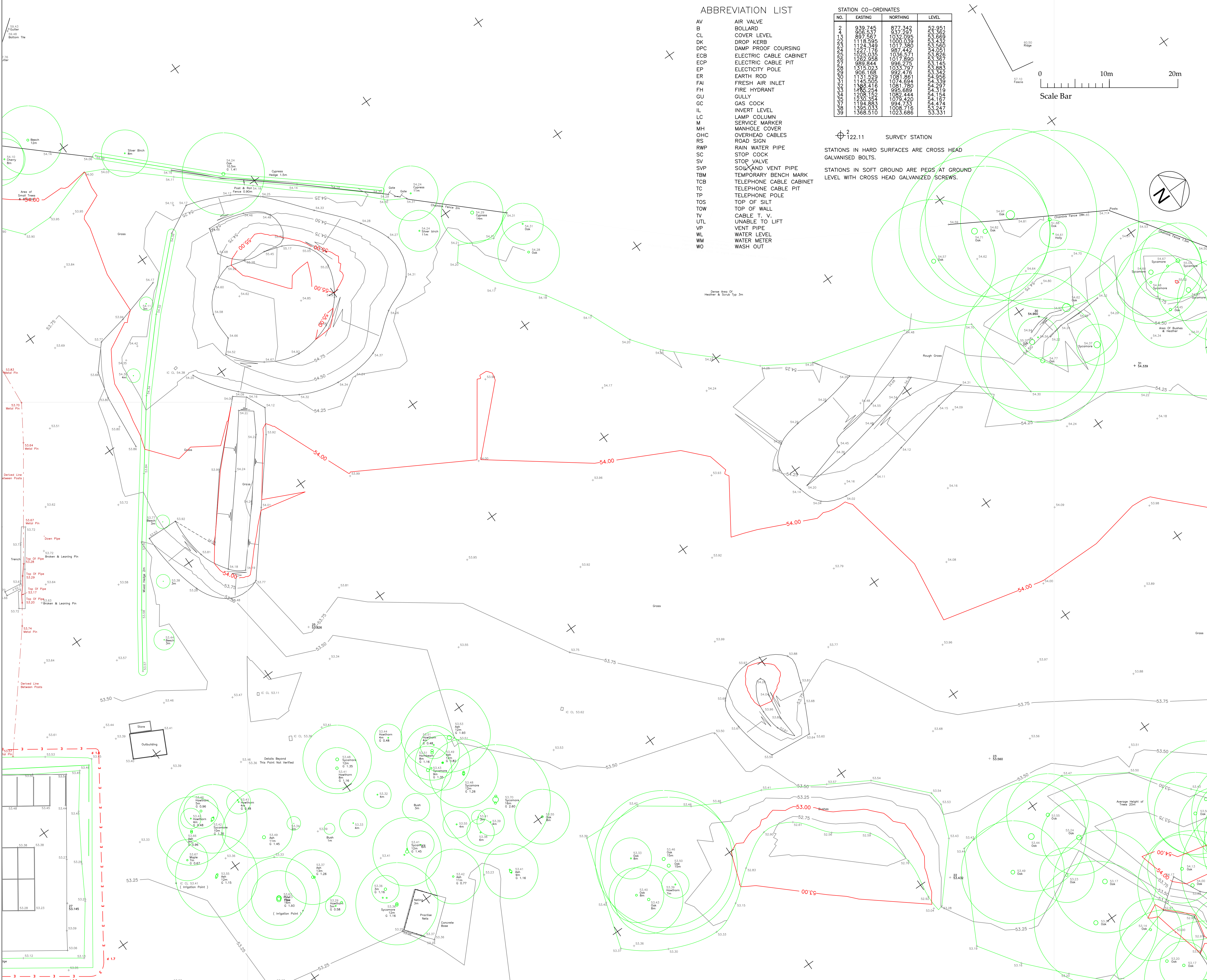


APPENDIX A

SITE SURVEY DRAWINGS



ABBREVIATION LIST

AV	AIR VALVE
B	BOLLARD
CL	COVER LEVEL
DK	DROP KERB
DPC	DAMP PROOF COURSING
ECB	ELECTRIC CABLE CABINET
ECP	ELECTRIC CABLE PIT
EP	ELECTRICITY POLE
ER	EARTH ROD
FAI	FRESH AIR INLET
FH	FIRE HYDRANT
GU	GULLY
GC	GAS COCK
IL	INVERT LEVEL
LC	LAMP COLUMN
M	SERVICE MARKER
MH	MANHOLE COVER
OHC	OVERHEAD CABLES
RS	ROAD SIGN
RWP	RAIN WATER PIPE
SC	STOP COCK
SV	STOP VALVE
SVP	SOIL AND VENT PIPE
TBM	TEMPORARY BENCH MARK
TCC	TELEPHONE CABLE CABINET
TP	TELEPHONE POLE
TOS	TOP OF SILT
TOW	TOP OF WALL
TV	CABLE T. V.
UTL	UNABLE TO LIFT
VP	VENT PIPE
WL	WATER LEVEL
WM	WATER METER
WO	WASH OUT

STATION CO-ORDINATES			
NO.	EASTING	NORTHING	LEVEL
2	939.745	877.342	52.951
4	908.537	937.297	53.362
13	897.567	1032.099	53.669
23	1118.995	1000.039	54.432
24	1124.349	1017.360	53.560
25	1227.176	997.442	54.051
26	1025.035	1036.571	53.826
27	1262.958	1017.890	53.167
28	989.844	996.476	53.145
29	1315.023	1033.797	53.853
30	906.168	892.476	53.347
31	1131.529	1081.861	54.956
32	1145.505	1074.694	54.339
33	1183.416	1081.780	54.297
34	1208.752	1082.689	54.131
35	1230.354	1079.420	54.167
36	1194.683	994.733	54.474
38	1395.033	1008.718	53.247
39	1368.510	1023.686	53.331

122.11 SURVEY STATION

STATIONS IN HARD SURFACES ARE CROSS HEAD GALVANISED BOLTS.

STATIONS IN SOFT GROUND ARE PEGS AT GROUND LEVEL WITH CROSS HEAD GALVANIZED SCREWS.

Notes:

- 1.1 Do not scale from this drawing.
- 1.2 All dimensions are in m unless otherwise specified.
- 1.3 In case of any discrepancies in drawings or details refer to engineer for clarification. Unilateral decisions by the contractor will not be accepted.
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- 1.14 Formation to road/hardstanding to be proof rolled and any soft spots in subgrade of road/Hardstanding areas are to be excavated and replaced with well compacted sub-base or free draining granular material to Department of Transport Specification for Highway Works Part 2' Table 6/1 Class 1 (General Granular Fill) and compacted in accordance with Table 6/4.

PLANNING ISSUE

REV.	DATE	DESCRIPTION	CHK	APP
-	-	-	-	-

Aventus Design Ltd
Unit 5 - Leaches Farm
Business Centre
Bicester Road
Kingswood
Aylesbury
Bucks HP18 0RF
Tel: 01296 770066
Email: mail@aventusdesign.co.uk
Web: www.aventusdesign.co.uk

Client: Sonning Golf Club

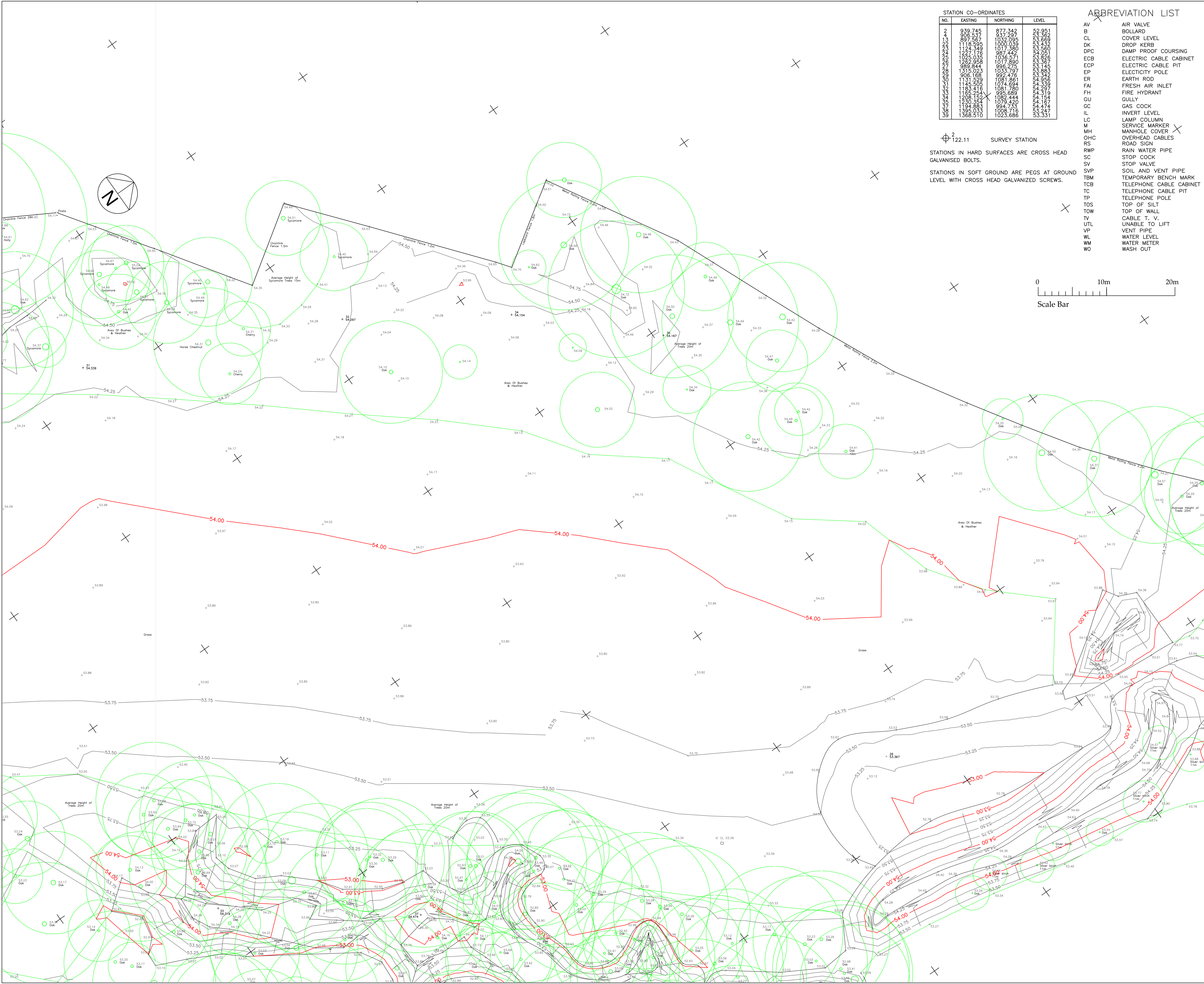
Site: Sonning Golf Club,
Duffield Road, Sonning
RG4 6GJ

Title: Site Survey Sheet 1 of 2

Drawing no. H1620 - 400-1

Issue:	Scale: 1:250 @ A1	Checked: -	Date: -
-	Drw: C.U.	Date: June '26	Approve: -

50mm
100mm
150mm
200mm
250mm
ORIGINAL SIZE - A1



STATION CO-ORDINATES			
NO.	EASTING	NORTHING	LEVEL
2	939.745	877.342	52.951
4	906.537	957.297	53.662
12	897.567	1032.095	53.669
13	1118.595	1000.459	53.651
23	1124.349	1017.360	53.660
24	1227.176	997.442	54.051
25	1025.035	1036.571	53.826
26	1262.958	1017.690	53.367
29	989.844	996.279	53.145
29	1315.023	1033.797	53.883
29	906.168	962.476	53.342
30	1131.529	1081.861	54.956
31	1145.505	1074.694	54.339
32	1183.416	1081.780	54.297
33	1157.294	995.689	54.159
34	1208.252	1082.444	54.159
35	1230.354	1079.420	54.167
37	1194.883	994.753	54.474
38	1395.033	1008.716	53.247
39	1368.510	1023.686	53.331

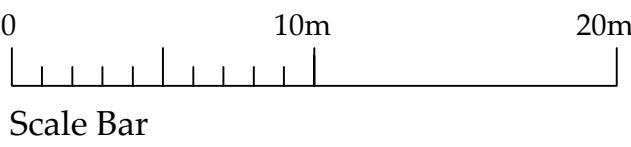
122.11 SURVEY STATION

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ABBREVIATION LIST

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B	BOLLARD
CL	COVER LEVEL
DK	DROP KERB
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ECP	ELECTRIC CABLE PIT
EP	ELECTRICITY POLE
ER	EARTH ROD
FAI	FRESH AIR INLET
FIH	FIRE HYDRANT
GU	GULLY
GC	GAS COCK
IL	INVERT LEVEL
LC	LAMP COLUMN
M	SERVICE MARKER
MH	MANHOLE COVER
OHC	OVERHEAD CABLES
RS	ROAD SIGN
RWP	RAIN WATER PIPE
SC	STOP COCK
SV	STOP VALVE
SVP	SOIL AND VENT PIPE
TBM	TEMPORARY BENCH MARK
TCB	TELEPHONE CABLE CABINET
TC	TELEPHONE CABLE PIT
TP	TELEPHONE POLE
TOS	TOP OF SILT
TOW	TOP OF WALL
TV	CABLE T. V.
UTL	UNABLE TO LIFT
VP	VENT PIPE
WL	WATER LEVEL
WM	WATER METER
WO	WASH OUT



Notes:

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- 1.14 Formation to road/hardstanding to be proof rolled and any soft spots in subgrade of road/Hardstanding areas are to be excavated and replaced with well compacted sub-base or free draining granular material to Department of Transport Specification for Highway Works Part 2' Table 6/1 Class 1 (General Granular Fill) and compacted in accordance with Table 6/4.

Drawing Status **PLANNING ISSUE**

REV.	DATE	DESCRIPTION	CHK	APP
Aventus Design Ltd Unit 5 - Leaches Farm Business Centre Bicester Road Kingswood Aylesbury Bucks HP18 0RF Tel: 01296 770066				
Client: Sonning Golf Club				
Site: Sonning Golf Club, Duffield Road, Sonning RG4 6GJ				
Title: Site Survey Sheet 2 of 2				
Drawing no. H1620 - 400-2				
Issue:	Scale: 1:250 @ A1	Checked: -	Date: -	
-	Drw: C.U.	Date: June '26	Approve: -	Date: -

50mm
100mm
150mm
200mm
250mm
ORIGINAL SIZE - A1

APPENDIX B

EXISTING RUN-OFF CALCULATIONS

Aventus Design Limited		Page 1
Unit 7, Leaches Farm Bus. Ce...		
Bicester Road		
Kingswood, Aylesbury, Bucks ...		
Date 29/07/2026 12:35	Designed by admin	
File	Checked by	
Elstree Computing Ltd		Source Control 2020.1.3

ICP SUDS Mean Annual Flood

Input

Return Period (years)	100	Soil	0.300
Area (ha)	3.200	Urban	0.000
SAAR (mm)	700	Region Number	Region 6

Results l/s

QBAR Rural	5.8
QBAR Urban	5.8
Q100 years	18.6
Q1 year	5.0
Q30 years	13.2
Q100 years	18.6

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APPENDIX C

EA FLOOD ZONE MAP

Flood map for planning

Your reference
H1620

Location (easting/northing)
476507/174819

Created
29 July 2026 12:45

Your selected location is in flood zone 1, an area with a low probability of flooding.

You will need to do a flood risk assessment if your site is **any of the following**:

- bigger than 1 hectare (ha)
- in an area with critical drainage problems as notified by the Environment Agency
- identified as being at increased flood risk in future by the local authority's strategic flood risk assessment
- at risk from other sources of flooding (such as surface water or reservoirs) and its development would increase the vulnerability of its use (such as constructing an office on an undeveloped site or converting a shop to a dwelling)

Notes

The flood map for planning shows river and sea flooding data only. It doesn't include other sources of flooding. It is for use in development planning and flood risk assessments.

This information relates to the selected location and is not specific to any property within it. The map is updated regularly and is correct at the time of printing.

Flood risk data is covered by the Open Government Licence which sets out the terms and conditions for using government data. <https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3>

Use of the address and mapping data is subject to Ordnance Survey public viewing terms under Crown copyright and database rights 2026 AC0000807064. <https://flood-map-for-planning.service.gov.uk/os-terms>



Flood map for planning

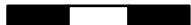
Your reference
H1620

Location (easting/northing)
476507/174819

Scale
1:2,500

Created
29 Jul 2026 12:45

-  Selected area
-  Flood zone 3
-  Flood zone 2
-  Flood zone 1
-  Flood defence
-  Main river
-  Water storage area


0 20 40 60m

APPENDIX D

EA SOURCE PROTECTION ZONES



Legend



Only layers selected and visible at this map scale will be shown

Magic

Designations

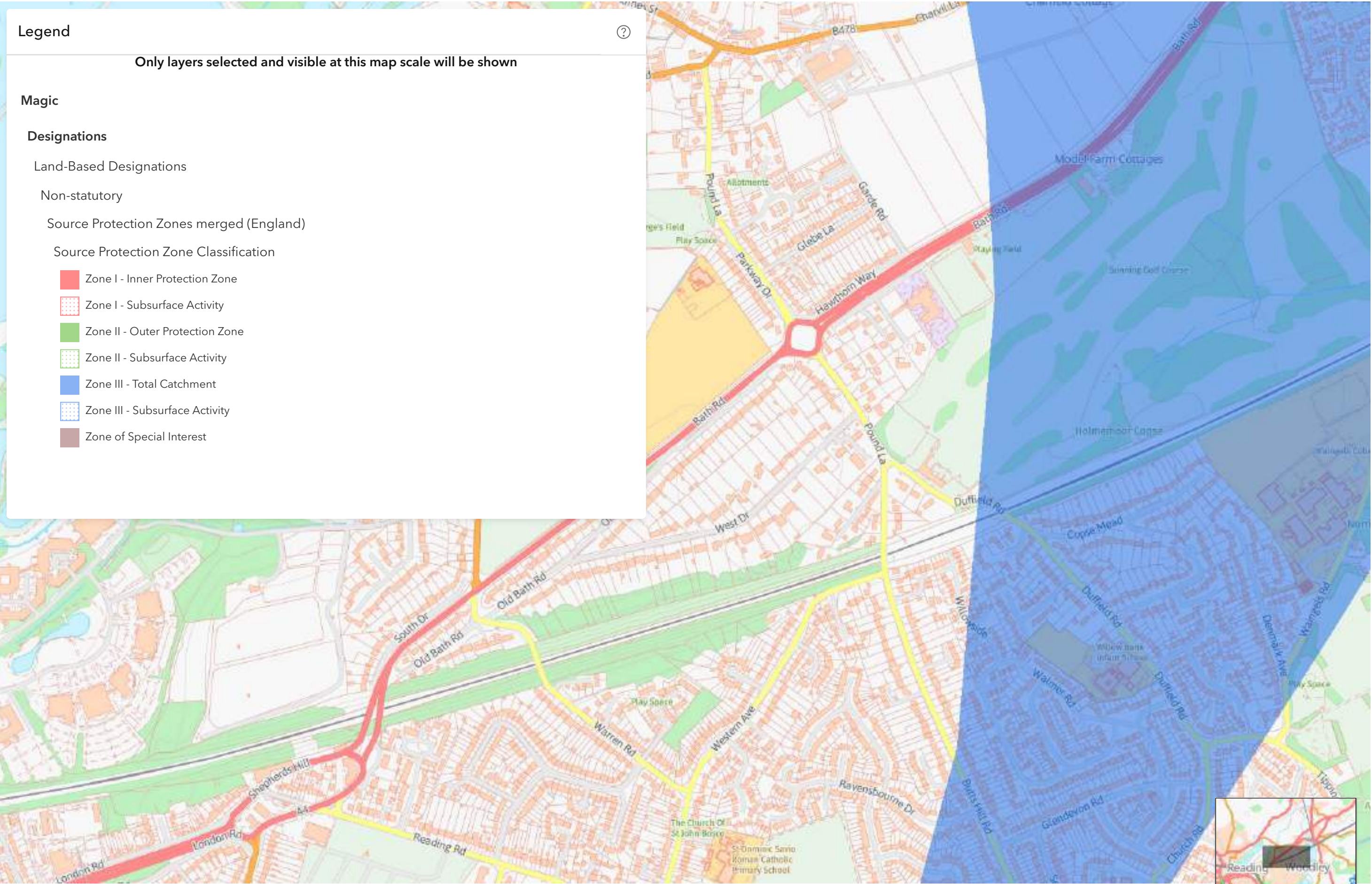
Land-Based Designations

Non-statutory

Source Protection Zones merged (England)

Source Protection Zone Classification

- Zone I - Inner Protection Zone
- Zone I - Subsurface Activity
- Zone II - Outer Protection Zone
- Zone II - Subsurface Activity
- Zone III - Total Catchment
- Zone III - Subsurface Activity
- Zone of Special Interest



APPENDIX E

DRAINAGE DESIGN DRAWINGS

Rodding Eye
Shallow Inspection Chamber
450Ø Inspection Chamber
450Ø IC with 300mm sump
Cellular Crate Soakaway
Rainwater Pipe
Private Road Gully
Sandbag Headwall

3.1 All private drainage works to be in accordance with Part H of the current Building Regulations and BS 8301.

- 3.2 All private drainage to be either:-
PVCu to BS EN 1401-1 (BS 4660/5481) by Osma,
Marley or similar.
OR
Vitrified Clayware to BS 65 and BS EN 295.

The drainage design shown on this drawing has been based upon a PVCu drainage system.

- 3.3 All private drainage to be 100mm diameter unless noted otherwise. Gully laterals to be sized to suit gully outlets. Connections to public sewers to be 150mm dia unless noted otherwise.

- 3.4 Foundations adjacent to drain runs are to be constructed so that the difference between the formation level of the foundation and invert level of any drain must not exceed the horizontal distance minus 500mm.

- 3.5 Where foul and surface water sewers cross and there is less than 100mm clearance short lengths of both runs are to be encased in concrete

- 3.6 All RWP, SVP and foul drainage positions are to be confirmed by the Architect.

- 3.7 Where RWP's are connected direct to drain, rodding access plates are to be provided.

- 3.8 For pipe bedding and backfill details refer to drawing number xxxx\xxxx.

- 3.9 Inspection chambers shown thus IC, are not part of the critical drainage run. Depth to invert to be generally 550mm

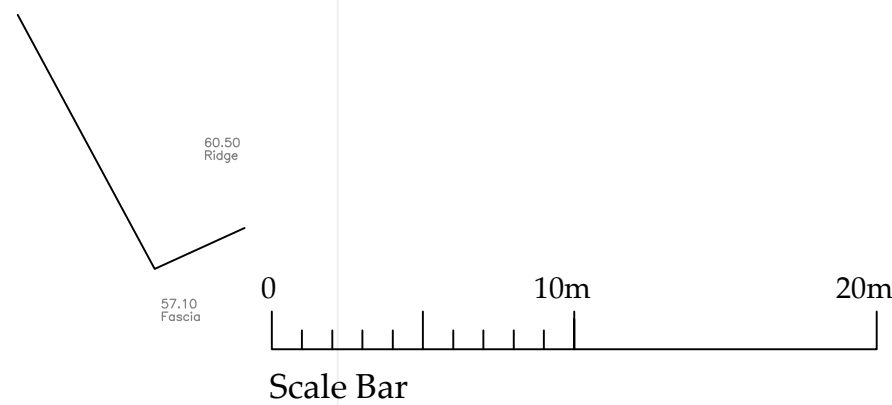
4.1 Site investigation report by Aviron Ref: 11043a/CA has shown the infiltration rate to be $8.88 \times 10^{-6} \text{ m/s}$. Soakaways have been designed to accord with BRE365 & Ciria Report 156 utilising this value.

- 4.2 Soakage tests (to BRE365) are to be undertaken at the location of each soakaway in order to confirm that the design infiltration rate is achieved. Any discrepancy in the infiltration rate must be reported immediately to Aventus Design Civils' Department.

- 4.3 All soakaways to be sited 5m minimum from any building or wall, existing or proposed, or any other soakaway.

- 4.4 No soakaway bases to penetrate water table level.

- 4.5 No soakaway to be constructed in contaminated ground



1.1 Do not scale from this drawing

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Drawing Status	PLANNING ISSUE	
-------------------	----------------	---

B	10.08.26	Layout updated, design amended.	SU	-
A	31.07.26	Layout amended, design progressed.	SU	-
REV.	DATE	DESCRIPTION	CHK	APP

Aventus
DESIGN
Civil & Structural Engineers
Email: mail@aventusdesign.co.uk
Web: www.ventusdesign.co.uk

Client:	Sonning Golf Club
Site:	Sonning Golf Club, Duffield Road, Sonning RG4 6GJ

Title: Schematic Drainage Layout 1 of 2

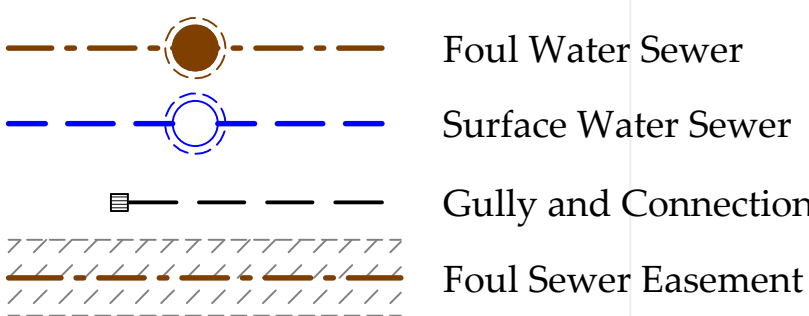
Issue: B	Scale: 1:250 @ A1	Checked: -	Date: -
	Drawn: G.H.	Date: Jan 2006	Approved: _____ Date: _____

NOTE:
FW RISING MAIN TO
PUMP MANUFACTURERS
SPECIFICATION

NOTE:
ADOPTABLE PUMPING
STATION PENDING
DETAILED DESIGN

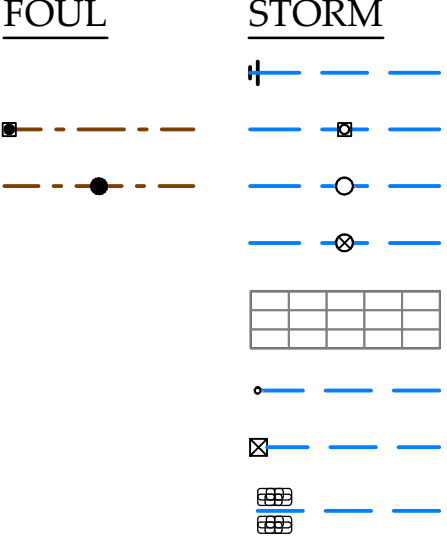
NOTE:
FOUL WATER EMERGENCY
STORAGE CALCULATION
 $160l \times 50 = 8.0m^3$
Top Storage Level=53.00m

Main Drainage Key



Private Drainage Key

Rodding Eye
Shallow Inspection Chamber
450Ø Inspection Chamber
450Ø IC with 300mm sump
Cellular Crate Soakaway
Rainwater Pipe
Private Road Gully
Sandbag Headwall

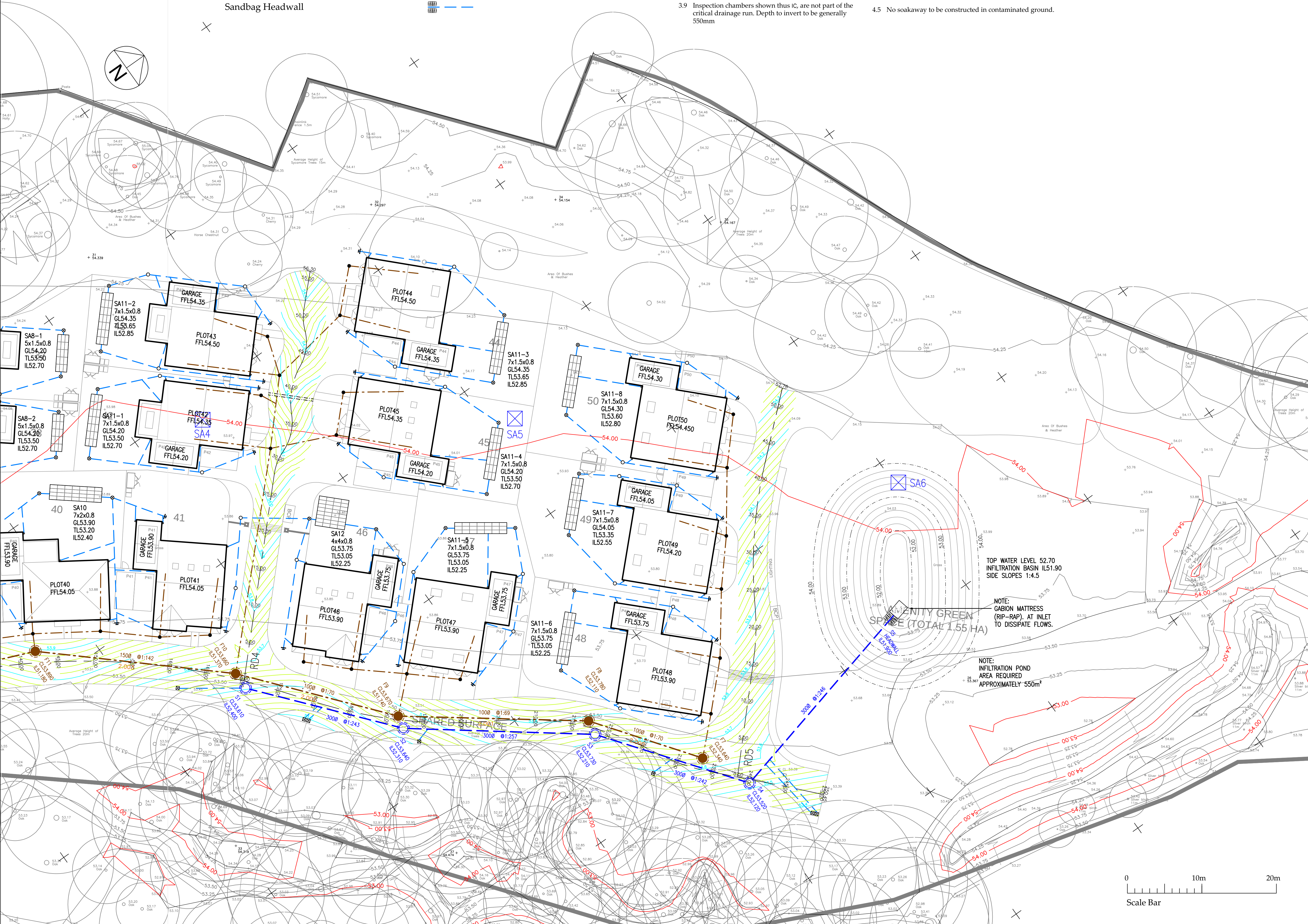


PRIVATE DRAINAGE NOTES
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PLANNING ISSUE

B	10.08.26	Layout updated, design amended.	SU	-
A	31.07.26	Layout amended, design progressed.	SU	-
REV.	DATE	DESCRIPTION	CHK	APP

Aventus Design Ltd
Unit 5 - Leaches Farm
Business Centre
Bicester Road
Kingswood
Aylesbury
Bucks HP18 0RF
Tel: 01296 770066
Email: mail@aventusdesign.co.uk
Web: www.aventusdesign.co.uk

Client: Sonning Golf Club

Site: Sonning Golf Club,
Duffield Road, Sonning
RG4 6GJ

Title: Schematic Drainage Layout 2 of 2

Drawing no. H1620 - 452

Issue:	Scale: 1:250 @ A1	Checked: -	Date: -
B	Drw: C.U.	Date: June '26	Approve: -

50mm
100mm
150mm
200mm
250mm
ORIGINAL SIZE - A1

Private Areas

- *tcc* Tarmac Carriageway Construction
- *tfc* Tarmac Footpath Construction
- *bcc* Blockwork Carriageway Construction
- *pbcc* Porous Blockwork Carriageway Construction
- *bpc* Porous Blockwork Parking Construction
- *pbc* Porous Blockwork Construction (No Dig)
- *bfc* Blockwork Footpath Construction
- Concrete Dam in Porous Pavement

FILL SPECIFICATION
Fill under adoptable carriageway and other vehicularised areas to be to Department of Transport 'Specification for Highway Works Part 1' Table 6/1 Class 1 (General Granular Fill) and compacted in accordance with Table 6/4. Subject to the final approval of the adopting Authority.

Fill under gardens and other landscaped areas to be as raised from site excavations and compaction shall be sufficient to remove large voids and to produce a coherent mass whilst preventing overcompaction and any build up of excess pore pressures.

Levels Key

- Existing survey levels
- Existing Survey Contours
- Proposed site levels
- Proposed Road Contours
- Proposed Gradient

NOTE:
Where level threshold access occurs, a stepped DPC to architects detail is to be constructed where the adjacent levels are above the normal DPC detail.

Scale Bar

- Notes:
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PLANNING ISSUE

B	10.08.26	Layout updated, design amended.	SU	-
A	31.07.26	Layout amended, design progressed.	SU	-
REV.	DATE	DESCRIPTION	CHK	APP
Aventus Design Ltd Unit 5 - Leaches Farm Business Centre Bicester Road Kingswood Aylesbury Bucks HP18 0RF Tel: 01296 770066 Email: mail@aventusdesign.co.uk Web: www.aventusdesign.co.uk				
Client:	Sonning Golf Club			
Site:	Sonning Golf Club, Duffield Road, Sonning RG4 6GJ			
Title:	Schematic Layout & Levels 1 of 2			
Drawing no.	H1620 - 453			
Issue:	Scale: 1:250 @ A1	Checked: -	Date: -	
B	Drw: C.U.	Date: June '26	Approve: -	Date: -

NOTE:
FOUL WATER EMERGENCY
STORAGE CALCULATION
160l x 50 = 8.0m³
Top Storage Level=53.00m

Private Areas

- *tcc* Tarmac Carriageway Construction
- *tfc* Tarmac Footpath Construction
- *bcc* Blockwork Carriageway Construction
- *pbcc* Porous Blockwork Carriageway Construction
- *bpc* Porous Blockwork Parking Construction
- *pbc* Porous Blockwork Construction (No Dig)
- *bfc* Blockwork Footpath Construction
- Concrete Dam in Porous Pavement

FILL SPECIFICATION
Fill under adoptable carriageway and other vehicularised areas to be to Department of Transport 'Specification for Highway Works Part 1' Table 6/1 Class 1 (General Granular Fill) and compacted in accordance with Table 6/4. Subject to the final approval of the adopting Authority.

Fill under gardens and other landscaped areas to be as raised from site excavations and compaction shall be sufficient to remove large voids and to produce a coherent mass whilst preventing overcompaction and any build up of excess pore pressures.

Levels Key

- Existing survey levels
- Existing Survey Contours
- Proposed site levels
- Proposed Road Contours
- Proposed Gradient

NOTE:
Where level threshold access occurs, a stepped DPC to architects detail is to be constructed where the adjacent levels are above the normal DPC detail.

- Notes:
- 1.1 Do not scale from this drawing.
 - 1.2 All dimensions are in m unless otherwise specified.
 - 1.3 In case of any discrepancies in drawings or details refer to engineer for clarification. Unilateral decisions by the contractor will not be accepted.
 - 1.4 This drawing is to be read in conjunction with all related Architects, Consultants & Sub-Contractors drawings and specifications.
 - 1.5 The Contractor is to ensure that all design drawings and information are read concurrently and any discrepancies or omissions reported directly to Aventus Design.
 - 1.6 This drawing is based upon the survey by KND Surveys Ltd, reference E 12 22 dated 31st May 2022 provided in digital format.
 - 1.7 Levels are related to previous KND Surveys Drawing (A0515-T).
 - 1.8 The grid relates to a local datum.
 - 1.9 The Contractor must check the levels of all existing drainage outfalls prior to construction of any drainage, unless otherwise agreed, to ensure the proposed design may be achieved. Any discrepancies must be reported immediately to Aventus Design.
 - 1.10 Sulphates have been determined as class 1 (DS-x) for design purposes in accordance with BRE Special Digest 1 (2001). Buried Concrete to be in accordance with ACEC Site Class AC-x.
 - 1.11 All external building dimensions are to be checked against the Architects drawings prior to any construction commencing.
 - 1.12 All adoptable highway works to be in accordance with the Local Authorities Specifications.
 - 1.13 All adoptable drainage works to be in accordance with the Water Authorities standard guidelines for connections etc.
 - 1.14 Formation to road/hardstanding to be proof rolled and any soft spots in subgrade of road/Hardstanding areas are to be excavated and replaced with well compacted sub-base or free draining granular material to Department of Transport Specification for Highway Works Part 2' Table 6/1 Class 1 (General Granular Fill) and compacted in accordance with Table 6/4.

PLANNING ISSUE

B	10.08.26	Layout updated, design amended.	SU	-
A	31.07.26	Layout amended, design progressed.	SU	-
REV.	DATE	DESCRIPTION	CHK	APP

Aventus Design Ltd
Unit 5 - Leaches Farm
Business Centre
Bicester Road
Kingswood
Aylesbury
Bucks HP18 0RF
Tel: 01296 770066
Email: mail@aventusdesign.co.uk
Web: www.aventusdesign.co.uk

Client: Sonning Golf Club

Site: Sonning Golf Club,
Duffield Road, Sonning
RG4 6GJ

Title: Schematic Layout & Levels 2 of 2

Drawing no. H1620 - 454

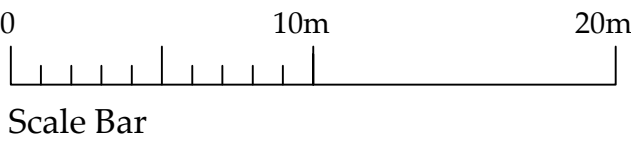
Issue:	Scale: 1:250 @ A1	Checked: -	Date: -
B	Drw: C.U.	Date: June '26	Approve: -





Areas Key

- 50 Roof Areas
- 25 Driveway / Parking Areas
- 200 Carriageway / Shared Drive Areas
- SA Soakaway Test Locations

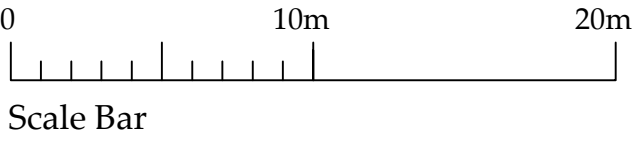


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 - All adoptable drainage works to be in accordance with the Water Authorities standard guidelines for connections etc.
 - Formation to road/hardstanding to be proof rolled and any soft spots in subgrade of road/Hardstanding areas are to be excavated and replaced with well compacted sub-base or free draining granular material to Department of Transport Specification for Highway Works Part 2' Table 6/1 Class 1 (General Granular Fill) and compacted in accordance with Table 6/4.

Drawing Status PLANNING ISSUE

B	10.08.26	Layout updated, design amended.	SU	-
A	31.07.26	Layout amended, design progressed.	SU	-
REV.	DATE	DESCRIPTION	CHK	APP
Aventus Design Ltd Unit 5 - Leaches Farm Business Centre Bicester Road Kingswood Aylesbury Bucks HP18 0RF Tel: 01296 770066 Aventus DESIGN Civil & Structural Engineers Email: mail@aventusdesign.co.uk Web: www.aventusdesign.co.uk				
Client: Sonning Golf Club				
Site: Sonning Golf Club, Duffield Road, Sonning RG4 6GJ				
Title: Drainage Areas 1:500				
Drawing no. H1620 - 455				
Issue: B	Scale: 1:500 @ A1	Checked: -	Date: -	
	Drw: C.U.	Date: June '26	Approve: -	Date: -

50mm
100mm
150mm
200mm
250mm
ORIGINAL SIZE - A1



Design Exceedance

Overland Floodflow



- Notes:
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 - 1.14 Formation to road/hardstanding to be proof rolled and any soft spots in subgrade of road/Hardstanding areas are to be excavated and replaced with well compacted sub-base or free draining granular material to Department of Transport Specification for Highway Works Part 2' Table 6/1 Class 1 (General Granular Fill) and compacted in accordance with Table 6/4.

Drawing Status **PLANNING ISSUE**

B	10.08.26	Layout updated, design amended.	SU	-
A	31.07.26	Layout amended, design progressed.	SU	-
REV.	DATE	DESCRIPTION	CHK	APP

Aventus Design Ltd
Unit 5 - Leaches Farm
Business Centre
Bicester Road
Kingswood
Aylesbury
Bucks HP18 0RF
Tel: 01296 770066
Email: mail@aventusdesign.co.uk
Web: www.aventusdesign.co.uk

Aventus
DESIGN
Civil & Structural Engineers

Client: **Sonning Golf Club**

Site: **Sonning Golf Club,
Duffield Road, Sonning
RG4 6GJ**

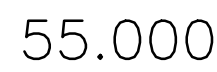
Title: **Design Exceedance**

Drawing no. **H1620 - 456**

Issue:	Scale: 1:500 @ A1	Checked: -	Date: -
B	Drw: C.U.	Date: June '26	Approve: - Date: -

50mm
100mm
150mm
200mm
250mm
ORIGINAL SIZE - A1

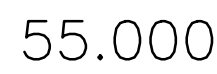
Hori scale 1:200
Vert scale 1:50



RD 1

[illegible]

Hori scale 1:200
Vert scale 1:50



RD 1

[illegible]

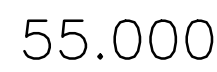
Notes:

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- 1.10 Sulphates have been determined as class 1 (DS-x) for design purposes in accordance with BRE Special Digest 1 (2001). Buried Concrete to be in accordance with AACEE Site Class AC-x.
- 1.11 All external building dimensions are to be checked against the Architects drawings prior to any construction commencing.
- 1.12 All adoptable highway works to be in accordance with the Local Authorities Specifications.
- 1.13 All adoptable drainage works to be in accordance with the Water Authorities standard guidelines for connections etc.
- 1.14 Formation to road/hardstanding to be proof rolled and any soft spots in subgrade of road/Hardstanding areas are to be excavated and replaced with well compacted sub-base and free draining granular material to Department of Transport Specification for Highway Works Part 2' Table 6/1 Class 1 (General Granular Fill) and compacted in accordance with Table 6/4.

Drawing Status	PLANNING ISSUE	
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REV.	DATE	DESCRIPTION	CHK	APP
Aventus Design Ltd Unit 5 - Leaches Farm Business Centre Bicester Road Kingswood Aylesbury Bucks HP19 0RF Tel: 01296 770066				
Aventus DESIGN Civil & Structural Engineers Email: mail@aventusdesign.co.uk Web: www.aventusdesign.co.uk				
Client:				
Sonning Golf Club				
Site:				
Sonning Golf Club, Duffield Road, Sonning RG4 6GJ				
Title:				
C.U. Large Sections 1 of 4				
Drawing no.				
H1620 - 460				
Issue:	Scale:	1:200/50 @ A1	Checked:	Date:
-	Dwn:	C.U.	Apprv:	Date:
		Date:	July '26	

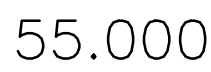
Hori scale 1:200
Vert scale 1:50



RD 1

[illegible]

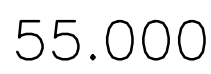
Hori scale 1:200
Vert scale 1:50



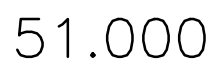
RD2A

[illegible]

Hori scale 1:200
Vert scale 1:50



RD2

[illegible]

Notes:

- 1.1 Do not scale from this drawing.
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- 1.11 All external building dimensions are to be checked against the Architects drawings prior to any construction commencing.
- 1.12 All adoptable highway works to be in accordance with the Local Authorities Specifications.
- 1.13 All adoptable drainage works to be in accordance with the Water Authorities standard guidelines for connections etc.
- 1.14 Formation to road/hardstanding to be proof rolled and any soft spots in subgrade of road/Hardstanding areas are to be excavated and replaced with well compacted sub-base and free draining granular material to Department of Transport Specification for Highway Works Part 2' Table 6/1 Class 1 (General Granular Fill) and compacted in accordance with Table 6/4.

Drawing Status	PLANNING ISSUE	
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-	-	-	-	-
REV.	DATE	DESCRIPTION	CHK	APP

Aventus Design Ltd
Unit 5 - Leaches Farm
Business Centre
Bicester Road
Kingswood
Aylesbury
Bucks HP18 0RF
Tel: 01296 770066

Aventus
DESIGN
Civil & Structural Engineers
Email: mail@aventusdesign.co.uk
Web: www.aventusdesign.co.uk

Client: Sonning Golf Club

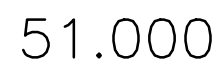
Site: Sonning Golf Club,
Duffield Road, Sonning
RG4 6GJ

Title: Long Sections 2 of 4

Drawing no. H1620 - 461

Issue:	Scale: 1:200/50 @ A1		Checked: -	Date: -
-	Drn: C.U.	Date: July '26	Approv: -	Date: -

A vertical scale bar with markings at 50mm, 100mm, 150mm, 200mm, and 250mm. The markings are horizontal lines of varying lengths, with the longest lines corresponding to the 50mm, 100mm, 150mm, and 200mm marks, and the shortest lines corresponding to the 250mm mark. The text labels are placed to the right of the scale bar.

[illegible]

51.000

[illegible]

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- 1.10 Sulphates have been determined as class 1 (DS-) for design purposes in accordance with BRE Special Digest 1 (2001). Buried Concrete to be in accordance with ACEC Site Class A-Cx.
- 1.11 All external building dimensions are to be checked against the Architects drawings prior to any construction commencing.
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- 1.14 Formation to road/hardstanding to be proof rolled and any soft spots in subgrade of road/Hardstanding areas are to be excavated and replaced with well compacted sub-base or free draining granular material to Department of Transport Specification for Highway Works Part 2' Table 6/1 Class 1 (General Granular Fill) and compacted in accordance with Table 6/4.

ORIGINAL SIZE - A1

250mm

200mm

150mm

100mm

50mm

Hori scale 1:200
Vert scale 1:50

RD5

Hori scale 1:200 Vert scale 1:50			
RD5		55.000	
LEFT HAND CHANNEL			
ALIGNMENT LEVEL		53.627	53.655
RIGHT HAND CHANNEL		53.628	53.650
VERTICAL ALIGNMENT		G = 1.400%	
HORIZONTAL ALIGNMENT		R = 30.000	
EXISTING GROUND LEVEL		53.381	53.511
CHAINAGE		0.000	5.000
STORMWATER DETAILS		0.000	5.000
FOULWATER DETAILS		0.000	5.000

Hori scale 1:200
Vert scale 1:50

RD4

[illegible]

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Drawing Status	PLANNING ISSUE	
-------------------	----------------	---

A	04.08.26	Road 5 amended.	SU	-
REV.	DATE	DESCRIPTION	CHK	APP

Aventus Design Ltd
Unit 5 - Leaches Farm
Business Centre
Bicester Road
Kingswood
Aylesbury
Bucks HP18 0RF
Tel: 01296 770066

Aventus
DESIGN
Civil & Structural Engineers
Email: mail@aventusdesign.co.uk
Web: www.aventusdesign.co.uk

Client: **Sonning Golf Club**

Site: Sonning Golf Club,
Duffield Road, Sonning
RG4 6GJ

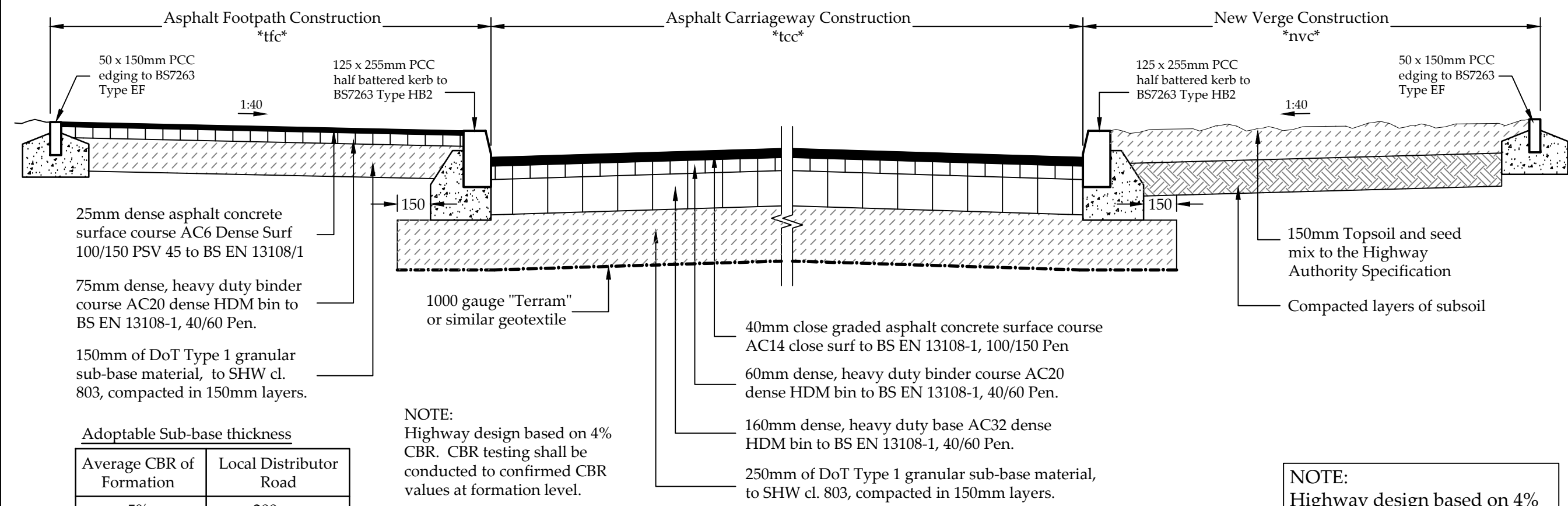
Title: Long Sections 4 of 4

Drawing no. H1620 - 463

Issue: A	Scale: 1:200/50 @ A1		Checked: -	Date: -
	Dwn: C.U.	Date: July '26	Apprv: -	Date: -

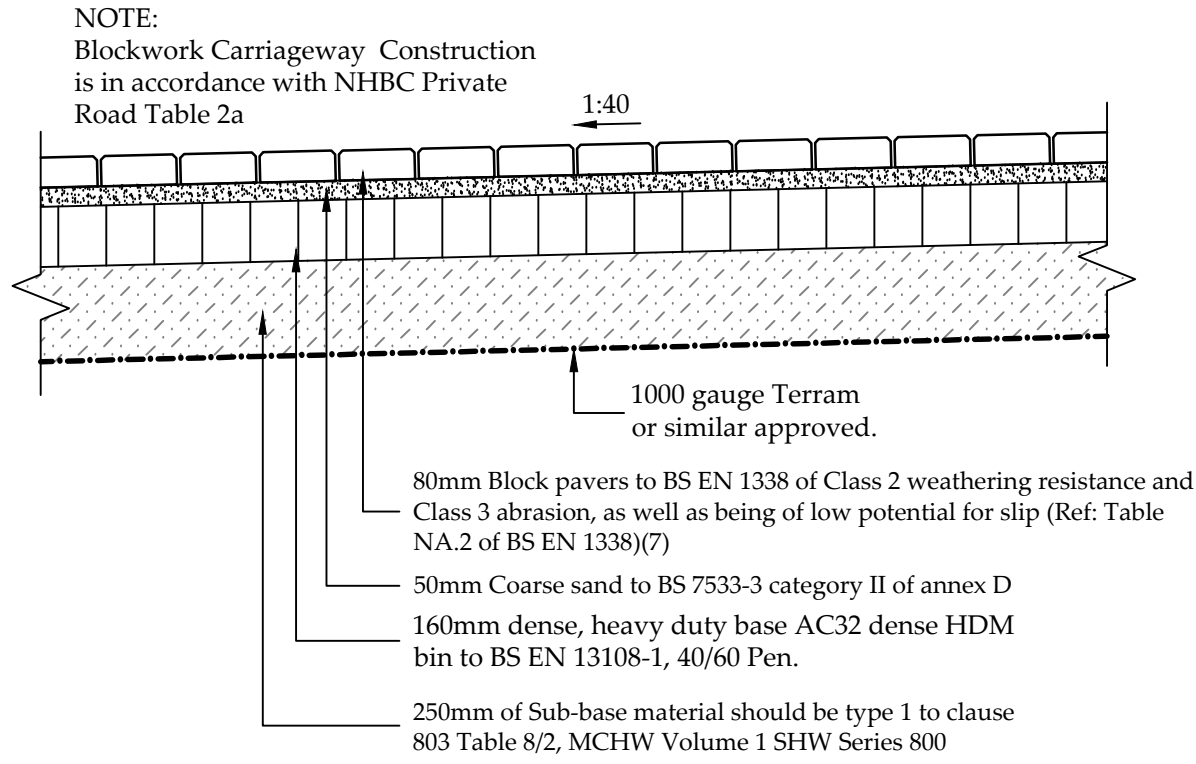
ORIGINAL SIZE - A1

250mm 200mm 150mm 100mm 50mm



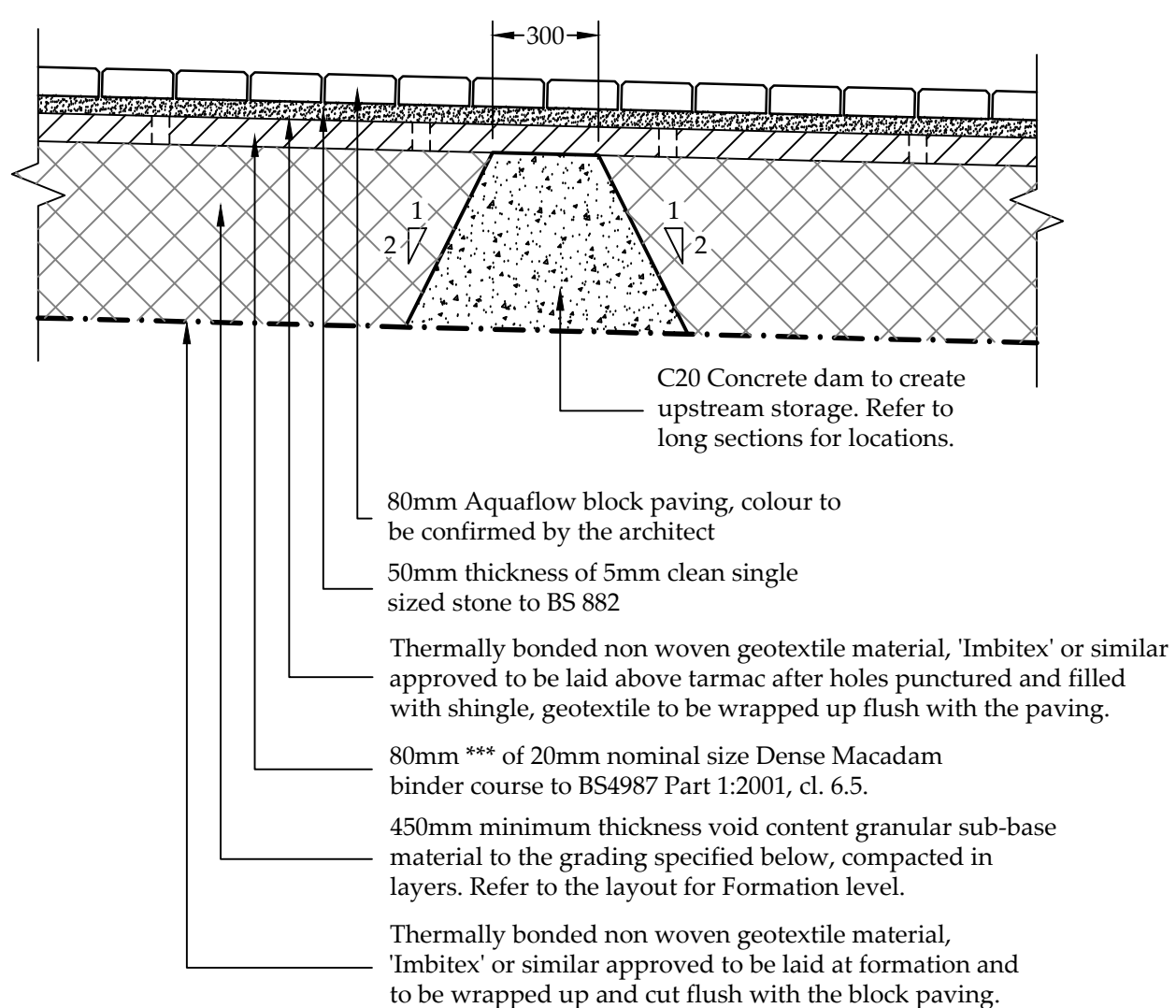
Asphalt Carriageway Construction Typical Section - New Access Road

tcc

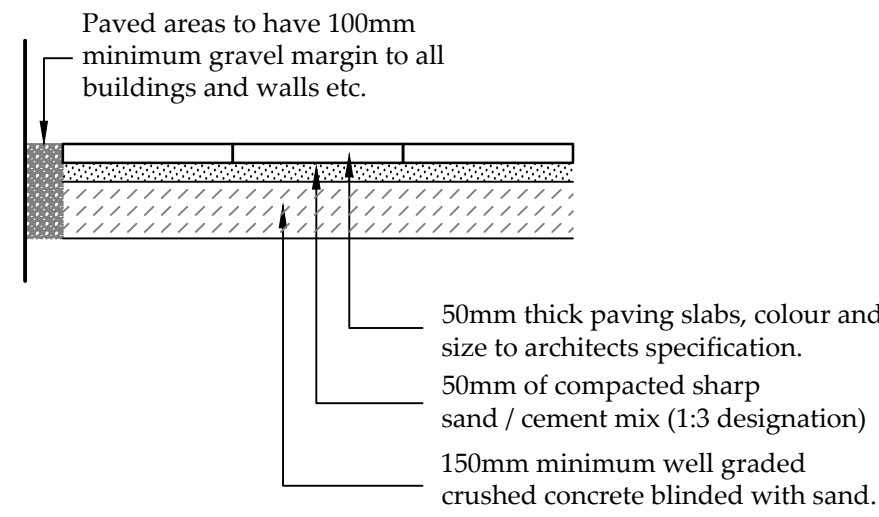


Private road having frequent use by commercial vehicles

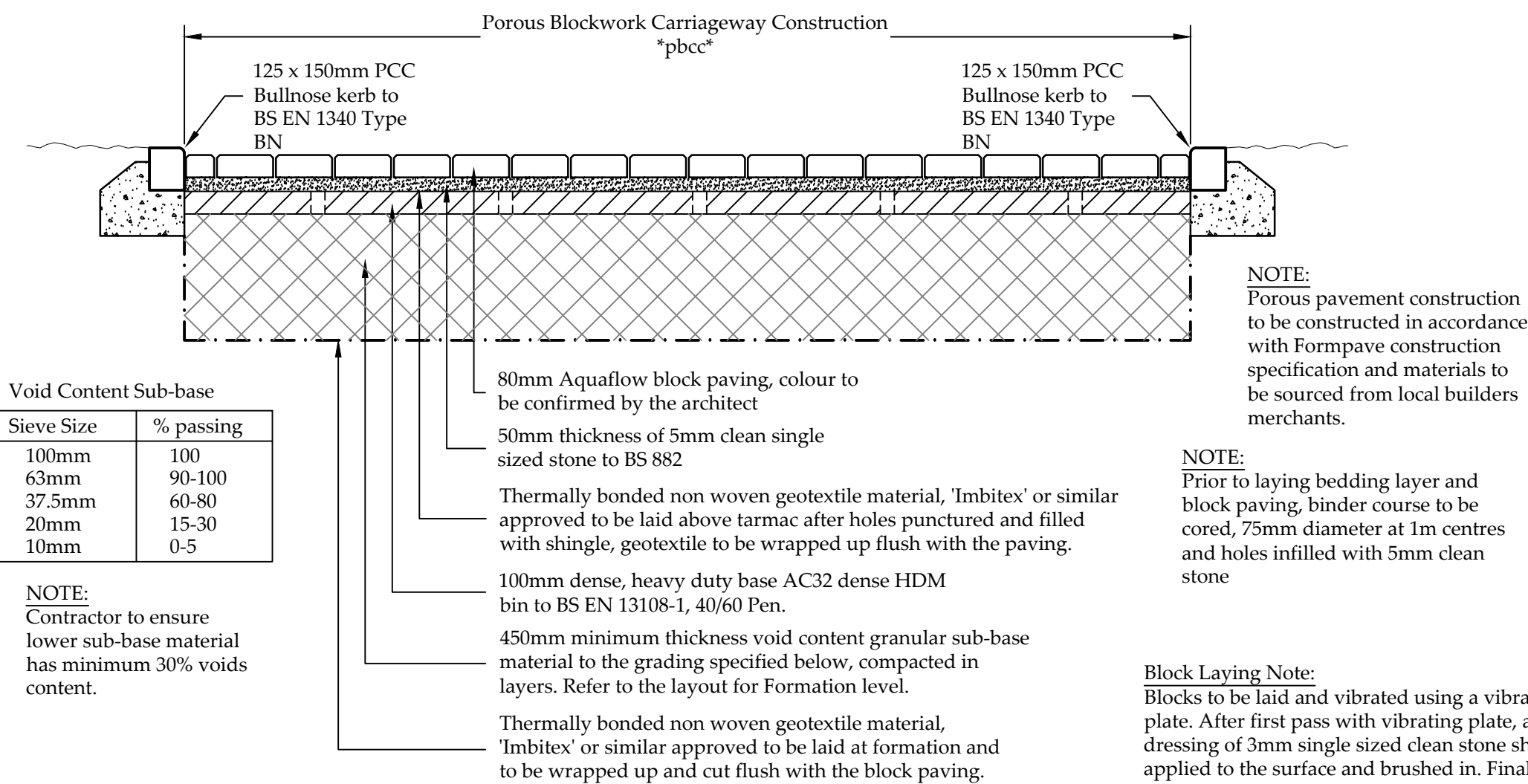
bcc



Porous Pavement Concrete Dam Construction

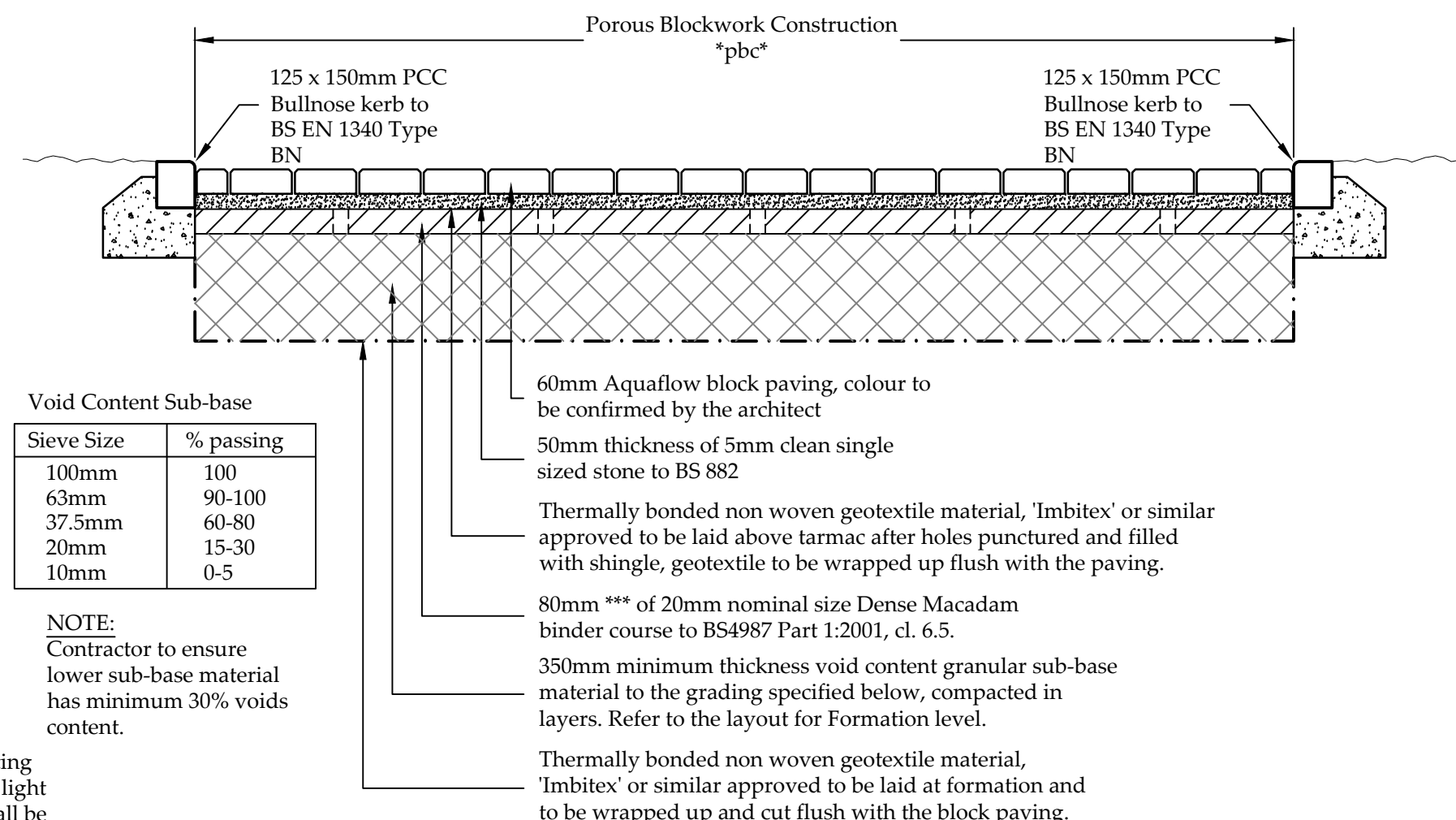


Paving Slab Footpath Construction



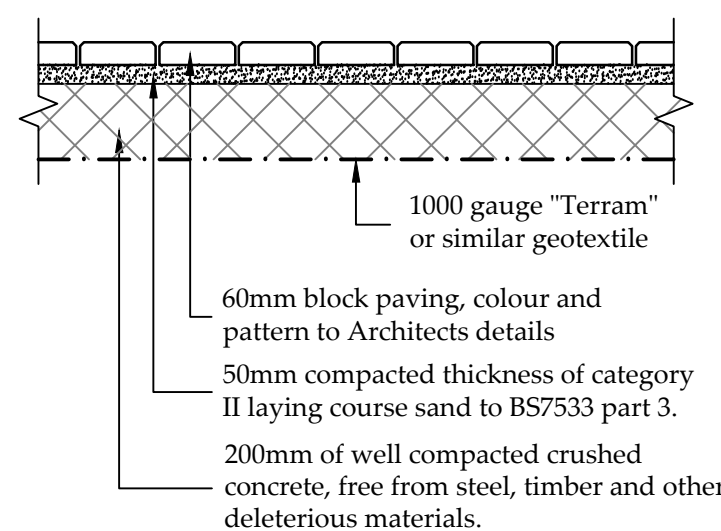
Porous Blockwork Construction

pbcc



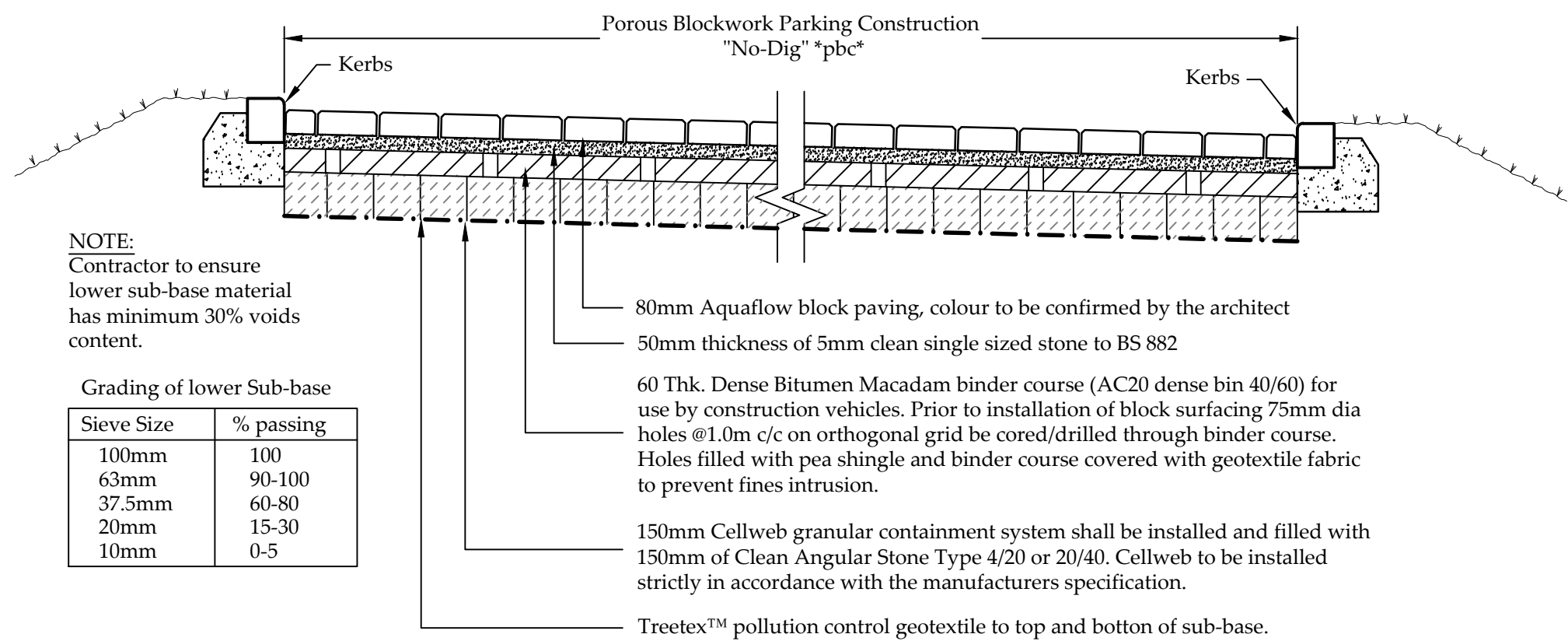
Porous Blockwork Construction

bpc



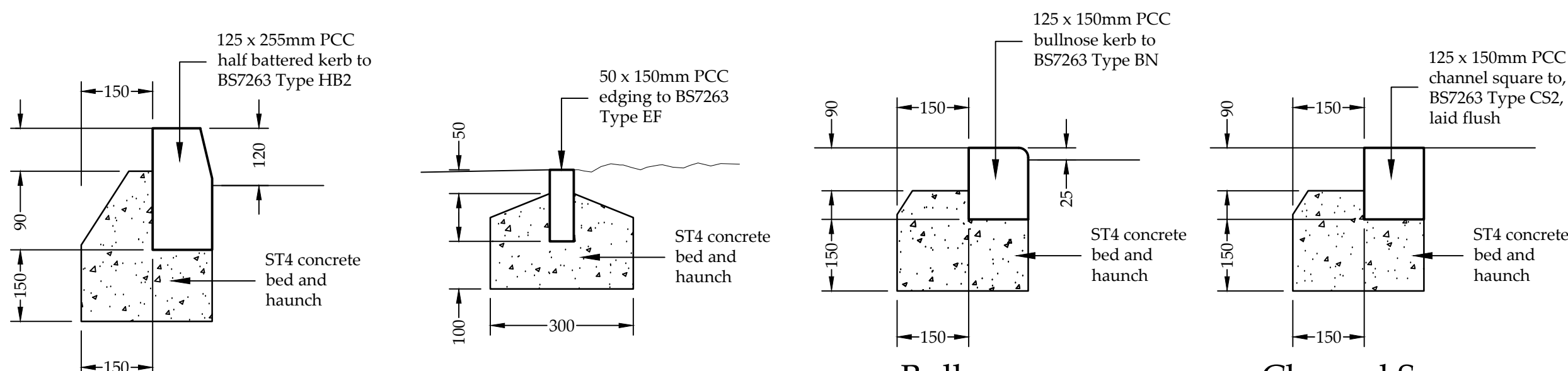
Blockwork Footpath Construction

bfc



Porous Blockwork Parking Construction - No Dig

pbc



Half Battered Kerb Detail

1:10

Edging Detail

1:10

Bullnose Kerb Detail

1:10

Channel Square Kerb Detail

1:10

FILL SPECIFICATION

Fill under adoptable carriageway and other vehicularised areas to be to Department of Transport 'Specification for Highway Works Part 1' Table 6/1 Class 1 (General Granular Fill) and compacted in accordance with Table 6/4. Subject to the final approval of the adopting Authority.

Fill under landscaped areas to be as raised from site excavations and compaction shall be sufficient to remove large voids and to produce a coherent mass whilst preventing overcompaction and any build up of excess pore pressures.

Notes:

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- 1.6 The Contractor must check the levels of all existing drainage outfalls prior to construction of any drainage, unless otherwise agreed, to ensure the proposed design may be achieved. Any discrepancies must be reported immediately to Aventus Design.
- 1.7 Sulphates to be confirmed.
- 1.8 All adoptable highway works to be in accordance with the Local Authorities Specifications.
- 1.9 All adoptable drainage works to be in accordance with the Water Authorities standard guidelines for connections etc.
- 1.10 Formation to road/hardstanding to be proof rolled and any soft spots in subgrade of road/Hardstanding areas are to be excavated and replaced with well compacted sub-base or free draining granular material to Department of Transport Specification for Highway Works Part 2' Table 6/1 Class 1 (General Granular Fill) and compacted in accordance with Table 6/4.

Drawing Status: PLANNING ISSUE

REV. DATE DESCRIPTION CHK APP

Aventus Design Ltd
Unit 5 - Leaches Farm
Business Centre
Bicester Road
Kingswood
Aylesbury
Bucks HP18 0RF
Tel: 01296 770066
Email: mail@aventusdesign.co.uk
Web: www.aventusdesign.co.uk

Client: Sonning Golf Club

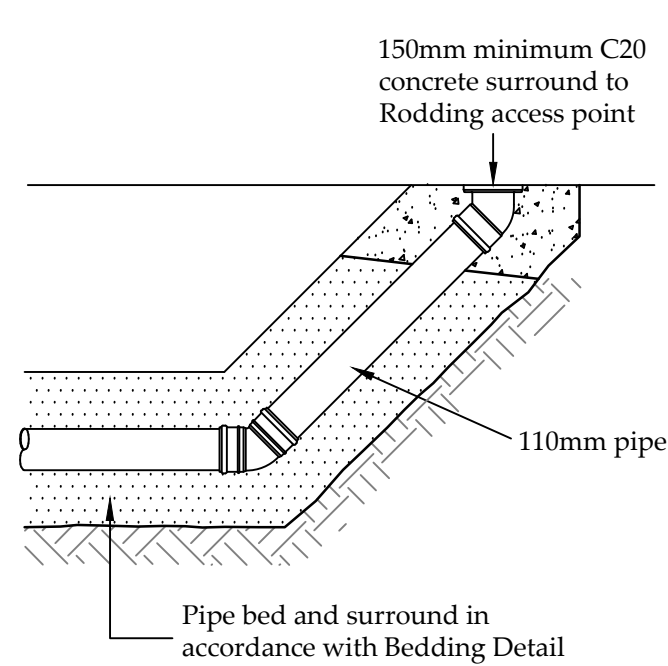
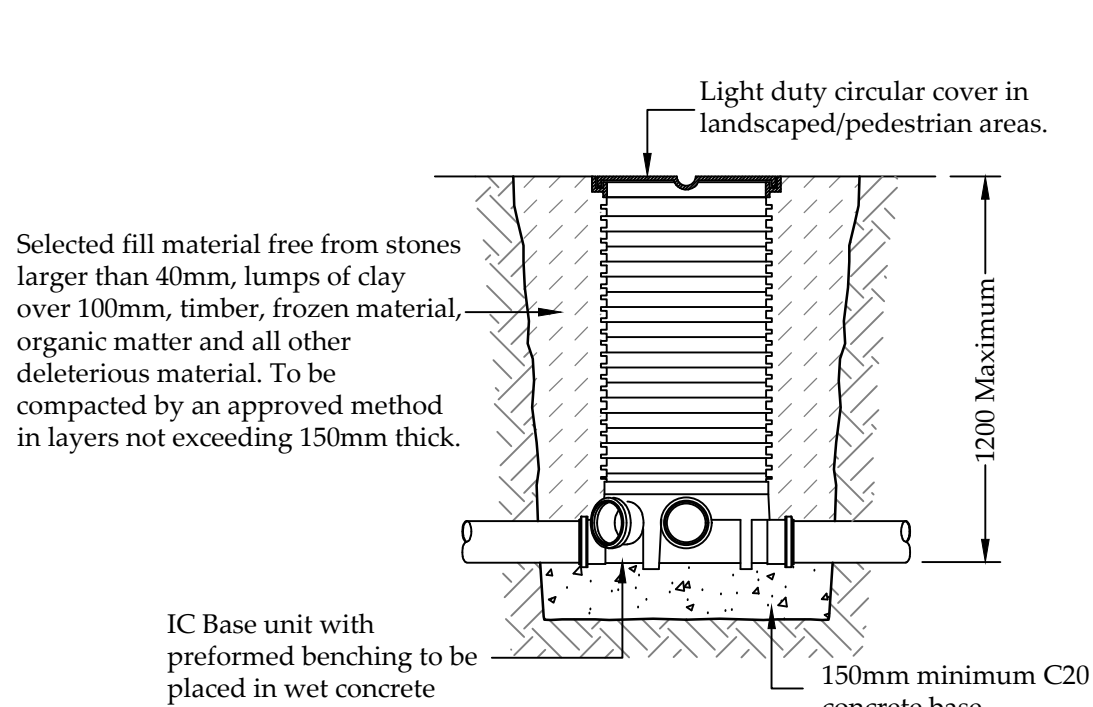
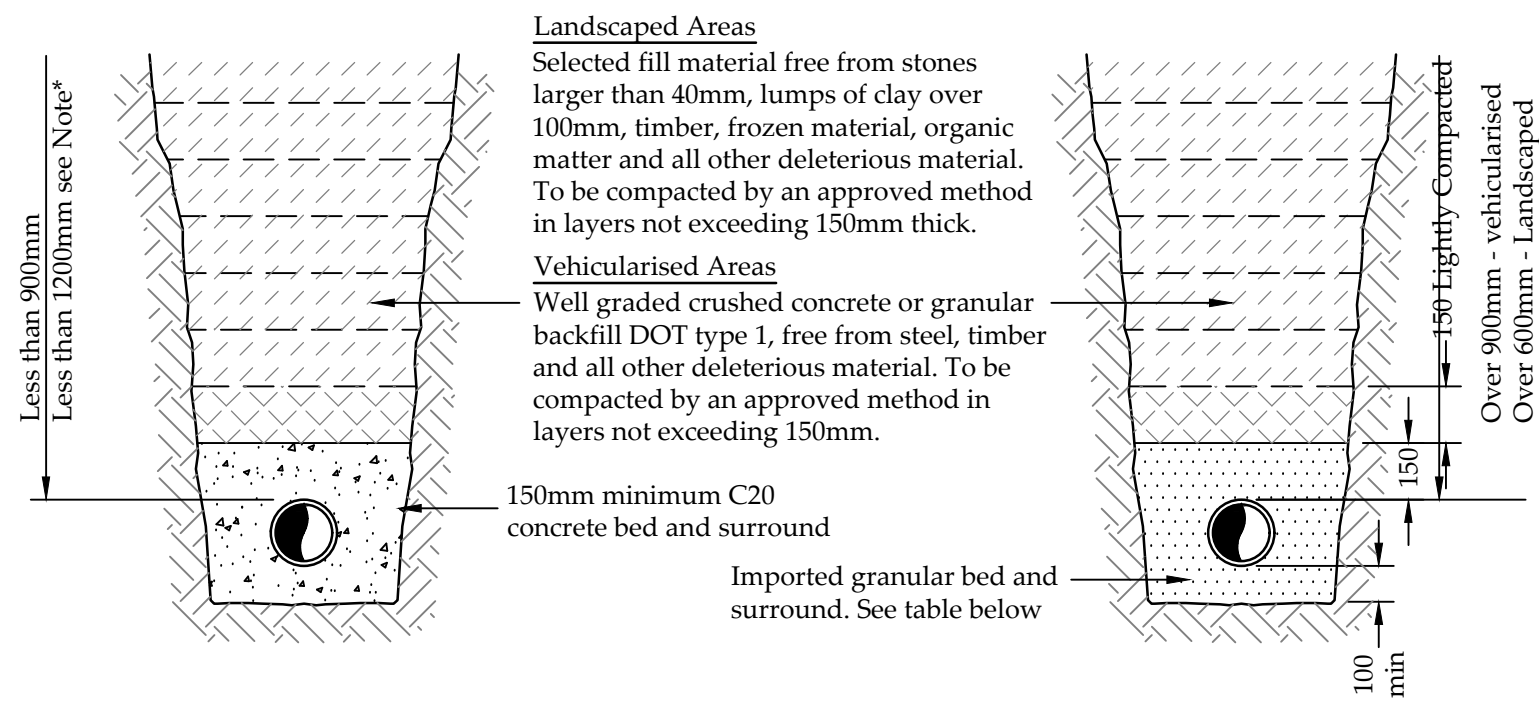
Site: Sonning Golf Club,
Duffield Road, Sonning
RG4 6GJ

Title: Highway Construction Details

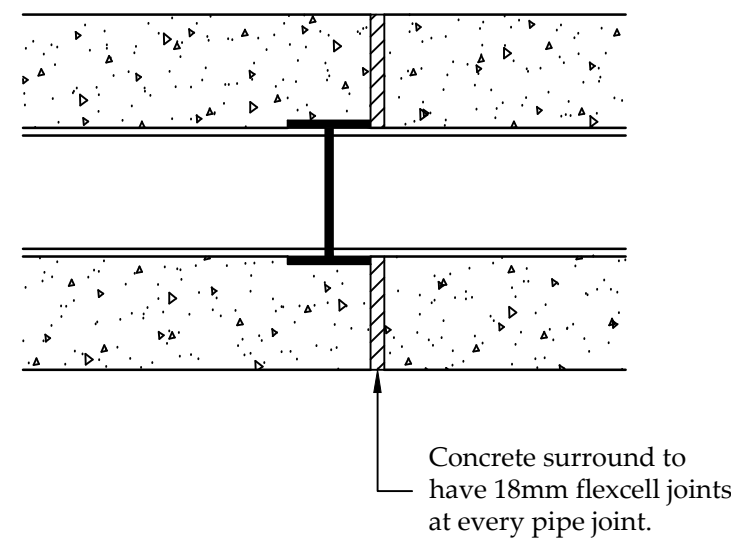
Drawing no. H1620 - 465

Issue: Scale: 1:20 @ A1
Dm: C.U. Date: June '26
Checked: - Date: -
Approve: - Date: -

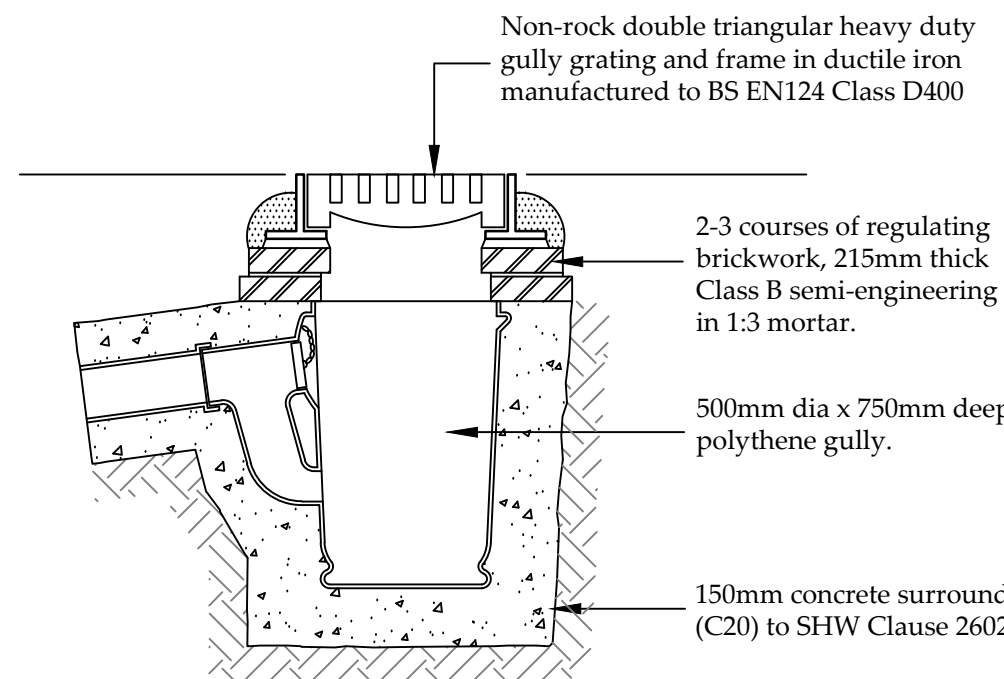
50mm
100mm
150mm
200mm
250mm
ORIGINAL SIZE - A1



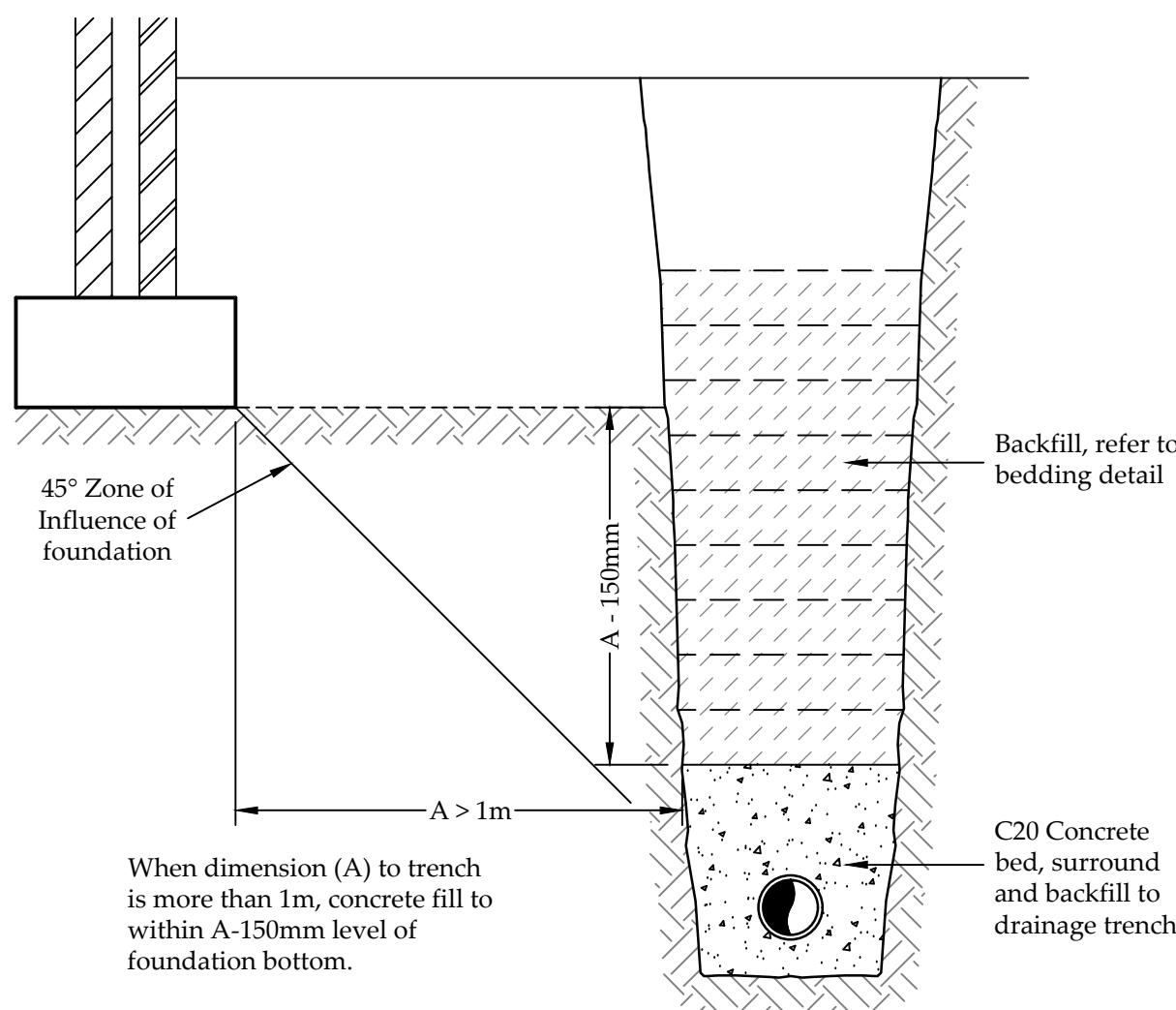
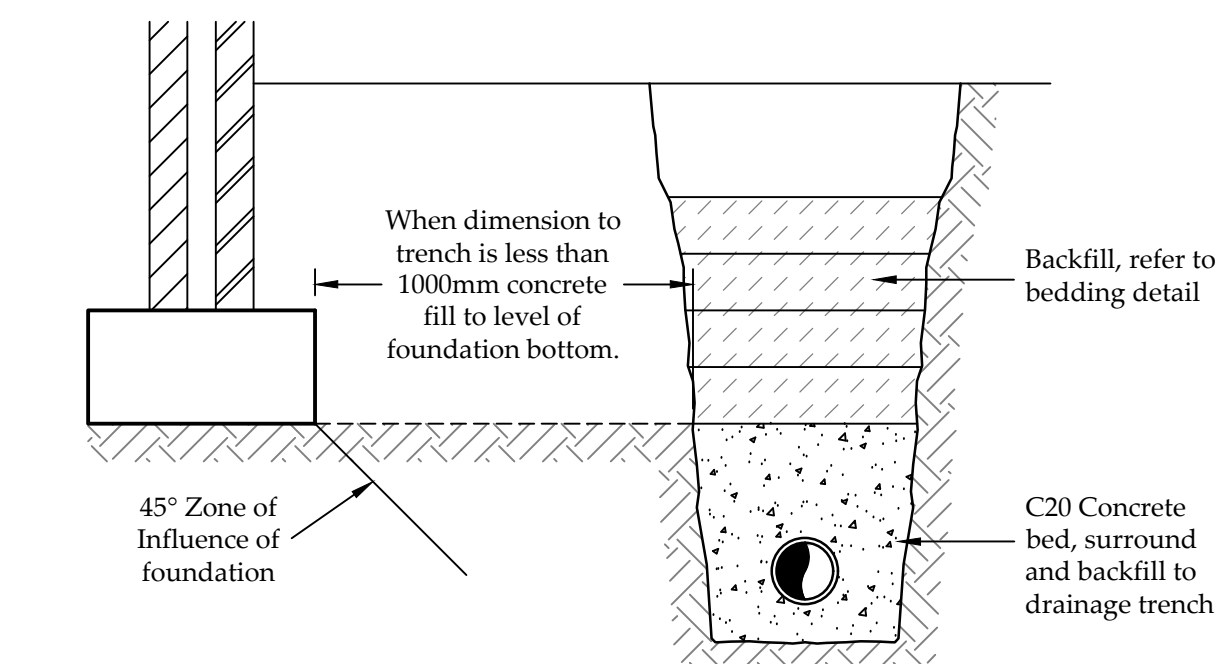
Typical Rodding Eye Detail



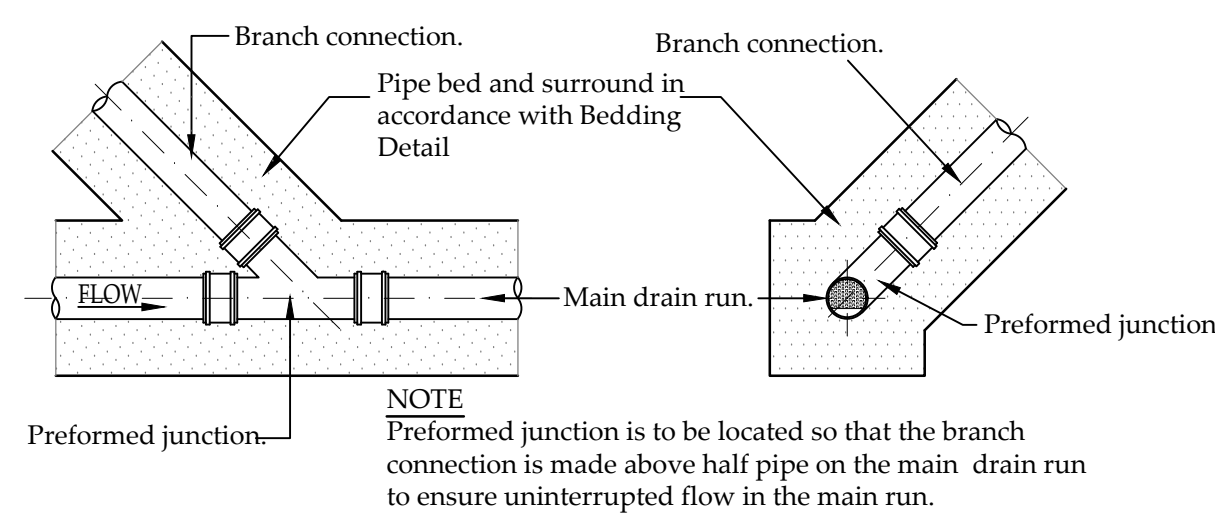
Expansion Joint Detail to Pipe Concrete Bed & Surround 1:10



Gully Detail



Pipe Runs Near Buildings

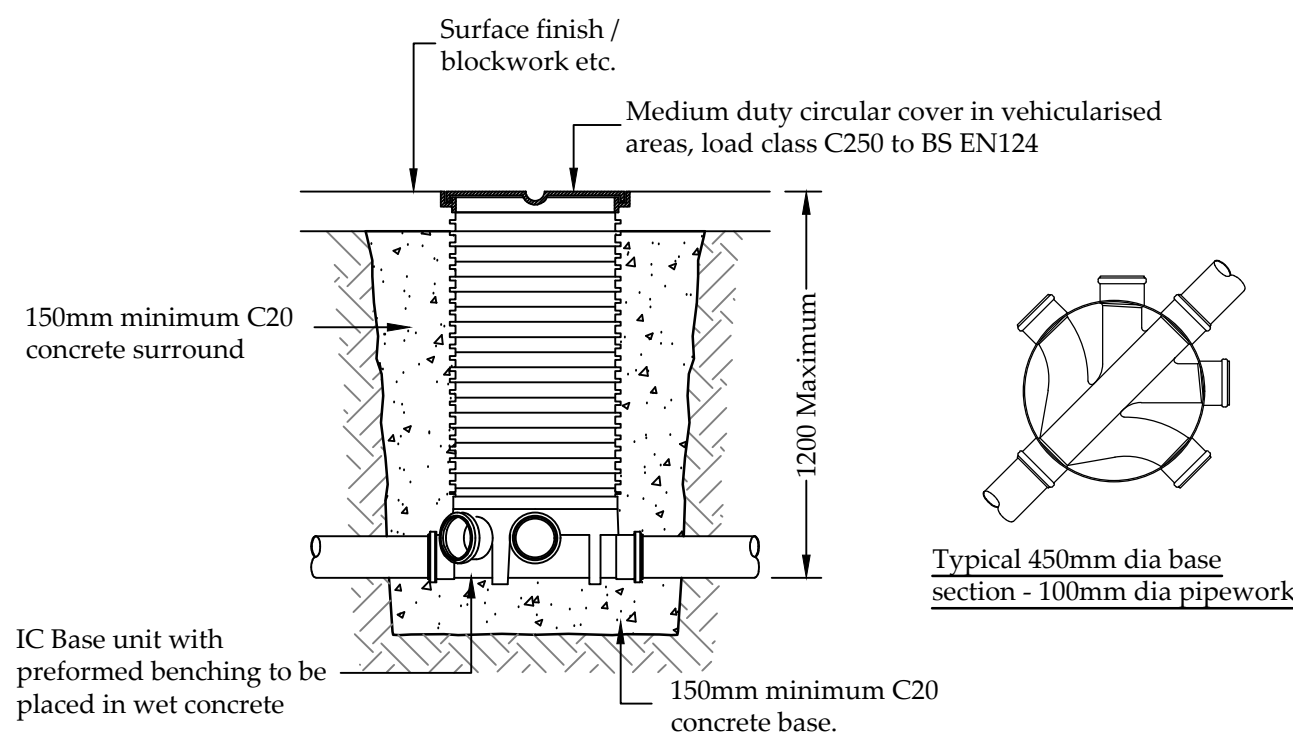


Plan

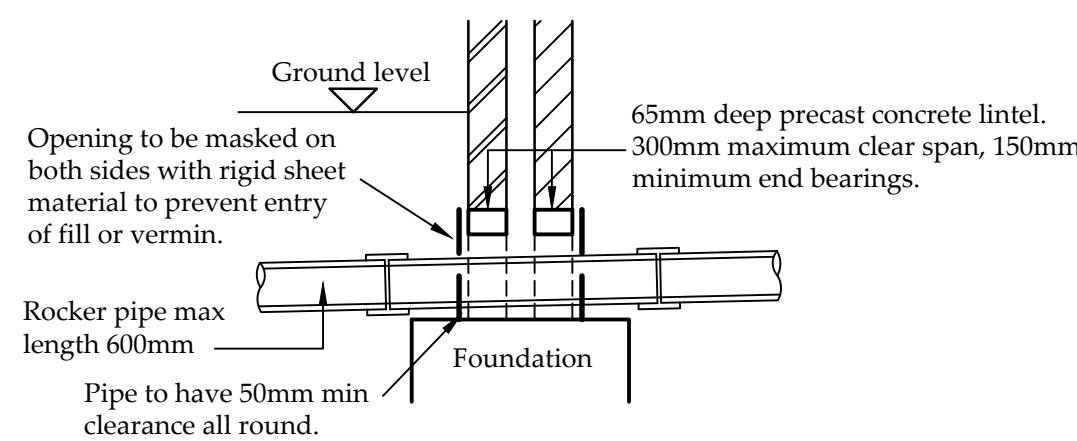
Section

Preformed Junction Detail

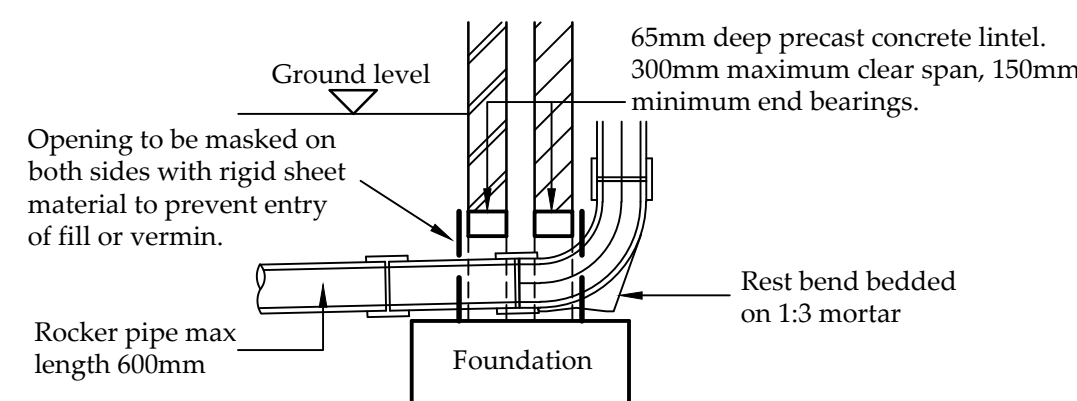
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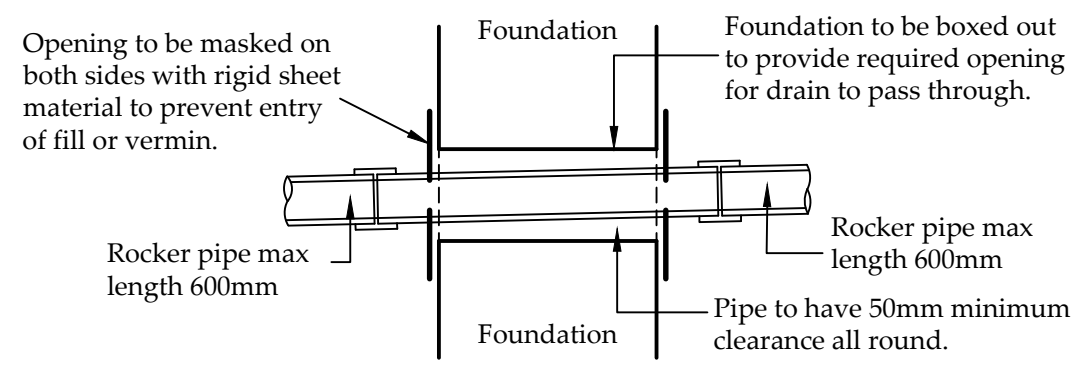
450 Dia Plastic Inspection Chamber Detail For Use in Vehicular Areas



Detail Where Drain Passes Through Wall

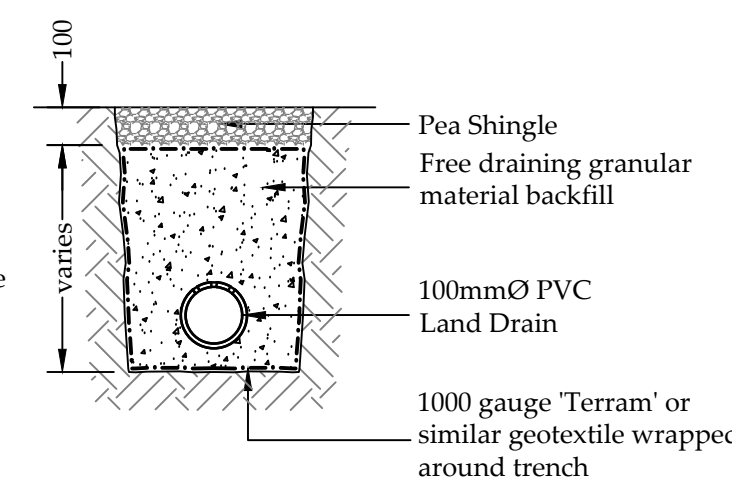


Detail Where SVP & Rest bend Passes Through Wall



Detail Where Drain Passes Through Foundation

Note: Contractor is to install land drainage as necessary to alleviate any potential surface water ponding in accordance with the NHBC guidelines.

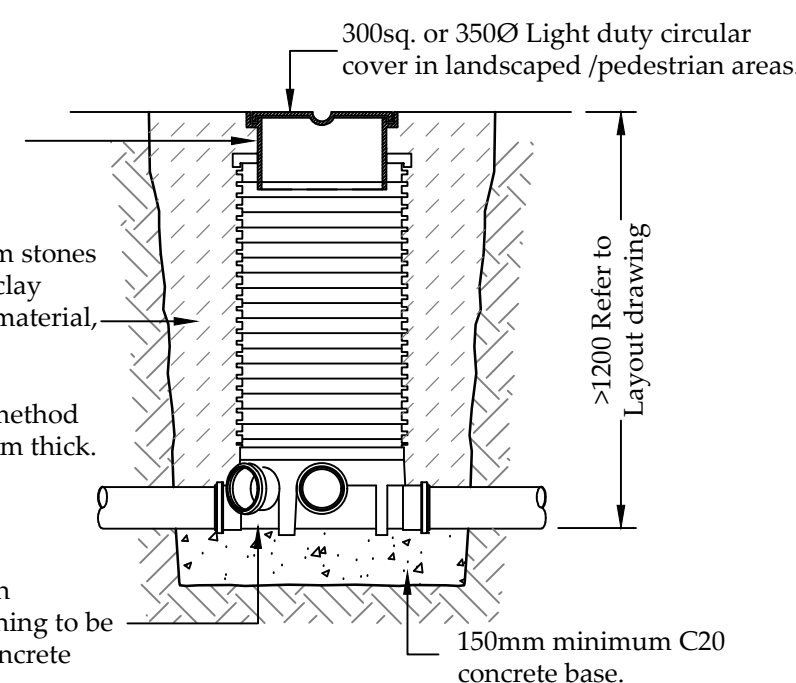


Land Drain Detail

Restricted access raising piece and collar.

Selected fill material free from stones larger than 40mm, lumps of clay over 100mm, timber, frozen material, organic matter and all other deleterious material. To be compacted by an approved method in layers not exceeding 150mm thick.

IC Base unit with preformed benching to be placed in wet concrete



450 Dia Restricted Access Plastic Inspection Chamber Detail For Use in Landscaped/Pedestrian Areas

PRIVATE DRAINAGE NOTES

- All private drainage works to be in accordance with Part H of the current Building Regulations and BS 8301.
- All private drainage to be either:- PVCu to BS EN 1401-1 (BS 4660/5481) by Osma, Marley or similar. OR Vitrified Clayware to BS 65 and BS EN 295. OR Concrete to BS 5911 and flexibly jointed. The drainage design shown on this drawing has been based upon a PVCu drainage system.
- All private drainage to be 100mm diameter unless noted otherwise. Gully laterals to be sized to suit gully outlets. Connections to public sewers to be 150mm dia unless noted otherwise.
- Foundations adjacent to drain runs are to be constructed so that the difference between the formation level of the foundation and invert level of any drain must not exceed the horizontal distance minus 500mm.
- Where foul and surface water sewers cross and there is less than 100mm clearance short lengths of both runs are to be encased in concrete.
- All RWP, SVP and foul drainage positions are to be confirmed by the Architect.
- Where RWP's are connected direct to drain, rodding access plates are to be provided.

Notes:

- Do not scale from this drawing.
- All dimensions are in m unless otherwise specified.
- In case of any discrepancies in drawings or details refer to engineer for clarification. Unilateral decisions by the contractor will not be accepted.
- This drawing is to be read in conjunction with all related Architects, Consultants & Sub-Contractors drawings and specifications.
- The Contractor is to ensure that all design drawings and information are read concurrently and any discrepancies or omissions reported directly to Aventus Design.
- The Contractor must check the levels of all existing drainage outfalls prior to construction of any drainage, unless otherwise agreed, to ensure the proposed design may be achieved. Any discrepancies must be reported immediately to Aventus Design.
- Sulphates to be confirmed.
- All adoptable highway works to be in accordance with the Local Authorities Specifications.
- All adoptable drainage works to be in accordance with the Water Authorities standard guidelines for connections etc.
- Formation to road/hardstanding to be proof rolled and any soft spots in subgrade of road/Hardstanding areas are to be excavated and replaced with well compacted sub-base or free draining granular material to Department of Transport Specification for Highway Works Part 2 Table 6/1 Class 1 (General Granular Fill) and compacted in accordance with Table 6/4.

PLANNING ISSUE

REV. DATE DESCRIPTION CHK APP

Aventus Design Ltd
Unit 5 - Leaches Farm
Business Centre
Bicester Road
Kingswood
Aylesbury
Bucks HP18 0RF
Tel: 01296 770066
Email: mail@aventusdesign.co.uk
Web: www.aventusdesign.co.uk

Client: Sonning Golf Club

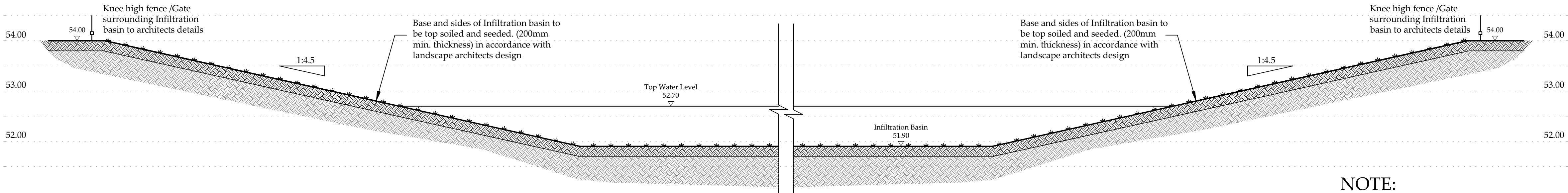
Site: Sonning Golf Club,
Duffield Road, Sonning
RG4 6GJ

Title: Drainage Details 1 of 3

Drawing no. H1620 - 470

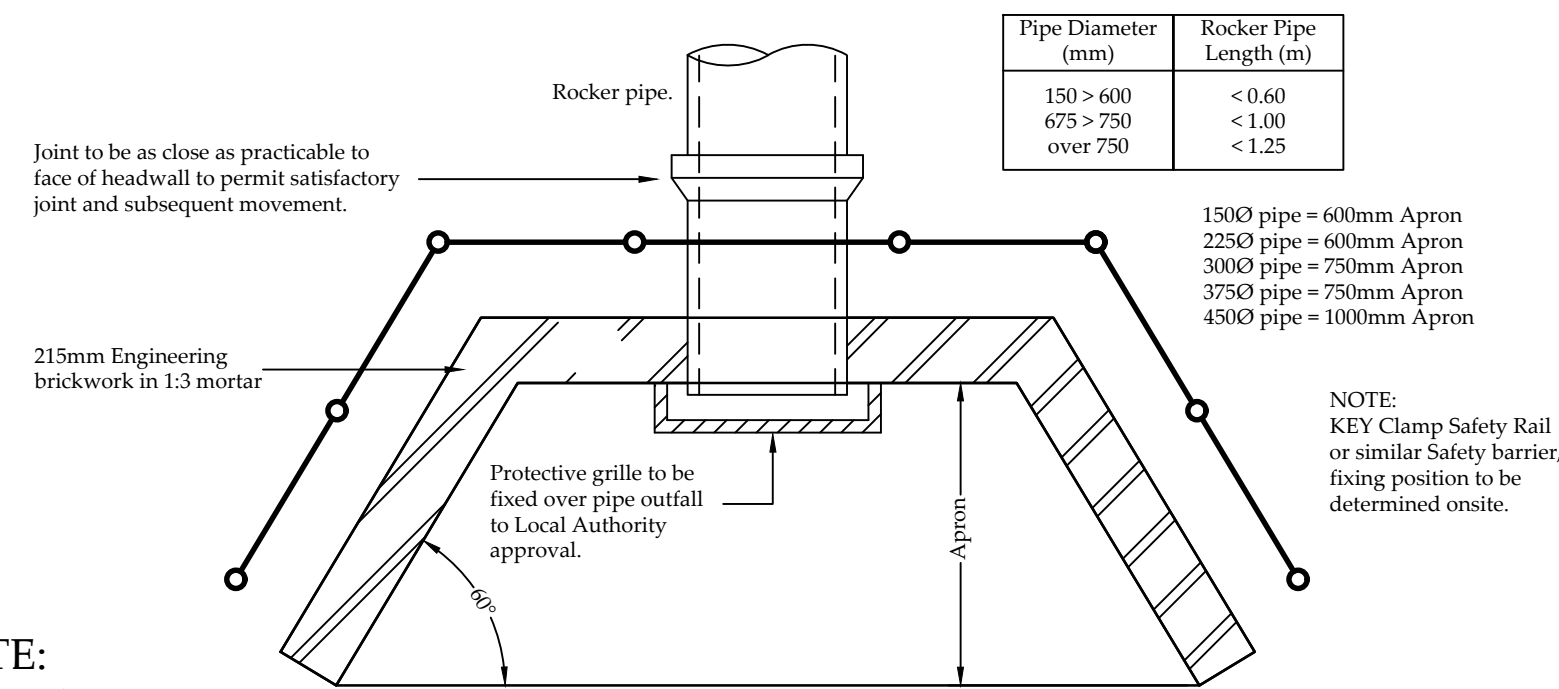
Issue: Scale: 1:20 @ A1 Checked: - Date: -
Dm: C.U. Date: June '26 Approve: - Date: -

50mm
100mm
150mm
200mm
250mm
300mm
350mm
400mm
450mm
500mm
550mm
600mm
650mm
700mm
750mm
800mm
850mm
900mm
950mm
1000mm

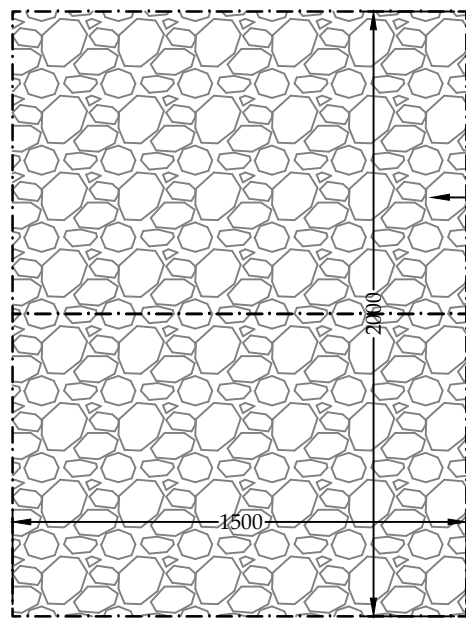
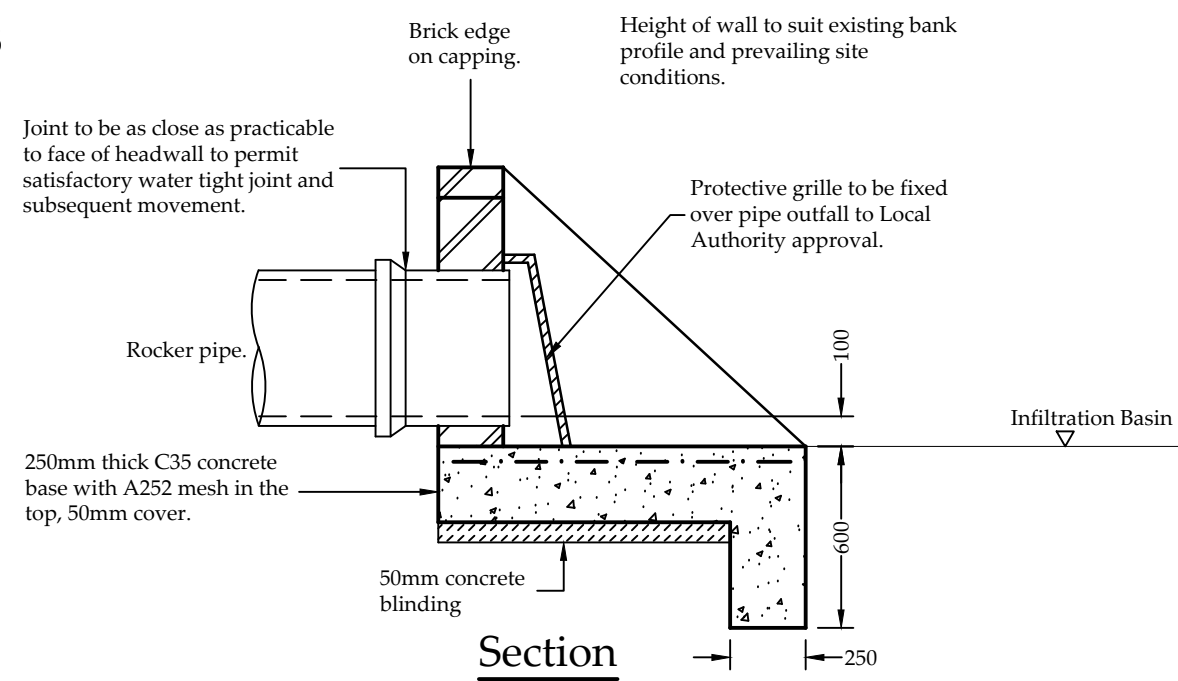


Infiltration Basin Section
(1:50)

NOTE:
Infiltration Basin
Design to be agreed
with the client and
landscape designer.

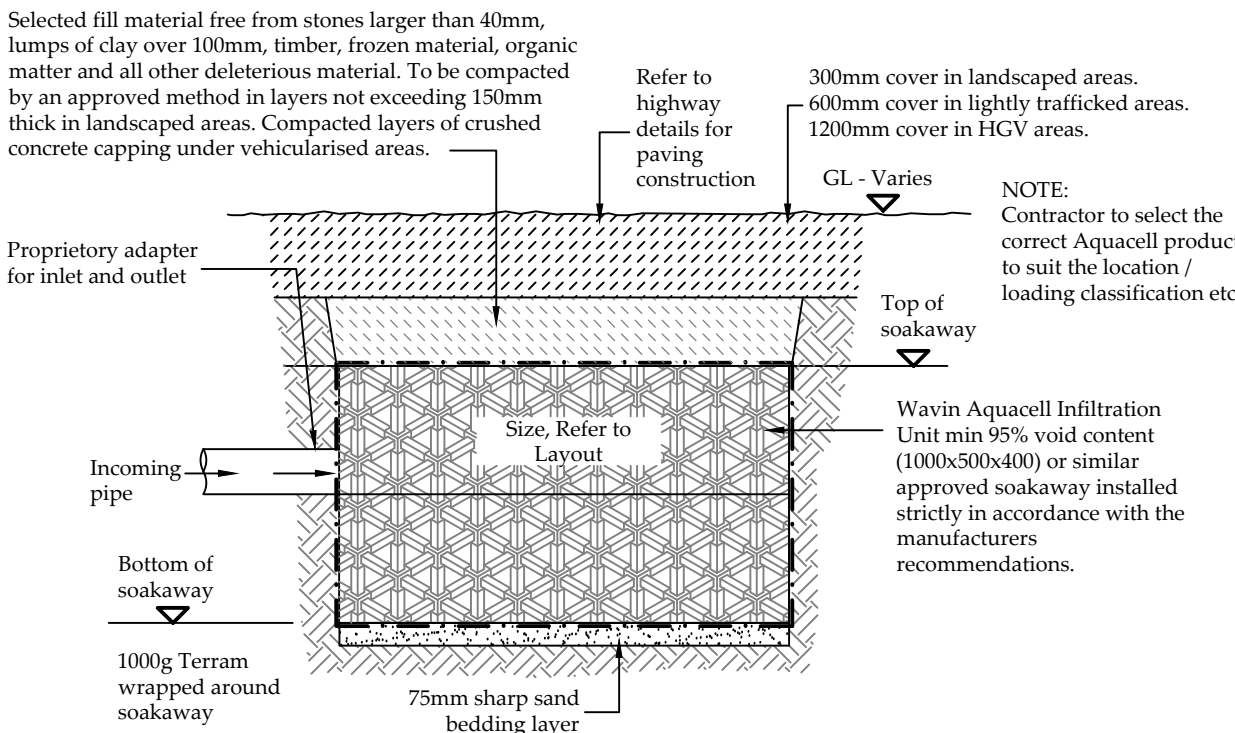


NOTE:
As an alternative to
a Brick Headwall,
an Althon SFA10 B
Headwall may be
proposed.



Gabion Mattress Plan
(1:25)

2No. 1.5m x 1.0m x
225mm Gabion mattresses
overfilled by 20 - 50mm
with local aggregate.
Galvanised to BS 729
with 75 x 75mm mesh.



Aquacell / Soakaway Detail

PRIVATE DRAINAGE NOTES
3.1 All private drainage works to be in accordance with Part H of the current Building Regulations and BS 8301.

3.2 All private drainage to be either:-
PVCu to BS EN 1401-1 (BS 4660/5481) by Osma, Marley or similar.
OR
Vitrified Clayware to BS 65 and BS EN 295.
OR
Concrete to BS 5911 and flexibly jointed.

The drainage design shown on this drawing has been based upon a PVCu drainage system.

3.3 All private drainage to be 100mm diameter unless noted otherwise. Gully laterals to be sized to suit gully outlets. Connections to public sewers to be 150mm dia unless noted otherwise.

3.4 Foundations adjacent to drain runs are to be constructed so that the difference between the formation level of the foundation and invert level of any drain must not exceed the horizontal distance minus 500mm.

3.5 Where foul and surface water sewers cross and there is less than 100mm clearance short lengths of both runs are to be encased in concrete.

3.6 All RWP, SVP and foul drainage positions are to be confirmed by the Architect.

3.7 Where RWP's are connected direct to drain, rodding access plates are to be provided.

Notes:

- 1.1 Do not scale from this drawing.
- 1.2 All dimensions are in m unless otherwise specified.
- 1.3 In case of any discrepancies in drawings or details refer to engineer for clarification. Unilateral decisions by the contractor will not be accepted.
- 1.4 This drawing is to be read in conjunction with all related Architects, Consultants & Sub-Contractors drawings and specifications.
- 1.5 The Contractor is to ensure that all design drawings and information are read concurrently and any discrepancies or omissions reported directly to Aventus Design.
- 1.6 The Contractor must check the levels of all existing drainage outfalls prior to construction of any drainage, unless otherwise agreed, to ensure the proposed design may be achieved. Any discrepancies must be reported immediately to Aventus Design.
- 1.7 Sulphates to be confirmed.
- 1.8 All adoptable highway works to be in accordance with the Local Authorities Specifications.
- 1.9 All adoptable drainage works to be in accordance with the Water Authorities standard guidelines for connections etc.
- 1.10 Formation to road/hardstanding to be proof rolled and any soft spots in subgrade of road/Hardstanding areas are to be excavated and replaced with well compacted sub-base or free draining granular material to Department of Transport Specification for Highway Works Part 2' Table 6/1 Class 1 (General Granular Fill) and compacted in accordance with Table 6/4.

Drawing Status	PLANNING ISSUE	
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REV.	DATE	DESCRIPTION	CHK	APP
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Aventus Design Ltd
Unit 5 - Leaches Farm
Business Centre
Bicester Road
Kingswood
Aylesbury
Bucks HP18 0RF
Tel: 01296 770066
Email: mail@aventusdesign.co.uk
Web: www.aventusdesign.co.uk

Aventus
DESIGN
Civil & Structural Engineers

Client: Sonning Golf Club

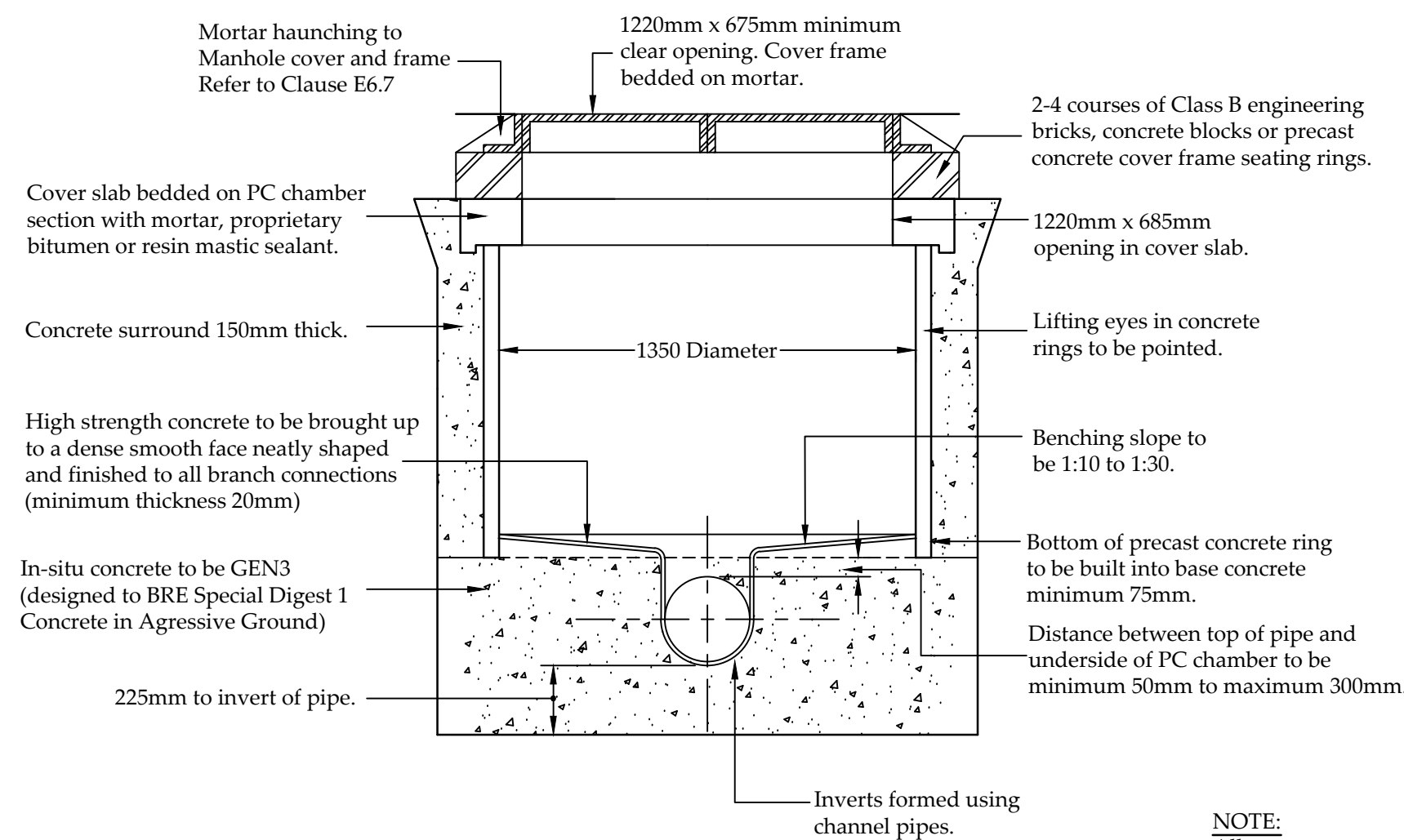
Site: Sonning Golf Club,
Duffield Road, Sonning
RG4 6GJ

Title: Drainage Details 2 of 3

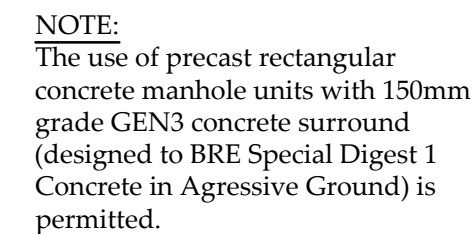
Drawing no. H1620 - 471

Issue:	Scale: 1:20 @ A1	Checked: -	Date: -
-	Drw: C.U.	Date: June '26	Approve: - Date: -

50mm
100mm
150mm
200mm
250mm
A1
ORIGINAL SIZE



NOTE:
All precast concrete sections/slab
and in-situ concrete to be GEN3
(designed to BRE Special Digest 1
Concrete in Aggressive Ground).



Diameter of largest pipe in MH (mm)	Internal dia. of MH (mm)
Less than 375	1200
375-700	1500
750-900	1800
Greater than 900	Consult Undertaker

Typical Manhole Detail - Type D

Depth from cover level to soffit of pipe less than 1.0m

The design of manholes will need to comply with the Undertaker's safety policy.

NOTE:
Pipe specification to "Sewers for Adoption"
6th edition.
Vitrified Clayware to BS 65 and BS EN 295.
OR
Concrete to BS 5911 Part 100 Class M loading
and flexibly jointed (Class 3 Sulphate resistant
cement).

movement joint of 13mm compressible board.

150

150

150

pipe encased in concrete minimum 100mm thick

1:25

1:25

The diagram shows a vertical cross-section of a test specimen. It consists of three main horizontal sections. The top section is labeled 'Lightly compacted' and has a height of 150 mm. Below this is a larger section labeled 'Over 1200mm' which contains a circular hole. The bottom section has a height of 150 mm. Arrows indicate the flow direction from the top section into the middle section.

Type B Cl. 505 free draining uniformly readily compactible material free from rubbish and organic matter, steel, timber, frozen soil, clay lumps, large stones and all other deleterious material. To be compacted by an approved method in layers not exceeding 150mm thick.

NOTE:
Under carriageway, backfill to be Type 1 granular material.

150mm minimum C20
concrete bed and surround

5-14mm graded imported granular bed and surround in accordance with "Sewers For

Adoption" 6th edition & the Water Authorities Association's "Information & Guidance Note No. 4-08-01". Alternative sized material maybe employed by local agreement.

Drawing Status	PLANNING ISSUE	
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REV.	DATE	DESCRIPTION	CHK	APP
Aventus Design Ltd Unit 5 - Leaches Farm Business Centre Bicoster Road Kingswood Aylesbury Bucks HP18 0RF Tel. 01296 770066			 Civil & Structural Engineers Email: mail@aventusdesign.co.uk Web: www.ventusdesign.co.uk	
Client: Sonning Golf Club				
Site: Sonning Golf Club, Duffield Road, Sonning RG4 6GJ				
Title: Drainage Details 3 of 3				
Drawing no. H1620 - 472				
Issue:	Scale:	1:20 @ A1	Checked:	Date:
-	Dim: C.U.	Date: June '26	Apprv:	Date:

APPENDIX F

CAUSEWAY "FLOW" CALCULATIONS

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	100	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	40	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.400	Preferred Cover Depth (m)	1.200
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)	Invert Level (m)
1	0.032	5.00	53.610	1200	476535.521	174833.050	1.210	52.400
2	0.025	5.00	53.640	1200	476552.164	174847.230	1.330	52.310
3	0.010	5.00	53.730	1200	476567.679	174867.766	1.520	52.210
4	0.024	5.00	53.520	1200	476584.984	174880.923	1.400	52.120
5			53.500	1200	476577.799	174909.586	1.500	52.000

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	1	2	21.865	0.600	52.400	52.310	0.090	242.9	300	5.36	50.0
1.001	2	3	25.738	0.600	52.310	52.210	0.100	257.4	300	5.80	50.0
1.002	3	4	21.739	0.600	52.210	52.120	0.090	241.5	300	6.16	50.0
1.003	4	5	29.550	0.600	52.120	52.000	0.120	246.2	300	6.66	50.0

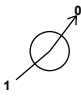
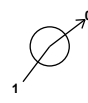
Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	1.004	71.0	6.1	0.910	1.030	0.032	0.0	59	0.618
1.001	0.975	68.9	10.8	1.030	1.220	0.057	0.0	80	0.715
1.002	1.007	71.2	12.7	1.220	1.100	0.067	0.0	85	0.765
1.003	0.997	70.5	17.3	1.100	1.200	0.091	0.0	101	0.829

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	21.865	242.9	300	Circular_Default Sewer Type	53.610	52.400	0.910	53.640	52.310	1.030
1.001	25.738	257.4	300	Circular_Default Sewer Type	53.640	52.310	1.030	53.730	52.210	1.220
1.002	21.739	241.5	300	Circular_Default Sewer Type	53.730	52.210	1.220	53.520	52.120	1.100
1.003	29.550	246.2	300	Circular_Default Sewer Type	53.520	52.120	1.100	53.500	52.000	1.200

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	1	1200	Manhole	Adoptable	2	1200	Manhole	Adoptable
1.001	2	1200	Manhole	Adoptable	3	1200	Manhole	Adoptable
1.002	3	1200	Manhole	Adoptable	4	1200	Manhole	Adoptable
1.003	4	1200	Manhole	Adoptable	5	1200	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
1	476535.521	174833.050	53.610	1.210	1200		0	1.000	52.400	300
2	476552.164	174847.230	53.640	1.330	1200		1	1.000	52.310	300
3	476567.679	174867.766	53.730	1.520	1200		1	1.001	52.210	300
4	476584.984	174880.923	53.520	1.400	1200		1	1.002	52.120	300
5	476577.799	174909.586	53.500	1.500	1200		1	1.003	52.000	300

Simulation Settings

Rainfall Methodology	FSR	Skip Steady State	✓
Rainfall Events	Singular	Drain Down Time (mins)	240
FSR Region	England and Wales	Additional Storage (m³/ha)	20.0
M5-60 (mm)	20.000	Starting Level (m)	
Ratio-R	0.400	Check Discharge Rate(s)	✓
Summer CV	0.750	Check Discharge Volume	✓
Winter CV	0.840	100 year 360 minute (m³)	
Analysis Speed	Normal		

Storm Durations

15 | 30 | 60 | 120 | 180 | 240 | 360 | 480 | 600 | 720 | 960 | 1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
100	40	0	0

Pre-development Discharge Rate

Site Makeup	Greenfield	Growth Factor 30 year	1.95
Greenfield Method	IH124	Growth Factor 100 year	2.48
Positively Drained Area (ha)		Betterment (%)	0
SAAR (mm)		QBar	
Soil Index	1	Q 1 year (l/s)	
SPR	0.10	Q 30 year (l/s)	
Region	1	Q 100 year (l/s)	
Growth Factor 1 year	0.85		

Pre-development Discharge Volume

Site Makeup	Greenfield	Return Period (years)	100
Greenfield Method	FSR/FEH	Climate Change (%)	0
Positively Drained Area (ha)		Storm Duration (mins)	360
Soil Index	1	Betterment (%)	0
SPR	0.10	PR	
CWI		Runoff Volume (m³)	

Node 5 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.03250	Safety Factor	2.0	Invert Level (m)	51.900
Side Inf Coefficient (m/hr)	0.03250	Porosity	1.00	Time to half empty (mins)	2463

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	32.0	32.0	2.000	483.0	493.5

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.73%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	1	10	52.510	0.110	20.0	0.1819	0.0000	OK
15 minute winter	2	11	52.470	0.160	35.3	0.2415	0.0000	OK
600 minute winter	3	585	52.452	0.242	3.8	0.3061	0.0000	OK
600 minute winter	4	585	52.452	0.332	5.0	0.4900	0.0000	SURCHARGED
600 minute winter	5	585	52.452	0.452	4.7	52.5928	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
15 minute winter	1	1.000	2	19.7	0.643	0.277	0.6706
15 minute winter	2	1.001	3	34.9	0.852	0.507	1.0637
600 minute winter	3	1.002	4	3.6	0.434	0.050	1.4284
600 minute winter	4	1.003	5	4.7	0.386	0.066	2.0809
600 minute winter	5	Infiltration		0.7			

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	100	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	40	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.400	Preferred Cover Depth (m)	1.200
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)	Invert Level (m)
20	0.027	5.00	54.070	1200	476428.341	174763.266	1.170	52.900
21	0.020	5.00	54.260	1200	476416.529	174748.796	1.480	52.780
22	0.036	5.00	53.760	1200	476442.049	174729.154	1.520	52.240
23	0.040	5.00	53.430	1200	476462.007	174716.609	1.660	51.770
24			53.300	1200	476468.880	174713.118	1.630	51.670

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	20	21	18.679	0.600	52.900	52.780	0.120	155.7	225	5.30	50.0
1.001	21	22	32.204	0.600	52.780	52.240	0.540	59.6	225	5.61	50.0
1.002	22	23	23.573	0.600	52.240	51.845	0.395	59.7	225	5.85	50.0
1.003	23	24	7.709	0.600	51.770	51.670	0.100	77.1	300	5.92	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	1.045	41.6	5.1	0.945	1.255	0.027	0.0	53	0.715
1.001	1.696	67.5	8.9	1.255	1.295	0.047	0.0	55	1.184
1.002	1.696	67.4	15.7	1.295	1.360	0.083	0.0	73	1.386
1.003	1.792	126.7	23.3	1.360	1.330	0.123	0.0	87	1.379

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	18.679	155.7	225	Circular_Default Sewer Type	54.070	52.900	0.945	54.260	52.780	1.255
1.001	32.204	59.6	225	Circular_Default Sewer Type	54.260	52.780	1.255	53.760	52.240	1.295
1.002	23.573	59.7	225	Circular_Default Sewer Type	53.760	52.240	1.295	53.430	51.845	1.360
1.003	7.709	77.1	300	Circular_Default Sewer Type	53.430	51.770	1.360	53.300	51.670	1.330

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	20	1200	Manhole	Adoptable	21	1200	Manhole	Adoptable
1.001	21	1200	Manhole	Adoptable	22	1200	Manhole	Adoptable
1.002	22	1200	Manhole	Adoptable	23	1200	Manhole	Adoptable
1.003	23	1200	Manhole	Adoptable	24	1200	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
20	476428.341	174763.266	54.070	1.170	1200		0	1.000	52.900	225
21	476416.529	174748.796	54.260	1.480	1200		1	1.000	52.780	225
22	476442.049	174729.154	53.760	1.520	1200		0	1.001	52.780	225
23	476462.007	174716.609	53.430	1.660	1200		1	1.001	52.240	225
24	476468.880	174713.118	53.300	1.630	1200		0	1.002	52.240	225
							1	1.002	51.845	225
							0	1.003	51.770	300
							1	1.003	51.670	300

Simulation Settings

Rainfall Methodology	FSR	Skip Steady State	✓
Rainfall Events	Singular	Drain Down Time (mins)	240
FSR Region	England and Wales	Additional Storage (m³/ha)	20.0
M5-60 (mm)	20.000	Starting Level (m)	
Ratio-R	0.400	Check Discharge Rate(s)	✓
Summer CV	0.750	Check Discharge Volume	✓
Winter CV	0.840	100 year 360 minute (m³)	
Analysis Speed	Normal		

Storm Durations

15 | 30 | 60 | 120 | 180 | 240 | 360 | 480 | 600 | 720 | 960 | 1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
100	40	0	0

Pre-development Discharge Rate

Site Makeup	Greenfield	Growth Factor 30 year	1.95
Greenfield Method	IH124	Growth Factor 100 year	2.48
Positively Drained Area (ha)		Betterment (%)	0
SAAR (mm)		QBar	
Soil Index	1	Q 1 year (l/s)	
SPR	0.10	Q 30 year (l/s)	
Region	1	Q 100 year (l/s)	
Growth Factor 1 year	0.85		

Pre-development Discharge Volume

Site Makeup	Greenfield	Return Period (years)	100
Greenfield Method	FSR/FEH	Climate Change (%)	0
Positively Drained Area (ha)		Storm Duration (mins)	360
Soil Index	1	Betterment (%)	0
SPR	0.10	PR	
CWI		Runoff Volume (m³)	

Node 24 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.03250	Safety Factor	2.0	Invert Level (m)	51.500
Side Inf Coefficient (m/hr)	0.03250	Porosity	0.95	Time to half empty (mins)	1324

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	105.0	105.0	0.800	105.0	134.1	0.900	0.0	134.1

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.77%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	20	10	53.005	0.105	17.0	0.1666	0.0000	OK
15 minute winter	21	10	52.882	0.102	29.3	0.1432	0.0000	OK
15 minute winter	22	11	52.396	0.156	51.4	0.2511	0.0000	OK
600 minute winter	23	585	52.306	0.536	7.0	0.8639	0.0000	SURCHARGED
600 minute winter	24	585	52.306	0.636	10.0	81.0627	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
15 minute winter	20	1.000	21	16.7	0.941	0.403	0.3323
15 minute winter	21	1.001	22	28.9	1.227	0.428	0.7550
15 minute winter	22	1.002	23	50.8	1.800	0.753	0.6648
600 minute winter	23	1.003	24	10.0	0.836	0.079	0.5429
600 minute winter	24	Infiltration		0.6			

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	100	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	40	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.400	Preferred Cover Depth (m)	1.200
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)	Invert Level (m)
30	0.038	5.00	53.610	1200	476507.753	174790.564	1.510	52.100
31	0.026	5.00	53.400	1200	476500.279	174772.417	1.600	51.800
32			53.300	1200	476503.753	174769.961	1.600	51.700

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	30	31	19.626	0.600	52.100	51.800	0.300	65.4	225	5.20	50.0
1.001	31	32	4.254	0.600	51.800	51.700	0.100	42.5	225	5.24	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	1.619	64.4	7.2	1.285	1.375	0.038	0.0	51	1.077
1.001	2.011	80.0	12.1	1.375	1.375	0.064	0.0	59	1.466

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	19.626	65.4	225	Circular_Default Sewer Type	53.610	52.100	1.285	53.400	51.800	1.375
1.001	4.254	42.5	225	Circular_Default Sewer Type	53.400	51.800	1.375	53.300	51.700	1.375

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	30	1200	Manhole	Adoptable	31	1200	Manhole	Adoptable
1.001	31	1200	Manhole	Adoptable	32	1200	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
30	476507.753	174790.564	53.610	1.510	1200		0	1.000	52.100	225
31	476500.279	174772.417	53.400	1.600	1200		1	1.000	51.800	225
							0	1.001	51.800	225

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
32	476503.753	174769.961	53.300	1.600	1200	1 	1.001	51.700	225

Simulation Settings

Rainfall Methodology	FSR	Skip Steady State	✓
Rainfall Events	Singular	Drain Down Time (mins)	240
FSR Region	England and Wales	Additional Storage (m³/ha)	20.0
M5-60 (mm)	20.000	Starting Level (m)	
Ratio-R	0.400	Check Discharge Rate(s)	✓
Summer CV	0.750	Check Discharge Volume	✓
Winter CV	0.840	100 year 360 minute (m³)	
Analysis Speed	Normal		

Storm Durations

15 | 30 | 60 | 120 | 180 | 240 | 360 | 480 | 600 | 720 | 960 | 1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
100	40	0	0

Pre-development Discharge Rate

Site Makeup	Greenfield	Growth Factor 30 year	1.95
Greenfield Method	IH124	Growth Factor 100 year	2.48
Positively Drained Area (ha)		Betterment (%)	0
SAAR (mm)		QBar	
Soil Index	1	Q 1 year (l/s)	
SPR	0.10	Q 30 year (l/s)	
Region	1	Q 100 year (l/s)	
Growth Factor 1 year	0.85		

Pre-development Discharge Volume

Site Makeup	Greenfield	Return Period (years)	100
Greenfield Method	FSR/FEH	Climate Change (%)	0
Positively Drained Area (ha)		Storm Duration (mins)	360
Soil Index	1	Betterment (%)	0
SPR	0.10	PR	
CWI		Runoff Volume (m³)	

Node 32 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.03250	Safety Factor	2.0	Invert Level (m)	51.500
Side Inf Coefficient (m/hr)	0.03250	Porosity	0.95	Time to half empty (mins)	1231

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	56.0	56.0	0.800	56.0	77.2	0.900	0.0	77.2

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.63%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
600 minute winter	30	585	52.264	0.164	2.2	0.2672	0.0000	OK
600 minute winter	31	585	52.264	0.464	10.2	0.6749	0.0000	SURCHARGED
600 minute winter	32	585	52.264	0.564	7.9	41.2569	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
600 minute winter	30	1.000	31	2.2	0.660	0.034	0.6936
600 minute winter	31	1.001	32	7.9	0.880	0.099	0.1692
600 minute winter	32	Infiltration		0.3			

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	100	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	40	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.400	Preferred Cover Depth (m)	1.200
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)	Invert Level (m)
40	0.026	5.00	53.950	1200	476487.705	174798.553	1.450	52.500
41			54.240	1200	476472.567	174807.022	2.040	52.200
42			54.100	1200	476470.190	174803.715	2.000	52.100

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	40	41	17.346	0.600	52.500	52.200	0.300	57.8	225	5.17	50.0
1.001	41	42	4.073	0.600	52.200	52.100	0.100	40.7	225	5.20	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	1.723	68.5	4.9	1.225	1.815	0.026	0.0	41	1.012
1.001	2.056	81.7	4.9	1.815	1.775	0.026	0.0	37	1.144

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	17.346	57.8	225	Circular_Default Sewer Type	53.950	52.500	1.225	54.240	52.200	1.815
1.001	4.073	40.7	225	Circular_Default Sewer Type	54.240	52.200	1.815	54.100	52.100	1.775

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	40	1200	Manhole	Adoptable	41	1200	Manhole	Adoptable
1.001	41	1200	Manhole	Adoptable	42	1200	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
40	476487.705	174798.553	53.950	1.450	1200		0	1.000	52.500	225
41	476472.567	174807.022	54.240	2.040	1200		1	1.000	52.200	225
							0	1.001	52.200	225

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
42	476470.190	174803.715	54.100	2.000	1200		1	1.001	52.100 225

Simulation Settings

Rainfall Methodology	FSR	Skip Steady State	✓
Rainfall Events	Singular	Drain Down Time (mins)	240
FSR Region	England and Wales	Additional Storage (m³/ha)	20.0
M5-60 (mm)	20.000	Starting Level (m)	
Ratio-R	0.400	Check Discharge Rate(s)	✓
Summer CV	0.750	Check Discharge Volume	✓
Winter CV	0.840	100 year 360 minute (m³)	
Analysis Speed	Normal		

Storm Durations

15 | 30 | 60 | 120 | 180 | 240 | 360 | 480 | 600 | 720 | 960 | 1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
100	40	0	0

Pre-development Discharge Rate

Site Makeup	Greenfield	Growth Factor 30 year	1.95
Greenfield Method	IH124	Growth Factor 100 year	2.48
Positively Drained Area (ha)		Betterment (%)	0
SAAR (mm)		QBar	
Soil Index	1	Q 1 year (l/s)	
SPR	0.10	Q 30 year (l/s)	
Region	1	Q 100 year (l/s)	
Growth Factor 1 year	0.85		

Pre-development Discharge Volume

Site Makeup	Greenfield	Return Period (years)	100
Greenfield Method	FSR/FEH	Climate Change (%)	0
Positively Drained Area (ha)		Storm Duration (mins)	360
Soil Index	1	Betterment (%)	0
SPR	0.10	PR	
CWI		Runoff Volume (m³)	

Node 42 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.03250	Safety Factor	2.0	Invert Level (m)	52.100
Side Inf Coefficient (m/hr)	0.03250	Porosity	0.95	Time to half empty (mins)	894

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	18.0	18.0	0.800	18.0	30.0	0.900	0.0	30.0

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 98.53%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
600 minute winter	40	600	52.969	0.469	1.5	0.6981	0.0000	SURCHARGED
600 minute winter	41	600	52.969	0.769	2.4	0.8692	0.0000	SURCHARGED
600 minute winter	42	600	52.969	0.869	2.2	15.4327	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
600 minute winter	40	1.000	41	1.4	0.491	0.020	0.6899
600 minute winter	41	1.001	42	2.2	0.533	0.027	0.1620
600 minute winter	42	Infiltration		0.1			

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	100	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	40	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.400	Preferred Cover Depth (m)	1.200
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)	Invert Level (m)
1	0.006	5.00	53.500	450	100.000	100.000	1.500	52.000
2	0.005		53.500	450	110.000	100.000	1.700	51.800

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
PIPE	1	2	10.000	0.600	52.000	51.800	0.200	50.0	150	5.12	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
PIPE	1.426	25.2	1.1	1.350	1.550	0.006	0.0	22	0.726

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
PIPE	10.000	50.0	150	Circular_Default Sewer Type	53.500	52.000	1.350	53.500	51.800	1.550

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
PIPE	1	450	Manhole	Adoptable	2	450	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
1	100.000	100.000	53.500	1.500	450		0	PIPE 52.000	150
2	110.000	100.000	53.500	1.700	450		1	PIPE 51.800	150

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Normal
Rainfall Events	Singular	Skip Steady State	x
FSR Region	England and Wales	Drain Down Time (mins)	240
M5-60 (mm)	20.000	Additional Storage (m ³ /ha)	20.0
Ratio-R	0.400	Starting Level (m)	
Summer CV	0.750	Check Discharge Rate(s)	x
Winter CV	0.840	Check Discharge Volume	x

Storm Durations

15 | 30 | 60 | 120 | 180 | 240 | 360 | 480 | 600 | 720 | 960 | 1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
100	40	0	0

Node 2 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.03250	Safety Factor	2.0	Invert Level (m)	51.500
Side Inf Coefficient (m/hr)	0.03250	Porosity	0.95	Time to half empty (mins)	744

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	8.0	8.0	0.800	8.0	16.0	0.900	0.0	16.0

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 97.91%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
600 minute winter	1	570	52.713	0.713	0.3	0.1704	0.0000	SURCHARGED
600 minute winter	2	570	52.713	0.913	0.6	6.6592	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
600 minute winter	1	PIPE	2	0.3	0.424	0.012	0.1760
600 minute winter	2	Infiltration		0.1			

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	100	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	40	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.400	Preferred Cover Depth (m)	1.200
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)	Invert Level (m)
1	0.006	5.00	53.500	450	100.000	100.000	1.500	52.000
2	0.006		53.500	450	110.000	100.000	1.700	51.800

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
PIPE	1	2	10.000	0.600	52.000	51.800	0.200	50.0	150	5.12	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
PIPE	1.426	25.2	1.1	1.350	1.550	0.006	0.0	22	0.726

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
PIPE	10.000	50.0	150	Circular_Default Sewer Type	53.500	52.000	1.350	53.500	51.800	1.550

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
PIPE	1	450	Manhole	Adoptable	2	450	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
1	100.000	100.000	53.500	1.500	450				
						0	PIPE	52.000	150
2	110.000	100.000	53.500	1.700	450		1	PIPE	51.800
						1	PIPE	51.800	150

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Normal
Rainfall Events	Singular	Skip Steady State	x
FSR Region	England and Wales	Drain Down Time (mins)	240
M5-60 (mm)	20.000	Additional Storage (m ³ /ha)	20.0
Ratio-R	0.400	Starting Level (m)	
Summer CV	0.750	Check Discharge Rate(s)	x
Winter CV	0.840	Check Discharge Volume	x

Storm Durations

15 | 30 | 60 | 120 | 180 | 240 | 360 | 480 | 600 | 720 | 960 | 1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
100	40	0	0

Node 2 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.03250	Safety Factor	2.0	Invert Level (m)	51.500
Side Inf Coefficient (m/hr)	0.03250	Porosity	0.95	Time to half empty (mins)	766

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	9.0	9.0	0.800	9.0	17.5	0.900	0.0	17.5

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 98.14%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
720 minute winter	1	675	52.878	0.878	0.3	0.2097	0.0000	SURCHARGED
720 minute winter	2	675	52.878	1.078	0.6	7.5155	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
720 minute winter	1	PIPE	2	0.3	0.424	0.012	0.1760
720 minute winter	2	Infiltration		0.1			

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	100	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	40	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.400	Preferred Cover Depth (m)	1.200
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)	Invert Level (m)
1	0.020	5.00	53.500	450	100.000	100.000	1.500	52.000
2	0.019		53.500	450	110.000	100.000	1.700	51.800

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
PIPE	1	2	10.000	0.600	52.000	51.800	0.200	50.0	150	5.12	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
PIPE	1.426	25.2	3.8	1.350	1.550	0.020	0.0	40	1.034

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
PIPE	10.000	50.0	150	Circular_Default Sewer Type	53.500	52.000	1.350	53.500	51.800	1.550

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
PIPE	1	450	Manhole	Adoptable	2	450	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
1	100.000	100.000	53.500	1.500	450				
						0	PIPE	52.000	150
2	110.000	100.000	53.500	1.700	450		1	PIPE	51.800
						1	PIPE	51.800	150

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Normal
Rainfall Events	Singular	Skip Steady State	x
FSR Region	England and Wales	Drain Down Time (mins)	240
M5-60 (mm)	20.000	Additional Storage (m ³ /ha)	20.0
Ratio-R	0.400	Starting Level (m)	
Summer CV	0.750	Check Discharge Rate(s)	x
Winter CV	0.840	Check Discharge Volume	x

Storm Durations

15 | 30 | 60 | 120 | 180 | 240 | 360 | 480 | 600 | 720 | 960 | 1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
100	40	0	0

Node 2 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.03250	Safety Factor	2.0	Invert Level (m)	51.500
Side Inf Coefficient (m/hr)	0.03250	Porosity	0.95	Time to half empty (mins)	993

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	32.0	32.0	0.800	32.0	48.0	0.900	0.0	48.0

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.66%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
720 minute winter	1	690	52.367	0.367	1.0	0.1563	0.0000	SURCHARGED
720 minute winter	2	690	52.367	0.567	1.9	25.8906	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
720 minute winter	1	PIPE	2	1.0	0.643	0.040	0.1760
720 minute winter	2	Infiltration		0.2			

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	100	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	40	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.400	Preferred Cover Depth (m)	1.200
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)	Invert Level (m)
1	0.007	5.00	53.500	450	100.000	100.000	1.500	52.000
2	0.007		53.500	450	110.000	100.000	1.700	51.800

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
PIPE	1	2	10.000	0.600	52.000	51.800	0.200	50.0	150	5.12	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
PIPE	1.426	25.2	1.3	1.350	1.550	0.007	0.0	23	0.750

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
PIPE	10.000	50.0	150	Circular_Default Sewer Type	53.500	52.000	1.350	53.500	51.800	1.550

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
PIPE	1	450	Manhole	Adoptable	2	450	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
1	100.000	100.000	53.500	1.500	450				
						0	PIPE	52.000	150
2	110.000	100.000	53.500	1.700	450		1	PIPE	51.800
						1	PIPE	51.800	150

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Normal
Rainfall Events	Singular	Skip Steady State	x
FSR Region	England and Wales	Drain Down Time (mins)	240
M5-60 (mm)	20.000	Additional Storage (m ³ /ha)	20.0
Ratio-R	0.400	Starting Level (m)	
Summer CV	0.750	Check Discharge Rate(s)	x
Winter CV	0.840	Check Discharge Volume	x

Storm Durations

15 | 30 | 60 | 120 | 180 | 240 | 360 | 480 | 600 | 720 | 960 | 1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
100	40	0	0

Node 2 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.03250	Safety Factor	2.0	Invert Level (m)	51.500
Side Inf Coefficient (m/hr)	0.03250	Porosity	0.95	Time to half empty (mins)	804

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	11.0	11.0	0.800	11.0	20.4	0.900	0.0	20.4

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 98.76%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
720 minute winter	1	690	52.549	0.549	0.3	0.1384	0.0000	SURCHARGED
720 minute winter	2	690	52.549	0.749	0.6	9.0632	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
720 minute winter	1	PIPE	2	0.3	0.478	0.012	0.1760
720 minute winter	2	Infiltration		0.1			

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	100	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	40	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.400	Preferred Cover Depth (m)	1.200
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)	Invert Level (m)
1	0.006	5.00	53.500	450	100.000	100.000	1.500	52.000
2	0.005		53.500	450	110.000	100.000	1.700	51.800

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
PIPE	1	2	10.000	0.600	52.000	51.800	0.200	50.0	150	5.12	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
PIPE	1.426	25.2	1.1	1.350	1.550	0.006	0.0	22	0.726

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
PIPE	10.000	50.0	150	Circular_Default Sewer Type	53.500	52.000	1.350	53.500	51.800	1.550

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
PIPE	1	450	Manhole	Adoptable	2	450	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
1	100.000	100.000	53.500	1.500	450				
						0	PIPE	52.000	150
2	110.000	100.000	53.500	1.700	450		1	PIPE	51.800
						1	PIPE	51.800	150

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Normal
Rainfall Events	Singular	Skip Steady State	x
FSR Region	England and Wales	Drain Down Time (mins)	240
M5-60 (mm)	20.000	Additional Storage (m ³ /ha)	20.0
Ratio-R	0.400	Starting Level (m)	
Summer CV	0.750	Check Discharge Rate(s)	x
Winter CV	0.840	Check Discharge Volume	x

Storm Durations

15 | 30 | 60 | 120 | 180 | 240 | 360 | 480 | 600 | 720 | 960 | 1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
100	40	0	0

Node 2 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.03250	Safety Factor	2.0	Invert Level (m)	51.500
Side Inf Coefficient (m/hr)	0.03250	Porosity	0.95	Time to half empty (mins)	744

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	8.0	8.0	0.800	8.0	16.0	0.900	0.0	16.0

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 97.91%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
600 minute winter	1	570	52.713	0.713	0.3	0.1704	0.0000	SURCHARGED
600 minute winter	2	570	52.713	0.913	0.6	6.6592	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
600 minute winter	1	PIPE	2	0.3	0.424	0.012	0.1760
600 minute winter	2	Infiltration		0.1			

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	100	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	40	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.400	Preferred Cover Depth (m)	1.200
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)	Invert Level (m)
1	0.004	5.00	53.500	450	100.000	100.000	1.500	52.000
2	0.003		53.500	450	110.000	100.000	1.700	51.800

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
PIPE	1	2	10.000	0.600	52.000	51.800	0.200	50.0	150	5.12	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
PIPE	1.426	25.2	0.8	1.350	1.550	0.004	0.0	18	0.636

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
PIPE	10.000	50.0	150	Circular_Default Sewer Type	53.500	52.000	1.350	53.500	51.800	1.550

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
PIPE	1	450	Manhole	Adoptable	2	450	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
1	100.000	100.000	53.500	1.500	450				
						0	PIPE	52.000	150
2	110.000	100.000	53.500	1.700	450		1	PIPE	51.800
						1	PIPE	51.800	150

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Normal
Rainfall Events	Singular	Skip Steady State	x
FSR Region	England and Wales	Drain Down Time (mins)	240
M5-60 (mm)	20.000	Additional Storage (m ³ /ha)	20.0
Ratio-R	0.400	Starting Level (m)	
Summer CV	0.750	Check Discharge Rate(s)	x
Winter CV	0.840	Check Discharge Volume	x

Storm Durations

15 | 30 | 60 | 120 | 180 | 240 | 360 | 480 | 600 | 720 | 960 | 1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
100	40	0	0

Node 2 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.03250	Safety Factor	2.0	Invert Level (m)	51.500
Side Inf Coefficient (m/hr)	0.03250	Porosity	0.95	Time to half empty (mins)	657

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	5.0	5.0	0.800	5.0	11.3	0.900	0.0	11.3

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 97.64%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
360 minute winter	1	336	52.312	0.312	0.3	0.0661	0.0000	SURCHARGED
360 minute winter	2	344	52.312	0.512	0.6	3.9514	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
360 minute winter	1	PIPE	2	0.3	0.477	0.012	0.1760
360 minute winter	2	Infiltration		0.1			

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	100	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	40	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.400	Preferred Cover Depth (m)	1.200
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)	Invert Level (m)
1	0.009	5.00	53.500	450	100.000	100.000	1.500	52.000
2	0.008		53.500	450	110.000	100.000	1.700	51.800

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
PIPE	1	2	10.000	0.600	52.000	51.800	0.200	50.0	150	5.12	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
PIPE	1.426	25.2	1.7	1.350	1.550	0.009	0.0	27	0.819

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
PIPE	10.000	50.0	150	Circular_Default Sewer Type	53.500	52.000	1.350	53.500	51.800	1.550

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
PIPE	1	450	Manhole	Adoptable	2	450	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
1	100.000	100.000	53.500	1.500	450		0	PIPE 52.000	150
2	110.000	100.000	53.500	1.700	450		1	PIPE 51.800	150

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Normal
Rainfall Events	Singular	Skip Steady State	x
FSR Region	England and Wales	Drain Down Time (mins)	240
M5-60 (mm)	20.000	Additional Storage (m³/ha)	20.0
Ratio-R	0.400	Starting Level (m)	
Summer CV	0.750	Check Discharge Rate(s)	x
Winter CV	0.840	Check Discharge Volume	x

Storm Durations

15 | 30 | 60 | 120 | 180 | 240 | 360 | 480 | 600 | 720 | 960 | 1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
100	40	0	0

Node 2 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.03250	Safety Factor	2.0	Invert Level (m)	51.500
Side Inf Coefficient (m/hr)	0.03250	Porosity	0.95	Time to half empty (mins)	848

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	14.0	14.0	0.800	14.0	24.6	0.900	0.0	24.6

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.15%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
960 minute winter	1	915	52.517	0.517	0.4	0.1442	0.0000	SURCHARGED
960 minute winter	2	915	52.517	0.717	0.7	11.4865	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
960 minute winter	1	PIPE	2	0.4	0.480	0.016	0.1760
960 minute winter	2	Infiltration		0.1			

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	100	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	40	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.400	Preferred Cover Depth (m)	1.200
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)	Invert Level (m)
1	0.005	5.00	53.500	450	100.000	100.000	1.500	52.000
2	0.005		53.500	450	110.000	100.000	1.700	51.800

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
PIPE	1	2	10.000	0.600	52.000	51.800	0.200	50.0	150	5.12	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
PIPE	1.426	25.2	0.9	1.350	1.550	0.005	0.0	20	0.676

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
PIPE	10.000	50.0	150	Circular_Default Sewer Type	53.500	52.000	1.350	53.500	51.800	1.550

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
PIPE	1	450	Manhole	Adoptable	2	450	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
1	100.000	100.000	53.500	1.500	450				
						0	PIPE	52.000	150
2	110.000	100.000	53.500	1.700	450		1	PIPE	51.800
						1	PIPE	51.800	150

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Normal
Rainfall Events	Singular	Skip Steady State	x
FSR Region	England and Wales	Drain Down Time (mins)	240
M5-60 (mm)	20.000	Additional Storage (m³/ha)	20.0
Ratio-R	0.400	Starting Level (m)	
Summer CV	0.750	Check Discharge Rate(s)	x
Winter CV	0.840	Check Discharge Volume	x

Storm Durations

15 | 30 | 60 | 120 | 180 | 240 | 360 | 480 | 600 | 720 | 960 | 1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
100	40	0	0

Node 2 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.03250	Safety Factor	2.0	Invert Level (m)	51.500
Side Inf Coefficient (m/hr)	0.03250	Porosity	0.95	Time to half empty (mins)	732

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	7.5	7.5	0.800	7.5	15.3	0.900	0.0	15.3

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 97.89%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
600 minute winter	1	555	52.581	0.581	0.3	0.1314	0.0000	SURCHARGED
600 minute winter	2	555	52.581	0.781	0.6	6.2267	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
600 minute winter	1	PIPE	2	0.3	0.424	0.012	0.1760
600 minute winter	2	Infiltration		0.1			

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	100	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	40	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.400	Preferred Cover Depth (m)	1.200
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)	Invert Level (m)
1	0.013	5.00	53.500	450	100.000	100.000	1.500	52.000
2	0.013		53.500	450	110.000	100.000	1.700	51.800

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
PIPE	1	2	10.000	0.600	52.000	51.800	0.200	50.0	150	5.12	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
PIPE	1.426	25.2	2.5	1.350	1.550	0.013	0.0	32	0.913

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
PIPE	10.000	50.0	150	Circular_Default Sewer Type	53.500	52.000	1.350	53.500	51.800	1.550

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
PIPE	1	450	Manhole	Adoptable	2	450	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
1	100.000	100.000	53.500	1.500	450				
						0	PIPE	52.000	150
2	110.000	100.000	53.500	1.700	450		1	PIPE	51.800
						1	PIPE	51.800	150

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Normal
Rainfall Events	Singular	Skip Steady State	x
FSR Region	England and Wales	Drain Down Time (mins)	240
M5-60 (mm)	20.000	Additional Storage (m ³ /ha)	20.0
Ratio-R	0.400	Starting Level (m)	
Summer CV	0.750	Check Discharge Rate(s)	x
Winter CV	0.840	Check Discharge Volume	x

Storm Durations

15 | 30 | 60 | 120 | 180 | 240 | 360 | 480 | 600 | 720 | 960 | 1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
100	40	0	0

Node 2 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.03250	Safety Factor	2.0	Invert Level (m)	51.500
Side Inf Coefficient (m/hr)	0.03250	Porosity	0.95	Time to half empty (mins)	944

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	24.0	24.0	0.800	24.0	37.9	0.900	0.0	37.9

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.70%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
480 minute winter	1	472	52.232	0.232	0.9	0.0770	0.0000	SURCHARGED
480 minute winter	2	472	52.232	0.432	1.8	16.8238	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
480 minute winter	1	PIPE	2	0.9	0.644	0.036	0.1760
480 minute winter	2	Infiltration		0.2			

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	100	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	40	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.400	Preferred Cover Depth (m)	1.200
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)	Invert Level (m)
1	0.007	5.00	53.500	450	100.000	100.000	1.500	52.000
2	0.006		53.500	450	110.000	100.000	1.700	51.800

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
PIPE	1	2	10.000	0.600	52.000	51.800	0.200	50.0	150	5.12	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
PIPE	1.426	25.2	1.3	1.350	1.550	0.007	0.0	23	0.750

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
PIPE	10.000	50.0	150	Circular_Default Sewer Type	53.500	52.000	1.350	53.500	51.800	1.550

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
PIPE	1	450	Manhole	Adoptable	2	450	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
1	100.000	100.000	53.500	1.500	450				
						0	PIPE	52.000	150
2	110.000	100.000	53.500	1.700	450		1	PIPE	51.800
						1	PIPE	51.800	150

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Normal
Rainfall Events	Singular	Skip Steady State	x
FSR Region	England and Wales	Drain Down Time (mins)	240
M5-60 (mm)	20.000	Additional Storage (m³/ha)	20.0
Ratio-R	0.400	Starting Level (m)	
Summer CV	0.750	Check Discharge Rate(s)	x
Winter CV	0.840	Check Discharge Volume	x

Storm Durations

15 | 30 | 60 | 120 | 180 | 240 | 360 | 480 | 600 | 720 | 960 | 1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
100	40	0	0

Node 2 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.03250	Safety Factor	2.0	Invert Level (m)	51.500
Side Inf Coefficient (m/hr)	0.03250	Porosity	0.95	Time to half empty (mins)	786

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	10.0	10.0	0.800	10.0	19.0	0.900	0.0	19.0

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 98.51%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
720 minute winter	1	675	52.711	0.711	0.3	0.1792	0.0000	SURCHARGED
720 minute winter	2	675	52.711	0.911	0.6	8.2847	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
720 minute winter	1	PIPE	2	0.3	0.450	0.012	0.1760
720 minute winter	2	Infiltration		0.1			

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	100	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	40	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.400	Preferred Cover Depth (m)	1.200
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)	Invert Level (m)
1	0.007	5.00	53.500	450	100.000	100.000	1.500	52.000
2	0.007		53.500	450	110.000	100.000	1.700	51.800

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
PIPE	1	2	10.000	0.600	52.000	51.800	0.200	50.0	150	5.12	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
PIPE	1.426	25.2	1.3	1.350	1.550	0.007	0.0	23	0.750

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
PIPE	10.000	50.0	150	Circular_Default Sewer Type	53.500	52.000	1.350	53.500	51.800	1.550

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
PIPE	1	450	Manhole	Adoptable	2	450	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
1	100.000	100.000	53.500	1.500	450				
						0	PIPE	52.000	150
2	110.000	100.000	53.500	1.700	450		1	PIPE	51.800
						1	PIPE	51.800	150

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Normal
Rainfall Events	Singular	Skip Steady State	x
FSR Region	England and Wales	Drain Down Time (mins)	240
M5-60 (mm)	20.000	Additional Storage (m ³ /ha)	20.0
Ratio-R	0.400	Starting Level (m)	
Summer CV	0.750	Check Discharge Rate(s)	x
Winter CV	0.840	Check Discharge Volume	x

Storm Durations

15 | 30 | 60 | 120 | 180 | 240 | 360 | 480 | 600 | 720 | 960 | 1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
100	40	0	0

Node 2 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.03250	Safety Factor	2.0	Invert Level (m)	51.500
Side Inf Coefficient (m/hr)	0.03250	Porosity	0.95	Time to half empty (mins)	795

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	10.5	10.5	0.800	10.5	19.7	0.900	0.0	19.7

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 98.50%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
720 minute winter	1	690	52.792	0.792	0.3	0.1996	0.0000	SURCHARGED
720 minute winter	2	690	52.792	0.992	0.6	8.7180	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
720 minute winter	1	PIPE	2	0.3	0.424	0.012	0.1760
720 minute winter	2	Infiltration		0.1			

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	100	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	40	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.400	Preferred Cover Depth (m)	1.200
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)	Invert Level (m)
1	0.010	5.00	53.500	450	100.000	100.000	1.500	52.000
2	0.010		53.500	450	110.000	100.000	1.700	51.800

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
PIPE	1	2	10.000	0.600	52.000	51.800	0.200	50.0	150	5.12	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
PIPE	1.426	25.2	1.9	1.350	1.550	0.010	0.0	28	0.841

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
PIPE	10.000	50.0	150	Circular_Default Sewer Type	53.500	52.000	1.350	53.500	51.800	1.550

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
PIPE	1	450	Manhole	Adoptable	2	450	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
1	100.000	100.000	53.500	1.500	450				
						0	PIPE	52.000	150
2	110.000	100.000	53.500	1.700	450		1	PIPE	51.800
						1	PIPE	51.800	150

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Normal
Rainfall Events	Singular	Skip Steady State	x
FSR Region	England and Wales	Drain Down Time (mins)	240
M5-60 (mm)	20.000	Additional Storage (m ³ /ha)	20.0
Ratio-R	0.400	Starting Level (m)	
Summer CV	0.750	Check Discharge Rate(s)	x
Winter CV	0.840	Check Discharge Volume	x

Storm Durations

15 | 30 | 60 | 120 | 180 | 240 | 360 | 480 | 600 | 720 | 960 | 1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
100	40	0	0

Node 2 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.03250	Safety Factor	2.0	Invert Level (m)	51.500
Side Inf Coefficient (m/hr)	0.03250	Porosity	0.95	Time to half empty (mins)	861

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	15.0	15.0	0.800	15.0	26.0	0.900	0.0	26.0

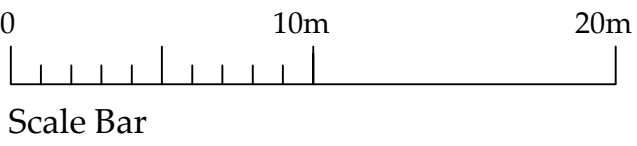
Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 98.98%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
1440 minute winter	1	1290	53.165	1.165	0.3	0.3401	0.0000	SURCHARGED
1440 minute winter	2	1290	53.165	1.365	0.6	12.4907	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
1440 minute winter	1	PIPE	2	0.3	0.424	0.012	0.1760
1440 minute winter	2	Infiltration		0.1			

APPENDIX G

DESIGN EXCEEDANCE



Design Exceedance

Overland Floodflow



- Notes:
- 1.1 Do not scale from this drawing.
 - 1.2 All dimensions are in m unless otherwise specified.
 - 1.3 In case of any discrepancies in drawings or details refer to engineer for clarification. Unilateral decisions by the contractor will not be accepted.
 - 1.4 This drawing is to be read in conjunction with all related Architects, Consultants & Sub-Contractors drawings and specifications.
 - 1.5 The Contractor is to ensure that all design drawings and information are read concurrently and any discrepancies or omissions reported directly to Aventus Design.
 - 1.6 This drawing is based upon the survey by KND Surveys Ltd, reference E 12 22 dated 31st May 2022 provided in digital format.
 - 1.7 Levels are related to previous KND Surveys Drawing (A0515-T).
 - 1.8 The grid relates to a local datum.
 - 1.9 The Contractor must check the levels of all existing drainage outfalls prior to construction of any drainage, unless otherwise agreed, to ensure the proposed design may be achieved. Any discrepancies must be reported immediately to Aventus Design.
 - 1.10 Sulphates have been determined as class 1 (DS-x) for design purposes in accordance with BRE Special Digest 1 (2001). Buried Concrete to be in accordance with ACEC Site Class AC-x.
 - 1.11 All external building dimensions are to be checked against the Architects drawings prior to any construction commencing.
 - 1.12 All adoptable highway works to be in accordance with the Local Authorities Specifications.
 - 1.13 All adoptable drainage works to be in accordance with the Water Authorities standard guidelines for connections etc.
 - 1.14 Formation to road/hardstanding to be proof rolled and any soft spots in subgrade of road/Hardstanding areas are to be excavated and replaced with well compacted sub-base or free draining granular material to Department of Transport Specification for Highway Works Part 2' Table 6/1 Class 1 (General Granular Fill) and compacted in accordance with Table 6/4.

Drawing Status **PLANNING ISSUE**

B	10.08.26	Layout updated, design amended.	SU	-
A	31.07.26	Layout amended, design progressed.	SU	-
REV.	DATE	DESCRIPTION	CHK	APP

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Client: **Sonning Golf Club**

Site: **Sonning Golf Club,
Duffield Road, Sonning
RG4 6GJ**

Title: **Design Exceedance**

Drawing no. **H1620 - 456**

Issue:	Scale: 1:500 @ A1	Checked: -	Date: -
B	Drw: C.U.	Date: June '26	Approve: - Date: -

50mm
100mm
150mm
200mm
250mm
ORIGINAL SIZE - A1

APPENDIX H

SURFACE WATER MAINTENANCE PLAN

1 Introduction

- 1.1 This document sets out the principles for the long-term management and maintenance of the proposed surface water Sustainable Drainage Systems (SuDS) installed at Sonning Golf Club, Duffield Road, Sonning. RG4 6GJ.
- 1.2 The purpose of this document is to ensure that the management company and /or homeowner that will be maintaining the SuDS is entrusted with an inspection and maintenance programme to ensure the optimum operation of the surface water drainage network is continually maintained for the lifetime of the development and to prevent the increased risk of flooding both on and off site in accordance with the NPPF.
- 1.3 The management company is funded by the development residents with every property paying an apportionment of the overall annual charge according to the size of the property.
- 1.4 This document details the SuDS structures within the treatment train and their required maintenance processes to ensure that no polluted discharge to the offsite network will take place. This plan has been directly referenced from the latest technical SuDS guidance within the CIRIA Report C753 The SuDS Manual (2015) and other applicable guidance.
- 1.5 This document is laid out in specific sections applicable to the relevant SuDS type detailing:
 - A description of the SUDS component and its use.
 - Maintenance requirements and frequencies.
 - Inspection requirements and frequencies.
- 1.6 The activities listed are generic to the relative SuDS types and represent the minimum maintenance and inspection requirements, however additional tasks or varied maintenance frequency may be instructed by the maintenance company as required. Specific maintenance needs of the SuDS elements should be monitored and maintenance schedules adjusted to suit requirements.

2 SUDS Layout & Design

- 2.1 The installed SuDS system at this development are the responsibility of Sonning Golf Club Ltd and their appointed Management Company or the relevant adopting authority.
- 2.2 Following installation and after transfer, all SuDS are to be maintained in perpetuity by the Management Company and shall ensure that it or any contractor employed by it carries out periodic maintenance of all such SuDS in accordance with the schedules listed in this report. Inspection checks shall be carried out by a qualified and competent person, at the minimum intervals listed within the schedules and the appropriate work carried out.
- 2.3 In terms of water quality, the proposed surface water system offers a suitable level of mitigation in accordance with the Environment Agency pollution prevention guidance GP3, NPPF, CIRIA C753 and DEFRA guidance.
- 2.4 There are three categories of maintenance activities referred to in this report:
- **Regular maintenance** (including inspections and monitoring). Consists of basic tasks done on a frequent and predictable schedule, including vegetation management, litter and debris removal, inspections and sampling.
 - **Occasional maintenance** Comprises tasks that are likely to be required periodically, but on a much less frequent and predictable basis than the routine tasks (sediment removal is an example).
 - **Remedial maintenance** Comprises intermittent tasks that may be required to rectify faults associated with the system, although the likelihood of faults can be minimised by good design. Where remedial work is found to be necessary, it is likely to be due to site-specific characteristics or unforeseen events, and as such timings are difficult to predict.
- 2.5 The proposed storm water system consists of the following SuDS components:
- Permeable block paving (under-drained)
 - Storm water pipe work, manholes and road gullies
 - Cellular Storage

3 SUDS Management & Maintenance

Permeable Block Paving

Key Maintenance Requirements:

- Sweeping
- Regular brushing and vacuuming (to be carried out by a specialist contractor)

- 3.1 Regular inspection and maintenance is important for the effective operation of permeable pavements and should be inspected regularly, preferably during and after heavy rainfall to check effective operation and to identify any areas of ponding.
- 3.2 Permeable block paving needs to be regularly cleaned of silt and other sediments to preserve infiltration capability and should have a minimum of three surface sweepings per year.

A brush and suction cleaner, which can be a lorry-mounted device or a smaller precinct sweeper, should be used and the sweeping regime should be as follows:

1. End of winter (April) – to collect winter debris.
 2. Mid-summer (July/August) – to collect dust, flower and grass-type deposits.
 3. After autumn leaf fall (November)
- 3.3 To ensure the continual optimal performance of the permeable paving, it is recommended that the following maintenance should be carried out: The following guidelines are offered as an initial regime, but maybe either increased or decreased depending on the local environment and any external contributing factors:
- A visual inspection of the paving may be carried out on a regular basis. This will confirm the effectiveness of the agitation maintenance due to variations between sites and allow any refinement of the regular agitation activity if necessary.
 - The paving should be agitated (e.g. brushed, vacuumed, etc.) at least twice a year. This is to ensure no vegetation of any sort is allowed to

grow and develop in the joints. Ideally, this activity should be carried out in the spring and autumn seasons.

- The paving should be inspected after any heavy precipitation to ensure no displacement of any organic matter onto the surface of the pavement.
- For winter maintenance, the controlled use of de-icing may be used without causing significant detrimental effects towards the permeable pavements performance. When used carefully, the use of these chlorides will not result in an increase in the chloride levels in the local ground.
- Weed growth – when sedimentation occurs in areas of permeable paving then there is the potential for weed growth, this will typically occur where there are overhanging trees or soft landscaping slopes down on to the paving or in areas which do not receive over run from vehicles particularly frequently. Weeds can be removed from the surface through the controlled application of proprietary non-persistent contact herbicides. Those containing Glyphosate are the most suitable.

3.4 Depending on the amount of usage and the environment the permeable pavement has received and been exposed to, the laying course material may require either replacement or cleaning after a 25 to 30 year period. This would be evident if the infiltration rate of the paving became prolonged, allowing ponding to develop. Should this occur, the uplifting and cleaning (or replacing, depending on the costings of the activity) of the laying course maybe considered. The laying course material, jointing and blocks may be reused (once cleaned), minimising costs.

3.5 If reconstruction is necessary, the following procedure should be followed:

1. Lift surface layer and laying course.
2. Remove any geotextile filter layer.
3. Inspect sub-base and remove, wash and replace if required.
4. Renew any geotextile layer.
5. Renew laying course, jointing material and concrete block paving.

3.6 Materials removed from the voids or the layers below the surface may contain heavy metals and hydrocarbons and may need to be disposed of as controlled waste. Sediment testing should be carried out before disposal to confirm its classification and appropriate disposal methods.

Storm water pipework & Road Gullies

- 3.7 The key maintenance requirement for the surface water drainage system includes the removal of sediments and debris from the system as required. The surface water drainage system is intended to remain private and will be the responsibility of the management company.
- 3.8 All storm water pipe work should be visually inspected a minimum of monthly for the first three months after installation and then a minimum of once year.
- 3.9 As road gullies are the first on the treatment train and susceptible to higher silt loadings, these will need to be inspected a minimum of monthly for the first three months after installation and then a minimum of every four months.
- 3.10 During this inspection identify any gully pots or pipes that require remedial maintenance such removal of sediment, debris, leaves and litter as required. This involves the removal all protective covers and grids and the cleaning out of channels or gully pots by hand or with suitable jetting equipment.
- 3.11 During the first year of operation each gully should be inspected every 3 months, and every 6 months thereafter for structural integrity and cleaned out as required.



SUDS MANAGEMENT AND MAINTENANCE PLAN

Sonning Golf Club Ltd

ADDRESS:

Sonning Golf Club Phase 2
– Housing Development

R01 – 07/08/26

Aventus Design Ltd
Unit 5 – Leaches Farm
Business Centre, Bicester Road
Kingswood
Aylesbury
Bucks HP18 0RF
Email: mail@aventusdesign.co.uk
Tel: **01296 770066**

Cellular Soakaway Crates

Key Maintenance Requirements:

- Regular inspection of silt traps, manholes, pipework and pre-treatment devices, with removal of sediment and debris as required.
- 3.12 Regular inspection and maintenance is required to ensure the effective long-term operation of below ground modular soakaway systems. Maintenance responsibility for the cellular soakaway crates shall be placed with the individual owners & management company.
- 3.13 A catch pit chamber or rodding eye is to be installed upstream of the crates and can be inspected and accessed for removal of silt/debris build up as required.

Cellular Crates Operation and Maintenance Requirements

Operation and Maintenance Requirements for Cellular Crates		
Maintenance schedule	Required action	Typical Frequency
Regular maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action	Monthly for 3 months, then annually
	Remove debris from the catchment surface (where it may cause risks to performance)	Monthly
	For systems where rainfall infiltrates into the tank from above, check surface of filter for blockage by sediment, algae or other matter; remove and replace surface infiltration medium as necessary.	Annually
	Remove sediment from pre-treatment structures	Annually, or as required
Remedial actions	Repair/rehabilitate inlets, outlet, overflows and vents	As required
Monitoring	Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed	Annually

Infiltration Basin

Key Maintenance Requirements:

- Regular inspection of inlets with removal of sediment and debris as required.
- Regular mowing to retain grass lengths of 75-150mm.
- Grass clippings should be disposed of off-site or outside the infiltration basin.
- Occasional removal of sediment once deposits exceed 25mm in depth.

3.14 Regular inspection and maintenance is required to ensure the effective long-term operation of an infiltration basin. Maintenance responsibility for the infiltration basin shall be placed with the management company.

Cellular Crates Operation and Maintenance Requirements

Operation and maintenance requirements for infiltration basins		
Maintenance schedule	Required action	Typical frequency
Regular maintenance	Remove litter, debris and trash	Monthly
	Cut grass – for landscaped areas and access routes	Monthly (during growing season) or as required
	Cut grass – meadow grass in and around basin	Half yearly: spring (before nesting season) and autumn
	Manage other vegetation and remove nuisance plants	Monthly at start, then as required
Occasional maintenance	Reseed areas of poor vegetation growth	Annually, or as required
	Prune and trim trees and remove cuttings	As required
	Remove sediment from pre-treatment system when 50% full	As required
Remedial actions	Repair erosion or other damage by reseedling or re-turfing	As required
	Realign the rip-rap	As required
	Repair or rehabilitate inlets, outlets and overflows	As required
	Rehabilitate infiltration surface using scarifying and spiking techniques if performance deteriorates	As required
	Relevel uneven surfaces and reinstate design levels	As required
Monitoring	Inspect inlets, outlets and overflows for blockages, and clear if required	Monthly
	Inspect banksides, structures, pipework etc for evidence of physical damage	Monthly
	Inspect inlets and pre-treatment systems for silt accumulation; establish appropriate silt removal frequencies	Half yearly
	Inspect infiltration surfaces for compaction and ponding	Monthly

APPENDIX I

SITE INVESTIGATION REPORT

SITE INVESTIGATION REPORT

PROPOSED DEVELOPMENT:

SONNING GOLF CLUB (HOUSING), DUFFIELD ROAD, SONNING, READING, BERKSHIRE RG4 6GJ



Client: Sonning Golf Club
Duffield Road, Sonning,
Reading, Berkshire
RG4 6GJ

Consulting Engineers: Aventus Design Ltd
4 Harrier Close, Watermead
Aylesbury, Bucks HP19 0UN

Report ref: 11043a/CA

Date: 1st September 2025

SITE INVESTIGATION REPORT

PROPOSED DEVELOPMENT:

SONNING GOLF CLUB (HOUSING), DUFFIELD ROAD, SONNING, READING, BERKSHIRE, RG4 6GJ

DOCUMENT ISSUE STATUS:

Issue	Date	Description	Author	Checked/approved
Rev 0	01/09/25	First issue	Chris Avalos BSc(Hons), MSc, FGS	Stuart Wagstaff BSc(Hons), MSc, FGS, CGeol, RoGEP

This investigation has been undertaken within the constraints of the client's instruction/contract, together with those set out in the 'General information, limitations and exceptions' section at the end of this report. The Soil Consultants Limited (SCL) 'Standard Terms of Appointment' are also included at the end of this report and these identify the contractual arrangements for the investigation. Conclusions or recommendations made in this report are limited to those which can be reasonably based upon the research and/or intrusive investigation work carried out. Any comments which rely on third-party information which has been provided to us are made in good faith and on the assumption that such information is accurate. SCL have not carried out independent validation of any third-party information. Any views or recommendations made by the authors are expressed solely on behalf of SCL and not as individuals.

SCL has prepared this Report for the Client in accordance with the Terms of Appointment under which our services were performed. With respect to third parties, no other warranty, expressed or implied, is made as to the professional advice included in this Report or any other services provided by us. This Report may not be relied upon by any other party without the prior and express written agreement of SCL.

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APPENDIX A

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-  Foreword
-  Borehole records
-  Standard Penetration Test results
-  SPT hammer calibration certificates
-  Trial pit records
-  Dynamic Probe Test results
-  TRL DCP Test results
-  Soakaway Test results
-  Groundwater and gas monitoring results

Laboratory testing

-  Index property testing
-  Plasticity chart
-  Particle size distribution tests

Ground profiles

-  Plot of SPT 'N' value versus depth
-  Plot of SPT 'N' value versus level
-  Cross section through boreholes

Contamination and chemical testing

-  Foreword
-  General soil suite
-  WAC test results
-  Sulphate/pH suite

Plans, drawings & photographs

-  Site photographs
-  Proposed development plans
-  Topographical drawing
-  Site Walkover Plan
-  Tree Survey Plan
-  Location Plan

APPENDIX B

-  GroundSure historical maps (Ref: SCL-37Z-4LU-5AW-28S, 10/07/25)
-  GroundSure Geo+EnviroInsight Report (Ref: SCL-6ZX-IEU-HY6-55U, 10/07/25)
-  Envirocheck mining and natural cavities database search (Ref: 381156499_1_1, 10/07/2025)

1.0 INTRODUCTION

Consideration is being given to the construction of 50no new residential dwellings with associated access roads, areas of hardstanding, soft landscaping and public open space. In connection with the proposed works, Soil Consultants Ltd (SCL) were commissioned by Aventus Design Ltd to carry out a site investigation to include the following elements:

-  Stage 1 Tier 1 Preliminary Risk Assessment (Desk Study) including initial Conceptual Site Model (CSM)
-  Intrusive investigation to identify the ground sequence and groundwater conditions
-  Geotechnical and geo-environmental sampling and laboratory testing
-  Provision of advice on shallow foundation and floor slab design along with advice on the construction of hard standing and the use of soakaways
-  Stage 1 Tier 2 generic quantitative risk assessment and refined Conceptual Site Model (CSM)

This report includes a summary of the findings and conclusions of the Desk Study research and Preliminary Risk Assessment. It then describes the intrusive investigation undertaken, gives a summary of the ground conditions encountered and discusses geotechnical design elements. A contamination assessment is also provided.

2.0 SITE DESCRIPTION

A summary description of the site and its general setting is as follows:

Element	Description
Site location and setting	- Located in Wokingham Borough Council district, within the county of Berkshire - Predominately residential area with sports ground to the north with open farm land beyond - The site forms part of the wider Sonning Golf Club located towards the south western corner of the complex occupying an area of about 4.5 hectares - Golf club located to the northeast of Duffield Road close to the junction with Pound Lane - NGR 476545E, 174846N
Site dimensions	Approximately 340m (NE-SW) x 80m (NW-SE); site narrows to the north east
Site boundaries	- The south eastern boundary is open to the golf course and formed in part by trees and a small area of woodland (Photos 3 to 6) - The north western boundary largely comprises mature trees and hedgerows with residential properties and Rams Rugby Club beyond (Photos 3 to 6 and 10) - The south western boundary comprises a part wooden fence and part hedgerow which separates the site from a plot of ground which is scheduled for residential development (adjacent to Pound Lane) (Photo 7)
Site description	- The site currently comprises an open grassed area which appears to have been formerly a fairway for the golf club but is currently unused. Several landscaped bunds are present as shown on the appended Site Survey Plan. - An area of woodland/cops is located along the northern half of the south eastern boundary and trees are largely present along the north western boundary. (Photos 1 to 6)
Topography and site levels	- A site survey has been provided completed by KND Surveys Ltd Ref Partial 3D Site Survey dated May 2022. - Overall, the highest point of the development plot is at about +54.25mOD (on the north western side) and the lowest point at about +35.30mOD (north eastern corner and south eastern side). Thus, the site attains a very gentle slope rising from south east to north west.
Existing vegetation within site and adjacent properties	- The trees within the wooded area / cops and those along the south eastern boundary are largely mature oaks up to about 15m in height. - Trees of varying species are present along the northwestern boundary including mostly poplar, oak, sycamore, horse chestnut, cherry and holly with some pine and coniferous trees towards the south western corner - A arboricultural survey has been undertaken for the site by Arbtech (Ref: Sonning Golf Club – Arbtech TSR 01 A) and reference should be made to this report in regarding to tree location and identification.

The current site features are shown on the Site Plan and Site Photographs which are included in Appendix A.

3.0 STAGE 1 TIER 1 PRELIMINARY RISK ASSESSMENT (DESK STUDY)

This assessment is generally based upon current UK guidance, primarily the Environment Agency's "Land contamination: risk management" 2023. The scope of the assessment is as follows:

-  A review of historical and current land-use and potential contaminated land risks
-  Development of an outline conceptual model, identifying potential sources, pathways and receptors and potential contaminant linkages (PCLs)
-  Development of a strategy for intrusive investigation

3.1 Review of historical mapping

The following summary of the history of the site and surrounding area has been compiled from a series of historical maps (Groundsure Ref: SCL-37Z-4LU-5AW-28S, dated 10/07/25) obtained from a commercially available database; these are included in Appendix B.

Historical development of site and surrounding area		
Map date	The site	Significant development / features in surrounding area
 1872 to 1914	 The site comprises part of an undeveloped plot of arable land within a wider open field	 Woodland of Holmemoor Copse is present approx. 150m S/SE of site  Railway tracks are present approx. 150-250m SW/S/SE  Unnamed roads are present 100m SW and 150m NW  A residential cottage is present approx. 120m S/SW, on the north side of the railway tracks  A gravel pit is present 500m NE  The village of Sonning is present beyond 600m NW
 1932 to 2025	 By 1932, the golf club had been developed with the Golf club "Club House" present 100m off the SW corner of site.  The site appears to be part of the overall golf course forming part of the fairway with areas of trees along the south eastern boundary	 Low density residential development is shown directly NW, about 100m W and 250m SW (beyond the rail tracks)  The village of Sonning had undergone significant residential development by this time  The gravel pit located 500m NE is no longer labelled but surface features are still present  By 1956 further residential development has occurred directly NW, 250m N, 220m W/SW and 300m S  By 1972 residential development has occurred beyond 250m W, SW, S and SE.

3.2 Database information

The database report includes information of local activities encompassing a range of subjects related to land use, pollution, and geological/hydrological conditions. Our assessment of contaminative uses and other environmental issues relevant to the site and its surroundings is provided below. The full database report (Groundsure Ref: SCL-6ZX-IEU-HY6-55U, dated 10/07/25) is included as Appendix B and this should be read and understood fully in conjunction with this summary.

Past land use

-  Historical industrial land uses (within 250m): Ten records of potentially contaminative historical land uses within proximity to site, all of which relate to the cuttings located 163m south to 245m southeast associated with the rail tracks, dated between 1898 to 1986. Unspecified ground workings are also detailed 251-254m south/southwest dated 1977 to 1986; along with an unspecified heap located 253-257m southwest dated 1900 to 1986.
-  Historical tanks (within 250m): An unspecified tank is identified to be present 234m north of site, dated 1977 to 1993.
-  Historical energy features (within 250m): There are four records of historical energy features within proximity to site, all relating to electricity substations located 90m southwest to 198m northwest, dated between 1977 to 1995.

Waste and landfill

-  Waste exemptions (within 250m): Four records of activities involving the storage, treatment, use or disposal of waste that are exempt from needing a permit within proximity to site. The nearest of these records relates to Old Bath Road, Sonning, Reading RG4 6TQ located 64m northwest of site and is for sorting and de-naturing of controlled drugs for disposal.

Current industrial land use

-  Recent industrial land uses: Eight records of current potentially contaminative land uses within proximity to the site. The nearest of these records relates to an electricity substations located 100m southwest. Other records include pump located 113m northwest; electricity substations located 130m northwest, 202m northwest, 213m southeast and 244m southeast; mast located 141m north; telephone exchange.
-  Current or recent tanks (within 250m): A roofed storage tank is present 222m northeast, present from 20/06/2014
-  Licensed Discharges to controlled waters (within 250m): Rear of the Lawn & Birchley, Old Bath Road, Sonning located 12m northwest which is identified to discharge final/treated effluent to gravel with the license revoked on 01/10/1996.

Hydrogeology

-  Superficial aquifer: Secondary A aquifer present beneath site
-  Bedrock aquifer: Secondary A aquifer present beneath site
-  Groundwater vulnerability: High vulnerability on site. Leaching class 'High'
-  Groundwater abstractions: two records of groundwater abstractions are identified at Sonning Golf Club located 225m north of site, both of which identified to be extraction of Thames groundwater for use as spray irrigation
-  Source Protection Zones: Type III Total Catchment on site.

Hydrology

-  Water Network (within 250m): there are 10 records of rivers, streams, lakes and canal features within proximity to site. The nearest of these records relates to an inland river not influenced by normal tidal action at ground surface located 182m southeast of site.
-  Water Framework Directive (WFD) surface water body catchments: onsite is the River Loddon catchment, with a operational catchment of Loddon and a management catchment of Loddon and Trib
-  WFD groundwater bodies: onsite is the Twyford Tertiaries catchment which has a overall rating of good, a chemical rating of good and a quantitative rating of good.

River and coastal flooding

-  Risks of flooding (RoFRaS), historical flooding and flood defences: none identified within 250m
-  No Zone 2 or 3 floodplains or flood defences within 50m

Surface water and groundwater flooding

-  Surface water flooding: the highest risk on site (and within 50m) is 1 in 30 year – 0.3m-1.0m
-  Groundwater flooding: the highest risk on site (and within 50m) is 'low'

Environmental designations

-  Designated Ancient Woodland: Holmemoor Copse is located 238m southeast of site
-  Nitrate Vulnerable Zones: The Sheeplands nitrate vulnerable zone is present onsite
-  SSSI Impact Risk Zones: the site and surrounding area are located within an SSSI impact zone which requires certain developments/activities to undergo consultation

Visual and cultural designations

-  Listed buildings: Keepers Cottage located 140m southeast of site is designated a Grade II listed building, with a listed date of 11/09/2009
-  Scheduled ancient monuments: Cropmark complex south of Charvil Lane located 185m north of site

Agricultural designations

-  Agricultural land designation: The site has a non-agricultural/no quality assigned designation. 13m west of site is designated urban. 35m northwest of site is designated Grade 2
-  Tree felling license: There are two records of tree felling applications onsite which relate to clear fell (conditional) and selective fell/thin (conditional) both with an application date of 19/11/2008. 18m southeast of site a clear fell application is identified with an application date of 19/11/2008

Habitat designations

-  Priority habitat inventory: There are twelve records of habitats of principal importance, with the nearest of these records identified to be deciduous woodland (INV >50%) located 31m southeast of site

Geology

-  Superficial geology: River Terrace Deposits (4); flow type is intergranular; high to very high permeability
-  Bedrock geology: Lambeth Group; flow type is mixed; very low to moderate permeability. It is noted that several faults are present in proximity to site, located onsite along the southwestern extent of the site, 37m southwest of site and 260m northwest of site.
-  BGS boreholes: There are fifteen records of BGS boreholes within 250m of the site. The nearest of these boreholes records, located 25m northwest of site (BGS ID: 18375518; BGS Reference: SU77SE317) identifies the following sequence of strata: topsoil to a depth of 0.30m bgl, brown silty very clayey gravelly sand to 0.70m bgl, soft orange brown silty very sandy gravelly clay to a depth of 1.30m bgl and very dense orange brown silty gravelly sand to 2.0m bgl. No groundwater was encountered
-  Natural ground subsidence: see Section 3.3

Mining, ground workings and natural cavities:

-  Surface ground workings: There are eleven records of surface ground workings, all of which relate to cuttings associated with the nearby railway tracks. The nearest of these records relate to cuttings located 163m south of site, dated 1900.
-  Historical mineral planning areas: There are three records of mineral planning permissions within proximity to site. The nearest of these records relates to Butts Hill located 230m south of site and is identified to be for the extraction of sand and gravel from a surface mineral working and has a valid planning status since 28/04/1959.
-  Non-coal mining: There are two records of potential non-coal mining activity within proximity to the site, both of these records relate to chalk mining one located onsite and one 25m north which consider that mining may have occurred although there is no definitive evidence of mining having been undertaken.
-  JPB mining areas: The site is outside the area of data held by the Coal Authority however, JPB may have records of mining in this area. Contact details contained within Groundsure report (JPB have not been contacted as part of this work). .
-  Researched mining: There is one record of areas of potential mining identified from alternative or archival sources, located 451m northwest of site and is for the extraction of stone.
-  There is a potential risk of chalk mining to have occurred onsite or within close proximity to site, this is further discussed in section 3.3 of this report.

Radon

-  Less than 1% of properties affected, Radon protection measures not required

Soil chemistry

 BGS estimated urban soil chemistry, extract as follows:

Location	Arsenic	Bioaccessible Arsenic	Lead	Bioaccessible Lead	Cadmium	Chromium	Nickel
On site	15 - 25 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 - 25 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg
25m N	15 - 25 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg

Railway infrastructure and projects

-  Underground railways (London): there is one record of active London Underground lines within proximity to site, this relates to the Elizabeth Line surface track located 189m south
-  Railways: there are six records of currently / existing railway lines the nearest of these records relates to Great Western Main Line located 182m to the south. Other records relate to the same rail tracks.

3.3 Mining and natural cavities

We commissioned a site-specific report from Envirocheck (Ref: 381156499_1_1, 10/07/2025) to address mining and natural cavity risks. Whilst the Groundsure report (discussed above) does provide some information in this respect, the Envirocheck report is more detailed and generally allows for better risk assessment. The following sections summarise the key data from the Envirocheck report and associated maps.

BGS recorded mineral sites: none within 500m.

Coal mining: site located 'in an area which may not be affected by coal mining'.

Natural cavities: nearest is sinkhole (x2) and solution pipe (x2) (in chalk) located 487m north

Non coal mining areas of GB: the risk is identified as 'unlikely'

Heap (unknown constituents): four records of heaps within proximity to site, the nearest of which is located 365m southwest of site noted to be present between 1882 to 1960.

Quarrying/Pits: nearest located 413m northeast of site identified to have taken place between 1882 to 1914.

Potentially infilled land: nearest non-water infilled land is identified to be an unknown filled ground pit (pit, quarry etc) located 448m northeast of site. The nearest water infilled land is identified to be unknown filled ground (pond, march, river, stream, dock etc) located 583m southeast.

Brine: the site does not fall within a brine compensation area or a brine subsidence solution area.

Ground stability: the following table summarises the hazard potential onsite and within 50m for all categories of natural ground subsidence where listed:

Stability Hazard	Hazard potential
Shrink/swell clays	Moderate on site
Running sand	Very low on site
Compressible ground	Negligible on site
Collapsible ground	Very low on site
Landslide	Very low on site
Ground dissolution	Very low on site

3.4 Other information

Wokingham Borough Council has been contacted on multiple occasions (11th July 2025, 18th July 2025, 11th August 2025 and 14th August 2025) but no response has been received at the time of writing this report.

3.5 Unexploded ordnance risk assessment

From a preliminary search of UXO risk (shown below), the site is within a low risk UXO area therefore on-site support is considered to not be required for both investigation or development works.



This map principally indicates a hazard from Unexploded Bombs (UXB) due to WWII bombardment. Other sources of Unexploded Ordnance (UXO) may be present. It should be noted that this map does not represent UXO risk and should not be reported as such when reproduced.

LEGEND			
 High: Areas indicated as having a bombing density of 50 bombs per 1000acre or higher.	Military	Industry	UXO find
 Moderate: Areas indicated as having a bombing density of 15 to 49 bombs per 1000acre.	Transport	Decks	Airstrike targets
 Low: Areas indicated as having 15 bombs per 1000acre or less.	Utilities	Bombing decoy	Airfields
			Other

3.6 Walk-over survey

A site walk-over survey was undertaken on 16th July 2025. A description of the general features of the site and the topography is provided in Section 2.0 above. From inspection of visible and accessible areas, a summary of specific features relevant to the land quality assessment is as follows:

Feature	Commentary
Electricity substations and transformers	 None observed within the site boundary  A electricity substation is present offsite approx. 100m NW of site at the adjacent rugby club (Photo 9)  A small gas regulator box is present within the vehicle parking area to the front of the main clubhouse, approx. 135m southeast of the site
Fuel storage tanks	 None observed
Fuel interceptors	 None observed
General chemical storage/waste	 None observed
Invasive species	 None observed
Evidence of gas protection	 None observed
Surface water contamination	 None observed
Waste storage	 None observed
ACMs	 None observed
Other	 Railway in cutting 230m SE (Photo 8)

3.7 Potential pollution linkages and Initial Conceptual Site Model

The information in the preceding sections has been used to undertake the Preliminary Risk Assessment and to compile the Initial Site Conceptual Model below in accordance with current LCRM (EA2021) guidance. The assessment follows a risk-based approach, with the potential risks determined qualitatively using the 'source-pathway-receptor' linkage concept. Potential harm may only exist where a plausible, rational and justified linkage is present between all factors of the linkage.

The following assessment pro-forma methodology has been formulated from existing guidance using a standard modified consequence and probability matrix:

		Consequences			
		Severe (4)	Medium (3)	Mild (2)	Minor (1)
Probability	High likelihood (4)	Very high risk	High risk	Moderate risk	Moderate/low risk
	Likely (3)	High risk	Moderate risk	Moderate/low risk	Low risk
	Low likelihood (2)	Moderate risk	Moderate/low risk	Low risk	Very low risk
	Unlikely (1)	Moderate/low risk	Low risk	Very low risk	Very low risk

Definitions of Consequence:

-  Severe (4): Significant damage or harm to buildings/property/services, short-term (possibly immediate) acute direct risks to controlled waters, human and ecological receptors via pollution and direct exposure.
-  Medium (3): Direct pollution of controlled waters and possible chronic or acute risks of significant harm to human health, buildings/services and/or ecological receptors via exposure.
-  Mild (2): Indirect pollution of controlled waters and possible chronic risks to human health, building/service and/or ecological receptors over the longer term causing potential harm.
-  Minor (1): Negligible potential for damage or harm to be significant to identified receptors but may still be present which may result in actions being required by appropriate regulators.

Definitions of Probability:

-  High likelihood (4): There is, or it is inevitable that there will be, an identified and/or confirmed potential pollution linkage or incident capable of causing harm in the immediate to medium term.
-  Likely (3): There is, or it is inevitable that there will be, an identified and/or confirmed potential pollution linkage or incident capable of causing harm in the medium or longer term.
-  Low likelihood (2): There is, or could be, an identified and/or confirmed potential pollution linkage or incident potentially capable of causing harm over time, but it is not inevitable.
-  Unlikely (1): There is, or could be, an identified and/or confirmed potential pollution linkage or incident potentially capable of causing harm over the longer term, but it is improbable that it will be significant.

Definitions of the final linkage risks are summarised as follows:

-  **Very high:** high probability that severe harm could occur, or there is evidence that it is currently occurring. If realised, the risk could result in substantial liability. Urgent investigation/remediation
-  **High:** harm is likely to occur, realisation is likely to present substantial liability. Urgent investigation required. Remedial works may be required in short-term, will be in long-term
-  **Moderate:** possible that harm could arise, but unlikely to be severe. Investigation normally required to clarify risk and liability. Remedial works may be necessary in long-term
-  **Low:** possible that harm could occur, but this would at worst be mild
-  **Very low:** low possibility of harm, unlikely to be severe

The following initial assessment has been carried out by identifying and evaluating the potential sources of contamination, the potential receptors and the plausible pathways for contamination migration. These have been determined from the available data using current guidance at the time of writing and will be subject to re-evaluation if or when additional data becomes available.

Potential sources of contamination

A summary of potential sources identified by our review of the above information is as follows:

-  **Present/recent site usage:** the site has been an undeveloped agricultural land from earliest map edition to early 1930's at which point it appears to have been developed as the golf course for Sonning Golf Club. It is noted that small scale landscaping has taken place onsite associated with the creation of the course and fairways which would have created the presence of limited made ground.
-  **Offsite usage:** the surrounding area has been developed largely for residential purpose. A historical electricity substation is noted 90m southwest of site which may be a source for potential inorganics (metalloids and heavy metals), hydrocarbons (TPH and PAH), organics (PCBs); railway tracks/sidings are noted to be present from earliest map edition which may be a source for potential inorganics (metalloids and heavy metals), asbestos, hydrocarbons (TPH and PAH), organics (lubricating oils PCB's, solvents, creosote). However, given their age, the distance and mostly topographically lower than the site, the risk from these features is considered to be low and unlikely to have affected the site.

It should be noted that any developed, non-greenfield land is likely to contain made ground. This will probably be of uncertain or unknown origin and may contain contaminants that have not been specifically identified.

The assessed risks from these potential sources are summarised in the Initial Conceptual Site Model below.

Potential receptors

In the context of the proposed development, the following potential receptors have been identified:

-  Human health: users of building, construction workers, adjacent site users
-  Controlled waters: Secondary A aquifer superficial deposits and bedrock geology beneath site. The site lies within a Type III source protection zone. The site is assessed as being of **medium environmental sensitivity**
-  Building fabric and services: buried foundations and potable water pipes

Plausible pathways

-  Ingestion of soil, dust or water
-  Inhalation of dust, gas or vapours
-  Direct physical contact with contaminated soil/water
-  Vertical and lateral migration of contamination including leaching
-  Chemical attack of building infrastructure, including water supply pipes
-  Migration of ground gas/vapour through permeable soils or open pathways

The Initial Conceptual Site Model and an estimate of the risk associated with each potential linkage is shown in the following table:

Source	Pathway	Receptor	Preliminary assessed risk and commentary/justification
On-site: contaminated soil and groundwater	Ingestion, contact, inhalation	End user, construction workers and infrastructure	Probability: 1 Consequence: 2 Potential Contaminant Linkage risk: Very low Historical/recent development of the site leaving made ground
	Leaching from contaminated soils and migration in groundwater	Superficial Aquifer	Probability: 1 Consequence: 2 Potential Contaminant Linkage risk: Very low There is a Secondary Aquifer (superficial and bedrock) beneath the site. However, no significant potential onsite contamination sources were identified and therefore the risk to the aquifer is expected to be lower bound
Off-site: contaminated soil and groundwater	Lateral migration of contaminants to site in groundwater	End user, construction workers and infrastructure	Probability: 1 Consequence: 2/3 Potential Contaminant Linkage risk: Very low to low No significant sources of offsite contamination have been identified within the vicinity
On-site and off- site: ground gas and vapours	Lateral and vertical migration of gas/vapour	End user, construction workers and infrastructure	Probability: 1 Consequence: 2 Potential Contaminant Linkage risk: Very low No specific significant sources of ground gas and vapour generation have been identified on or near to the site and therefore risk is expected to be very low. The site is not in a radon affected area

The overall risk rating for the site is assessed as being **Very low**.

3.8 Recommendations for intrusive investigation

The Initial Conceptual Site Model identified potential pollution linkages resulting in the overall assessed risk rating of very low. The following programme of intrusive investigation is recommended:

-  Intrusive investigation to confirm the ground sequence and groundwater regime, allow soil/water sampling and the installation of monitoring pipes for gas, groundwater and vapours.
-  No significant sources of contamination were identified during the preliminary risk assessment besides the presence of made ground from development onsite. Therefore, ground investigation works should be undertaken to provide general coverage of accessible areas of the site. It is considered that the railway sidings are too distant to present a viable source of contamination that could affect the site.
-  Soil sampling should provide general coverage of the development area from both any made ground and the underlying natural ground, as well as any obviously deleterious materials.
-  Samples should be analysed for a range of 'screening' contaminants to include metals, pH, TPH, and speciated PAHs.
-  An allowance for soil asbestos screening (and quantification as required) should also be included.
-  A preliminary programme of groundwater and gas monitoring should be undertaken to establish the potential gas risk present. There is no identified ground gas generation source but there is a potential moderate risk to the residential end user. Therefore, it is suggested that three preliminary rounds of gas monitoring are undertaken, with further rounds required only if a significant gas risk is identified from the preliminary rounds.

The Initial Conceptual Site Model should then be revised and reviewed to include assessment and quantification of any confirmed complete pollution linkages and/or the establishment of any previously unidentified or unexpected contamination. This should include an assessment of the potential risks and outline any potential mitigation/remedial measures, together with any requirements for any additional investigation to resolve any remaining unknowns or unquantified elements.

4.0 EXPLORATORY WORK AND LABORATORY TESTING

The ground investigation was carried out between 21st to 24th July 2025 and is described below.

4.1 Constraints of investigation

At the time of the investigation suitable access was available to the majority of areas across the site and reasonable coverage was possible.

4.2 Dynamic sampler boreholes

Fifteen window sample boreholes (WS01 to WS15) were completed using a tracked rig under the supervision of an experienced geo-environmental engineer. Representative samples were taken for geotechnical and environmental testing. In-situ Standard Penetration Testing (SPT) was carried out at appropriate intervals; the hammer Energy Ratio (E_r) for the SPT equipment used was 73% and 76%; the relevant test certificate is appended. Combined groundwater/gas monitoring pipes were installed in WS01, WS05 to WS08, WS10, WS12, WS14 and WS15; details of the installation is shown on the relevant borehole log.

4.3 Dynamic probing

Dynamic probe testing was carried out through the base of the respective borehole using 'Super Heavy-B' apparatus, to assist in the assessment of the potential presence of chalk dissolution features. A maximum depth of 10.00m bgl was achieved at one location with the majority refusing at shallow depth between 1.10m and 2.90mbgl due to the high density of the natural deposits.

4.4 Trial pits

Six trial pits (TP01 to TP06) were completed using a 2.5-ton tracked excavator to depths of between 1.0m and 2.0m under the supervision of an experienced geotechnical engineer. Representative geotechnical and geo-environmental samples were recovered. Soakage testing was undertaken in all of the trial pits in general accordance with the procedure outlined in BRE Digest 365:2016 'Soakaway design'; however, in general only one fill and drain cycle was achievable due to time constraints and the infiltration rate of the ground.

4.5 Groundwater and gas monitoring

Groundwater and ground gas monitoring was carried out on two occasions following completion of the site works on 1st and 18th August 2025.

4.6 Geotechnical laboratory testing

The following geotechnical laboratory testing was completed:

-  Index properties tests (Atterberg Limits)
-  Particle size distribution tests

4.7 Chemical and contamination testing

Selected soil samples were delivered to a specialist laboratory (NORMEC DETS Ltd), and the following testing was carried out:

	General soil suite	-	15no samples
	Asbestos screening	-	15no samples
	TPH-LQM/BTEX	-	8no samples
	Waste Acceptance Criteria (WAC)	-	3no samples
	Soluble sulphate/sulphur/pH analyses	-	6no samples

The engineering borehole and trial pit logs and the laboratory testing results are included in Appendix A.

5.0 GROUND CONDITIONS

Published BGS information (1:50,000 and 1:10,000 scale maps) indicates that the site is underlain by River Terrace Deposits which rests upon the Lambeth Group; this in turn overlies the Seaford and Newhaven Chalk Formations which are present at greater depth. It is noted that a geological fault runs diagonally through the south-western part of the site in a NW/SE direction. Further faults are recorded about 37m southwest and 260m northwest of site, both aligned in a NW/SE direction

The presence of River Terrace Deposits was confirmed by the investigation, with a covering of made ground and reworked natural material associated with the landscaping. The Lambeth Group and undifferentiated chalk formations were not encountered within the depth of investigation.

Detailed descriptions are presented on the exploratory hole records, and the ground sequence is represented on the geological cross sections; this information is appended. The ground sequence is summarised in the following sections. Note that all depths are relative to existing ground level unless otherwise stated.

5.1 Topsoil

Topsoil was encountered from ground level and identified to depths between 0.05m and 0.30m bgl and generally comprised brown silty gravelly sand locally, with occasional rootlets.

5.2 Made ground

Made ground was met beneath the topsoil and was proven to depths of between 0.40m and 0.75mbgl. With the exception of a thin layer (200mm thick) in TP01 which contained anthropogenic material, the soils were devoid of man-made material, generally comprising light greyish-brown silty gravelly sand. It is considered that this material represents naturally derived material used for regrading and landscaping of the golf course and fairways and also possibly to aid drainage.

Particle size distribution (PSD) analyses undertaken on two samples indicate a predominance of either gravel (58% and 27%) or sand (49% and 30%) with subordinate fines (12% and 24%).

5.3 River Terrace Deposits

River Terrace Deposits were met beneath the made ground, and the base of this stratum was not proven within the depths investigated (maximum depth 2.95mbgl). The soils generally comprised orangish-brown very sandy flint gravel, locally grading to gravelly sand, and were observed to be locally slightly silty to silty.

Particle size distribution (PSD) analyses undertaken indicate a predominance of either gravel (between 76% and 40%) or sand (between 84% and 44%) with sand (between 18% and 38%) with subordinate fines (between 4% and 21%).

Standard Penetration Test (SPT) recorded N values of between 10 and >50 (refusal) indicate the soils to be in a generally dense to very dense state of compaction locally being medium dense at shallow depth.

5.4 Groundwater

During site investigation works groundwater was not encountered within any of the boreholes or Measured in the monitoring pipes. We consider that the 'main' groundwater table lies within the underlying Lambeth Group and / or undifferentiated chalk formations at greater depth.

Of course, groundwater levels can of course vary seasonally and may be higher during the winter months and / or following periods of wet weather. We note that the investigation was undertaken during a period of extended dry weather (spring / summer 2025).

5.5 Environmental observations

No obvious olfactory or visual signs of soil contamination was encountered during site investigation works. PID headspace testing (for VOC concentrations) was undertaken on samples of made ground and natural soils during the work and during subsequent monitoring - no elevated levels were noted.

6.0 GEOTECHNICAL ASSESSMENT

The proposed works at this site include the following elements:

-  any required regrading works and clearance of any non retained trees
-  construction of 50no new residential dwellings with associated access, areas of hardstanding, soft landscaping and public open space.

The investigation has revealed that beneath a layer of topsoil, made ground (up to 0.75m thick) overlies competent natural River Terrace Deposits, extending to at least 2.75mbgl. We anticipate that the granular material of the River Terrace Deposits should be capable of supporting the envisaged moderate structural loads using traditional spread foundations.

6.1 Chalk dissolution and ground stability

Dissolution features within the chalk occur due to erosional processes during the last periglacial period. Their occurrence is random, and mobilisation of these features can be triggered by construction activities and/or changes to the groundwater regime.

The appended Groundsure report includes information on historical mining and natural cavities recorded in the vicinity of the site. The report indicates there are no recorded instances of natural cavities within 500m and the site lies within an area of 'negligible' risk with regards to the presence of chalk dissolution features, which are considered to be 'unlikely' to be present. There are no recorded underground workings in proximity to site and the nearest recorded surface ground working is 230m south of site. We have undertaken a natural cavities risk assessment using Edmonds procedure (Engineering Geology Special Publications No.18, 2001); this assessment indicates the site to have a 'Moderately low' subsidence hazard classification.

Our investigation revealed competent granular soils at shallow depth, with boreholes and dynamic probe tests generally refusing at shallow depth; the chalk was not encountered. A single probe (DP02) was completed to a depth of 10.0mbgl, which identified a possible change in strata at about 5.0mbgl; based on nearby historical boreholes we consider this could reflect the base of the River Terrace Gravel / top of the Lambeth Group. The Lambeth Group are typically composed of interbedded clay and sand and, are shown to extend to about 20mbgl in this area. The boreholes and probes did not identify any significant weak / loose soils or open voids which could be associated with the presence of chalk dissolution and given the significant thickness of cover deposits shown above the chalk on historical logs, the risk to foundation performance from the presence of chalk dissolution is considered to be low. Notwithstanding this, our investigation provided only limited lateral and vertical coverage of the site, and thus the presence of solution features below the site cannot be totally ruled out. Thus, a careful watching brief should therefore be adopted during construction and if anomalous ground conditions are encountered then specialist advice should be sought from geotechnical contractors experienced in providing options for additional measures.

6.2 Spread foundations

Spread foundations must bypass any topsoil and made ground and be placed within the competent natural River Terrace Deposits. The natural granular soils are not considered to be frost susceptible and thus, a minimum foundation depth of 0.75m is recommended although some deepening may be required to ensure that the 'reworked' soils are bypassed and the natural undisturbed soils are exposed at founding level.

For preliminary assessment of the feasibility and sizing of foundations placed within the natural gravel, we envisage that an allowable bearing resistance of 225kN/m² would be appropriate; this would be applicable to moderate sized strip or pad foundations, say up to 2.5m width. Settlement for this design pressure is expected to be very small and well within normal tolerable design limits. As required by EC7, the design engineer must ensure that the correct comparisons are made between Design Actions and Design Resistances after the application of appropriate partial factors and using the final base geometry. For ULS design the bearing resistance should be determined, using undrained and/or drained analysis as appropriate, to calculate the degree of utilisation of the foundation (limit state GEO). SLS checks should be carried out using appropriate methods in accordance with current practice.

Whilst the boreholes and trial pits encountered non-shrinkable granular soils, in our experience cohesive, shrinkable, clay layers can occur within River Terrace Deposits, and some variability in soil composition should be expected across the site. Thus, if clay soils are encountered then foundations should be deepened to bear on natural granular soils. In proximity to the trees on site, attention should be given any potential desiccation effects which may affect foundation design and construction and the guidance contained within NHBC Chapter 4.2 should be adopted.

The foundation excavations will encounter made ground and natural deposits that are granular in nature. These are expected to remain stable in the short term although some spalling of the unconsolidated soils could occur. Thus, provision for temporary lateral support should be made if excavations are to remain open or personnel entrance is required. On the basis of the boreholes, the excavations should remain dry but it must be noted that groundwater levels can rise significantly during wet periods. We recommend that a monitoring of the borehole installations is carried out to confirm the groundwater levels.

6.3 Ground floor slabs

Whilst the investigation has indicated that made ground is present across the site, this is generally less than 600mm thick and thus, ground bearing floor slabs could be adopted following proof rolling of the formation level. Any weak zone identified by proof rolling should be excavated and replaced with suitably compacted fill material. In proximity to trees, any root infested soils should be replaced.

Alternatively, fully suspended floor slabs could be adopted.

6.4 Pavement construction

Following removal of topsoil, a preliminary CBR value of 5% is considered appropriate for the underlying natural granular soils present at shallow depth. The formation should be proof rolled prior to surfacing, and any soft/loose zones replaced with suitably compacted granular material. Proof rolling could of course generate a higher CBR value dependant upon the method and achievable compaction depth. Based on the CBR value of the slightly deeper soils, a CBR value in excess of 20% could be achievable. This should be confirmed by the ground works contractor.

The shallow soils across the site are assessed as not being frost susceptible.

6.5 Soakaways

Trial pit soakage testing resulted in infiltration rates of between $2.48 \times 10^{-5} \text{m/s}$ and $9.03 \times 10^{-6} \text{m/s}$, which indicate the shallow granular soils may provide a suitable medium for the disposal of surface water via traditional soakaways. Variability in the soakage rate is observable and this is likely due to compositional changes within the river Terrace Gravel. Thus, trench style soakaways may offer the most efficient form of soakaway design.

The site lies within a source protection zone and thus, use of soakaways may require approval from the Environment Agency. Although it is considered that the risk of chalk solution features is low, it is recommended that any soakaway is at a minimum distance of 5m from any structure.

6.6 Foundation concrete

Low concentrations of water-soluble sulphates (2:1 water/soil extract) were measured in selected soil samples, with slightly acidic to neutral pH values. The results fall into Site Design Class DS-1 of Table C2 given in BRE Special Digest 1 (2005). We assess the site as having 'mobile' groundwater and this would result in an ACEC Site Class of AC-3z.

Consideration should also be given to the potential oxidation of pyritic soils. Following the procedure recommended in the BRE digest, the amount of oxidisable sulphides is seen to be >0.3% in none of samples, suggesting that pyrite is probably not present.

7.0 STAGE 1 TIER 2 ENVIRONMENTAL ASSESSMENT

This appraisal is generally based on the Environment Agency's 'Land contamination: risk management', 2023, adopting current UK practice which uses the Source-Pathway-Receptor methodology to assess contamination risks. For a site to be designated as contaminated a plausible linkage between any identified sources and receptors must be identified, i.e. whether potential contaminant linkages (PCLs) are present. In considering the potential for contamination to cause a significant effect, the extent and nature of the potential source are assessed and pathways/receptors identified; without a PCL there is theoretically no risk to the receptors from contamination. The assessed risks to the various potential receptors are summarised in the tabulated Conceptual Site Model which forms Section 7.5 of this report.

7.1 Environmental setting and context

The site is underlain by River Terrace Deposits (4) which has a Superficial Aquifer Designation of '**Secondary Aquifer – A**'. The underlying Lambeth Group has a Bedrock Aquifer Designation of '**Secondary Aquifer – A**'. The site lies within a Source Protection Zone III. Two groundwater abstraction points are identified at Sonning Golf Club, both of which identified to be extraction of Thames groundwater for use as spray irrigation

The site is assessed as being of **Moderate** environmental sensitivity.

7.2 Contamination sources and testing

The Preliminary Risk Assessment presented in Section 3.6 has not identified any significant potential sources of contamination. To confirm the presence or absence of contaminants for the proposed redevelopment, we have undertaken analysis of fifteen soil samples for a range of contaminants commonly associated with industrial activities and contaminative uses.

The soil test results have been assessed where relevant against the DEFRA Soil Guideline Values (SGV) and Category 4 Screening Levels (C4SLs), together with the LQM/CIEH Suitable 4 Use Level (S4UL) for Human Health Risk Assessment in which Generic Assessment Criteria (GACs) have been derived from the CLEA Model (2nd Edition, 2009). Any groundwater test results have primarily been assessed against the Water Supply (Water Quality) Regulations 2016, Environmental Quality Standards (EQS) and the WHO Guidelines for Drinking Water Quality WHO/SDE/WSH/0.5.08/123. The contamination testing was carried out specifically for the purpose of providing a general guidance evaluation for the proposed development. Reference should be made to the foreword to the appended contamination test results in order to fully understand the context in which this discussion should be viewed.

We have used, where relevant, the trigger levels for **residential development (with home-grown produce)** to assess the results of the contamination testing.

Using the relevant the trigger levels, all of the results fell below the threshold values indicating widespread contamination is not present. The implications of these results are addressed in the revised Conceptual Site Model below.

Although Asbestos-Containing Materials (ACMs) were neither observed on site nor identified in the samples examined, we note that buildings, especially those constructed or refurbished before 2000, are a potential source of ACM and may contribute to Asbestos-Containing Soils (ACS) on-site and in surrounding areas. Furthermore, made ground, construction and/or demolition materials on site may also contain ACM and/or ACS which should be further investigated, if encountered, by competent persons. These matters should be addressed and assessed by competent persons in the Pre-Construction H&S plan prior to any demolition or earthworks being undertaken.

7.3 Ground gas/vapour monitoring

No specific gas generating uses/risks were identified by the PRA, but with 'made ground' being identified as a possible potential source. Precautionary gas monitoring was undertaken on two occasions following completion of the boreholes. No elevated levels of methane were measured. Carbon Dioxide was identified with a maximum recorded concentration of 2.0%, carbon monoxide and hydrogen sulphide were identified each with a maximum recorded concentration of 4ppm. PID readings in the borehole installations were below 5ppm. A maximum gas flow of 0.5l/hr was recorded during the monitoring visits, therefore used to calculate gas screening values (GSV). On the basis of these results, we consider that Characteristic Situation 1 (very low risk) is appropriate (as described in CIRIA C665 "Assessing risks posed by hazardous ground gases to buildings", 2007) and this suggests that no gas protection measures will be required.

The site is not situated within a radon risk area therefore radon protection measures are considered not to be required. This is subject to no habitable basement being constructed as part of this development.

7.4 Disposal of excavated soils

Whilst a rigorous hazard assessment of the results was not within the scope of our investigation, three composite samples were tested for Waste Acceptance Criteria (WAC) determination. It should be noted that WAC tests alone do not allow for the characterisation of wastes under current UK law, which requires solid material results to be used to generate an appropriate European Waste Code (EWC) for the material. WAC results merely indicate if a waste soil or other excavated material "may" be suitable for disposal at a UK landfill of the appropriate type or if other methods of disposal are indicated or required. The WAC results to date indicate that the material would be suitable for disposal at a facility capable of accepting Inert wastes.

Specialist waste advice should be sought to confirm these findings using the additional contamination data provided in the environmental analysis in this report. These results should be sufficient to allow a characterisation to be undertaken by a competent waste advisor and they are available in electronic form on request.

Note that materials defined as wastes (ie anything intended to be discarded) cannot be removed from site or transported without being classified as either hazardous or non-hazardous and the appropriate EWC and Hazard Codes being determined, recorded, agreed and applied by competent licensed waste contractors. If re-use or retention of waste materials on-site is considered desirable or required (for example to meet sustainability criteria), this will have to be agreed with the regulator prior to being undertaken to avoid such actions being considered 'licensable and chargeable' waste activities under current UK legislation and guidance. Additional investigation and data analysis by competent persons may be required in order to determine and/or confirm the suitability and fitness for purpose of the materials concerned on a site-specific basis.

7.5 Refined Conceptual Site Model

Taking into account the above discussion, the assessed risks to potential receptors identified in the PRA are summarised in the refined Conceptual Site Model (CSM) below. See Section 3.6 for an explanation of probability and consequence ratings and the overall assessment of the risks of contaminant linkages. The CSM below includes recommendations for appropriate mitigation measures to render any linkages inactive and reduce the risks to receptors to acceptable levels:

Source	Pathway	Receptor	Assessed risk, justification and measures to mitigate the risk to acceptable levels
On site: contaminated soil/water	Ingestion & direct contact	End user	Probability: 1 Consequence: 2 Potential Contaminant Linkage (PCL) risk: Very low - No contamination was measured in the soil samples so there will be no PCL to human health - The near-surface soils were free from visual/olfactory evidence of volatile compounds/vapours; this was corroborated by analysis (TPH, PAH). The PCL to human health will be inactive - A careful watching brief should be kept during construction and if obvious or suspected contamination is encountered this should be dealt with prescriptively
	Ingestion, contact & inhalation	Construction workers and third parties	Probability: 1 Consequence: 2 Potential Contaminant Linkage (PCL) risk: Very low - No contamination was measured in the soil samples so there will be no PCL to human health - No PCL to human health has been identified. Any residual risks to these receptors will be managed through health & safety procedures and CDM regulations

Source	Pathway	Receptor	Assessed risk, justification and measures to mitigate the risk to acceptable levels
	Leaching from contaminated soils and migration in groundwater	Aquifer and surface water	Probability: 1 Consequence: 2 Potential Contaminant Linkage (PCL) risk: Very low  No contamination was measured in the soil samples so there will be no PCL to human health
	Direct contact with soil/water	Building fabric and infrastructure	 The effects of soluble sulphates and alkali/acidic ground are discussed in Section 6.6 of this report  Detailed assessment of soil/groundwater contamination with respect to water supply pipes is outside the scope of this report. The UKWIR publication 'Guidance for the selection of water supply pipes to be used in brownfield sites', 2010 states that if suitable barrier pipe is specified "there is no need to carry out soil sampling and analysis and this may be the most cost-effective solution". The validity of this approach will clearly be dependent upon the scale of the development and the quantity of pipe needed
Off site: contaminated soil/water	Lateral migration of contaminants in groundwater	End-user and buildings	Probability: 1 Consequence: 2 Potential Contaminant Linkage (PCL) risk: Very low  No contamination measured in onsite soils which may be associated with off-site sources
On-site and off-site: ground gas & vapour	Lateral migration through strata, service runs and cracks in buildings	End-user and buildings	Probability: 1 Consequence: 2 Potential Contaminant Linkage (PCL) risk: Very low  No elevated concentrations of ground gasses were measured during monitoring visits. Monitoring indicates that CIRIA C665 CS1 applies therefore no ground gas protection measures are required.  The site is not located within a radon risk area

In conclusion, based upon the information reviewed and the results of the investigation, our assessment is that there is suitably low contamination risk for the proposed residential end use. Any residual associated risks to construction workers will be mitigated by appropriate PPE and soil handling.

The investigation has provided coverage of the site specific to the development, and it is self-evident that there may be zones of contamination which were not encountered, including areas beneath the existing building. A careful watching brief should be kept during construction to ensure that any potentially contaminated soil encountered is disposed of in a safe and controlled manner. Site workers should observe normal hygiene precautions when handling soils and if material suspected of being contaminated is identified during construction, this should be set aside under protective cover and further tests undertaken to verify the nature and levels of contamination present. If contamination is present, a full site re-assessment may be required, and a contingency should be in place in this regard.

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GENERAL INFORMATION, LIMITATIONS AND EXCEPTIONS

Unless otherwise stated, our Report should be construed as being a Ground Investigation Report (GIR) as defined in BS EN1997-2. Our Report is not intended to be and should not be viewed or treated as a Geotechnical Design Report (GDR) as defined in EN1997-2. Any 'design' recommendations which are provided are for guidance only and are intended to allow the designer to assess the results and implications of our investigation/testing and to permit preliminary design of relevant elements of the proposed scheme.

The methods of investigation used have been chosen taking into account the constraints of the site including but not limited to access and space limitations. Where it has not been possible to reasonably use an EC7 compliant investigation technique we have adopted a practical technique to obtain indicative soil parameters and any interpretation is based upon our engineering experience and relevant published information.

The Report is issued on the condition that Soil Consultants Ltd will under no circumstances be liable for any loss arising directly or indirectly from ground conditions between the exploratory points which differ from those identified during our investigation. In addition, Soil Consultants Ltd will not be liable for any loss arising directly or indirectly from any opinion given on the possible configuration of strata between the exploratory points, below the maximum depth of the investigation or where site conditions have changed since the exploratory work; such opinions, where given, are for guidance only and no liability can be accepted as to their accuracy. The results of any measurements taken may vary spatially or with time and further confirmatory measurements should be made after any significant delay in using this Report. We will provide an indication of the strata configuration within the site based upon exploratory holes undertaken. Any strata boundaries shown will relate to the principal layers but it should be noted that these boundaries could be gradational and the depths identified would then not be definitive. The boundary depths/levels are given for guidance only.

Comments made relating to groundwater or ground-gas are based upon observations made during our investigation unless otherwise stated. Groundwater and ground-gas conditions may vary with time from those reported due to factors such as seasonal effects, atmospheric effects and and/or tidal conditions. We recommend that if monitoring installations have been included as part of our investigation, continued monitoring should be carried out to maximise the information gained.

Specific geotechnical features/hazards such as (but not limited to) areas of root-related desiccation and dissolution features in chalk/soluble rock can exist in discrete localised areas - there can be no certainty that any or all of such features/hazards have been located, sampled or identified. Where a risk is identified the designer should provide appropriate contingencies to mitigate the risk through additional exploratory work and/or an engineered solution.

Where a specific risk of ground dissolution features has been identified in our Report (anything above a 'low' risk rating), reference should be made to the local building control to establish whether there are any specific local requirements for foundation design and appropriate allowances should be incorporated into the design. If such a risk assessment was not within the scope of our investigation and where it is deemed that the ground sequence may give rise to such a risk (for example near-surface chalk strata) it is recommended that an appropriate assessment should be undertaken prior to design of foundations.

Where spread foundations are used, we recommend that all excavations are inspected and approved by suitably experienced personnel; appropriate inspection records should be kept. This should also apply to any structures which are in direct contact with the soil where the soil could have a detrimental effect on performance or integrity of the structure.

Ground contamination often exists in small discrete areas - there can be no certainty that any or all such areas have been located, sampled or identified.

The findings and opinions conveyed in this Report may be based on information from a variety of sources such as previous desk studies, investigations or chemical analyses. Soil Consultants Limited cannot and does not provide any guarantee as to the authenticity, accuracy or reliability of such information from third parties; such information has not been independently verified unless stated in our Report. No liability will be accepted for changes to the ground and groundwater conditions which occur post investigation.

Our Report is written in the context of an agreed scope of work between Soil Consultants Ltd and the Client and should not be used in any different context. In light of additional information becoming available, improved practices and changes in legislation, amendment or re-interpretation of the assessment or the Report in part or in whole may be necessary after its original publication.

Unless otherwise stated our investigation does not include an arboricultural survey, asbestos survey, ecological survey or flood risk assessment and these should be deemed to be outside the scope of our investigation.

We will identify tree and plant species if possible, but a suitably qualified arboriculturalist/botanist should be consulted to provide definitive identification.

Where reference to 'topsoil' is made, this should be construed as any turf (if present) plus any obvious organic-rich/humic layer of soil beneath, which may or may not contain roots/rootlets. Unless otherwise requested, we do not provide a detailed description, undertake sampling/testing for classification purposes or provide a specific classification. The thickness of the 'topsoil' identified on our exploratory hole records is indicative only and should not be used for detailed volume or site strip calculations.

STANDARD TERMS OF APPOINTMENT OF SOIL CONSULTANTS LTD FOR GEOTECHNICAL SERVICES

- 1 Unless previously withdrawn, our offer remains valid for a period of sixty days from date of offer. If an instruction is given after the sixty days we reserve the right to reasonably adjust any cost associated with the project to reflect any variance on the original offer. In placing an instruction to proceed with exploratory work, whether directly from the Client or Client's representative, the Client is deemed to have accepted our Terms of Appointment.
- 2 Our offer is on the basis that free, unhindered access and working conditions are available and that the investigation can be completed in one visit, if applicable. Delays beyond our control will incur additional charges. If additional works outside our offer are required to facilitate the investigation these will be advised and any costs will be passed on to the Client.
- 3 In our quotation we will provide an estimate of any mobilisation period following an instruction to proceed. This estimate will be accurate at the time of quotation, but it should be noted that the mobilisation period may vary at a later date due to factors such as sub-contractor availability and workload.
- 4 In commissioning this work, the Client has a responsibility for the health, safety and welfare of operatives invited to undertake work on their site. The Client shall indemnify us in respect of any failure to fulfil their obligations in connection with all relevant and current Health and Safety Regulations.
- 5 The methods of investigation used have been chosen taking into account the constraints of the site including but not limited to access, space and budgetary limitations. Where it has not been possible to reasonably use an EC7 compliant investigation technique, or where a non-compliant technique has been specified, we will adopt practical and appropriate techniques to obtain indicative soil parameters.
- 6 Unless otherwise stated, our Report should be construed as being a Ground Investigation Report (GIR) as defined in BS EN1997-2. Our Report is not intended to be and should not be viewed or treated as a Geotechnical Design Report (GDR) as defined in BS EN1997-2. Any interpretation which is provided is for guidance only and must not be regarded as design or design recommendation.
- 7 Where excavation is required as part of the exploratory work, the Client shall provide drawings or plans showing accurate and complete locations of all underground services and structures. In performing our service, we shall take reasonable precautions to avoid damage to underground services or structures. We will not be responsible for any damage caused to underground services or structures and will not be liable for any claims for damage, expenses arising or losses unless the location of all underground services or structures are accurately shown on drawings and those plans have been provided to us in good time prior to commencement of the exploratory work. Risk to the Client can be further reduced by undertaking a scan of the site using a specialist underground scanning service which would be intended to identify traceable services at shallow depth.
- 8 With some sites, especially those in certain areas of London and other large towns and cities, there may be a risk of unexploded ordnance (UXO) being present. Unless otherwise stated our offer is on the basis that the Client or their representative provides a preliminary UXO risk assessment for the site. It should be noted that if the site is deemed to be in an area of risk then further measures will be required. These would normally comprise either a more detailed risk assessment and/or specialist site attendance by an EOD engineer. These measures can be commissioned either by the Client or Soil Consultants Ltd. If the Client requires, we would be pleased to obtain a preliminary risk assessment at cost+10%.
- 9 The Client will supply a site plan (to a rational scale), an indication of the scope and type of the proposed development and an indication of any relevant structural loading information.
- 10 Should the Client terminate the contract after instruction, we reserve the right to recover costs associated to work carried out between the time of instruction and the point of termination. Cancellation fees, and material costs shall be charged at cost plus 20% (+VAT). Engineer/technician time shall be charged at £95+VAT per hour and principal consultant/director time shall be charged at £125+VAT per hour.

- 11 The Report is issued on the condition that Soil Consultants Ltd will under no circumstances be liable for any loss arising directly or indirectly from ground conditions between the exploratory points which differ from those identified during the investigation. In addition Soil Consultants Ltd will not be liable for any loss arising directly or indirectly from any opinion given on the possible configuration of strata both between the exploratory points and/or below the maximum depth of the investigation; such opinions, where given, are for guidance only and no liability can be accepted as to their accuracy. The results of any measurements taken may vary spatially or with time and further confirmatory measurements should be made after any significant delay in using this Report.
- 12 If and when instructed, an agreed number of contamination tests will be carried out to give an outline assessment of potential contaminants. In some circumstances it may be necessary to recommend further monitoring, contamination testing and assessment and the scope of this work would be agreed with the Client. Notwithstanding this additional scope, local regulatory authorities may have specific requirements which need to be addressed. Unless otherwise agreed or stated our reporting will constitute neither a Quantitative Risk Assessment nor a Remediation Statement or Strategy.
- 13 Our reports are counter-checked by one of our suitably qualified and experienced engineers/geologists.
- 14 Notwithstanding anything to the contrary contained in these terms, our liability under or in connection with these terms whether in contract or in tort, in negligence, for breach of statutory duty or otherwise (other than in respect of personal injury or death) shall not exceed the sum equivalent to ten times our contract fee or £100,000 whichever is less in the aggregate for geotechnical and environmental matters unless otherwise agreed.
- 15 Without prejudice to any other exclusion or limitation of liability, damages, loss, expense or costs our liability for any claim or claims under this agreement be further limited to such sum as it would be just and equitable for us to pay having regard to the extent of our responsibility for the loss or damage giving rise to such claim or claims ("the loss and damage") and on the assumptions that:
 - (a) All other consultants, contractors, sub-contractors, project managers or advisers engaged in connection with the Project have provided contractual undertakings to the Client on terms no less onerous than those set out in the original contracts in respect of the carrying out of their obligations in connection with the Project; and
 - (b) There are no exclusions of or limitations of liability nor joint insurance or co-insurance provisions between the Client and any other party referred to in this clause and any such other party who is responsible to any extent for the loss and damage is contractually liable to the Client for the loss and damage; and
 - (c) All such other consultants, contractors, sub-contractors, project managers or advisers have paid to the Client such proportion of the loss or damage which it would be just and equitable for them to pay having regard to the extent of their responsibility for the loss and damage.
- 16 Further and notwithstanding anything to the contrary contained in this agreement and without prejudice to any provision in this agreement whereby liability is excluded or limited to a lesser amount, our liability under or in connection with this agreement whether in contract or in tort, in negligence, for breach of statutory duty or otherwise for any claim shall not exceed the amount, if any, recoverable by us by way of indemnity against the claim in question under professional indemnity insurance taken out by us and in force at the time that the claims or (if earlier) circumstances that may give rise to the claim is or are reported to the insurers in question. The limitation shall not apply if no such amount is recoverable due to us having been in breach of our obligations or the terms of any insurance maintained in accordance therewith or having failed to report any such claim or circumstances to the Insurers in question timeously.
- 17 Whilst our investigation may include asbestos screening/quantification on selected samples, this must not be deemed to constitute a full asbestos survey or be taken as sufficient to definitively identify the presence or quantity of asbestos within or on the ground. We will not accept responsibility if asbestos is encountered during any subsequent construction or development works and in placing a contract with us the Client accepts this condition. Where the fabric of a building is to be disturbed, the Client shall provide an appropriate asbestos survey to us prior to exploratory work and make adequate provision to allow the implementation of sufficient and appropriate protective/remedial measures for the work to progress safely.

- 18 Where our report refers to 'topsoil', this should be construed as any turf (if present) plus any obvious organic rich/humic layer of soil beneath, which may or may not contain roots/rootlets. Unless otherwise requested, we do not provide a detailed description, undertake sampling/testing for classification purposes or provide a specific classification. The thickness of the 'topsoil' identified on our exploratory hole records is indicative only and should not be used for detailed volume or site strip calculations; if this type of classification is required, this should be identified to us at an early stage and the method of sampling, testing and classification agreed.
- 19 The Client agrees that they shall not bring any claim personally against any director/employee of Soil Consultants Ltd or consultant to us in respect of loss or damage suffered by the Client arising out of this contract.
- 20 Our appointment shall be under simple agreement and our liability under this agreement whether in contract or in tort shall be for a period of six years from date of instruction.
- 21 Our reports are non-assignable and are prepared for the benefit of the Client. No reliance can be assumed by others without written agreement from Soil Consultants Ltd. We will provide a letter of reliance at our discretion and this will be subject to payment of our fee, which will be 10% of contract value, subject to a minimum fee of £1,250 plus VAT. The terms of our letter of reliance are non-negotiable and the beneficiary should be aware that the information shall only apply to the scheme for which the report was originally produced and the original rights and benefits will apply.
- 22 A VAT invoice (at current rate) will be presented in respect of the work undertaken. Payment of our account is to be made within twenty-eight days of issue of our invoice unless otherwise agreed. On no account shall payment be on a 'pay-when-paid' basis. The information contained within our report remains the property of Soil Consultants Ltd and no reliance may be assumed by any party with an interest in the project until payment has been received in full. After one calendar month interest shall be chargeable at 10% above the Bank of England Rate and compensation claimed in accordance with 'Late Payments of Commercial Debts (Interest) Act 1998 and subsequent revisions. If the debt is referred to a debt collection agency then we have the right to recover associated fees under the terms of our contract.

APPENDIX A

Fieldwork, in-situ testing and monitoring

-  Foreword
-  Borehole records
-  Standard Penetration Test results
-  SPT hammer calibration certificates
-  Trial pit records
-  Dynamic Probe Test results
-  TRL DCP Test results
-  Soakaway Test results
-  Groundwater and gas monitoring results

Laboratory testing

-  Index property testing
-  Plasticity chart
-  Particle size distribution tests

Ground profiles

-  Plot of SPT 'N' value versus depth
-  Plot of SPT 'N' value versus level
-  Cross section through boreholes

Contamination and chemical testing

-  Foreword
-  General soil suite
-  WAC test results
-  Sulphate/pH suite

Plans, drawings & photographs

-  Site photographs
-  Proposed development plans
-  Topographical drawing
-  Site Walkover Plan
-  Tree Survey Plan
-  Location Plan

FOREWORD FOR DYNAMIC SAMPLER BOREHOLES (WINDOWLESS) - GUIDANCE NOTES

GENERAL

The borehole records are compiled from the driller's description of the strata encountered, an examination of the samples by our geotechnical engineer and the results of in-situ and laboratory tests. Based on these data, the report presents an opinion on the configuration of strata within the site. However, such reasonable assumptions are given for guidance only and no liability can be accepted for changes in conditions not revealed by the boreholes.

BORING METHODS

The dynamic sampler technique uses 1m long tubes containing a rigid plastic liner. These are driven into the ground by a falling hammer, then withdrawn and the liner removed. The borehole commences using a large diameter tube (usually 100mm) with each succeeding tube reducing usually by 10mm in diameter to assist the extraction of the tube from the ground. Thus, it is theoretically possible to obtain a total continuous sample of the soil for examination or testing. Casing can be utilised as required. The technique allows the ground conditions to be reasonably well established although disturbance of the ground is inevitable, particularly some "softening" of the upper zone of clay immediately beneath a granular soil. The presence of thin layers of different soils within a stratum may not always be detected.

GROUND WATER

The depth at which ground water was struck is entered on the borehole records. However, this observation may not indicate the true water level at that time. Due to the speed of boring and the relatively small diameter of the borehole, natural ground water may be present at a depth higher than the water strike. Moreover, ground water levels are subject to variations caused by changes in the local drainage conditions and by seasonal effects. When a moderate inflow of water does take place, boring is suspended for at least 10 minutes to enable a more accurate short-term water level to be achieved. An estimate of the rate of inflow is also given. This is a relative term and serves only as a guide to the probable flow of water into an excavation.

Further observations of the water level made during the progress of the borehole are shown including end of shift and overnight readings and the depth at which water was sealed off by the borehole casing, if applicable.

SAMPLES

Small disturbed samples can be recovered from the lining tubes for subsequent laboratory testing, including moisture content, index property tests and contamination analyses.

IN-SITU TESTING

Standard Penetration Test (SPT): this test is performed in accordance with the procedure given in BS EN ISO 22476-3:2005. The individual blow count record for each test is given on a separate table. The 'N' value is normally the number of blows to achieve a penetration of 0.3m following a seating distance of 0.15m and is quoted at the mid-depth of the test zone. However if a change of stratum occurs within the test zone then a revised 'N' value can be calculated to assess one layer in particular. In hard strata full penetration may not be obtained. The presence of groundwater and particularly Where groundwater can affect the test and the measured values may not represent the true in-situ density of the soil.

Hand Shear Vane: provides the shear strength of cohesive soils, values reported in kPa

Pocket Penetrometer: provides an estimate of the unconfined compression strength, values reported in kg/cm²

Site & Location: Sonning Golf Club (Housing) Duffield Road, Sonning, Reading, Berkshire, RG4 6GJ							Borehole No: WS01	
Client: Sonning Golf Club Ltd					Coordinates: 476436E, 174712N		Sheet 1 of 1	
Engineer: Aventus Design Ltd					Ground Level: +53.38mOD		Report No: 11043a/CA	
Progress & Observations	Samples & Tests		Field Test Results	Strata		Legend	Strata Descriptions	Backfill / Installation
	Type	Depth (m)		Depth (m)	Level (m)			
BH commenced: 21/07/2025	D ES	0.00 0.00	0.0	0.20	53.18		Grass over dark brownish-grey, gravelly, sandy TOPSOIL. Occasional rootlets.	
	D ES PID	0.20 0.20 0.20					POSSIBLE MADE GROUND: Light greyish-brown, silty very sandy gravel. Gravel is angular to subangular, fine to coarse, flint.	
Inspection pit to 0.50m	D ES PID	0.50 0.50 0.50		0.50	52.88		Dense becoming very dense orangish-brown silty very sandy GRAVEL. Gravel is angular to subrounded fine to coarse flint.	
BH dia. 100mm reducing with depth	D SPT/S PID	1.00 1.00 1.00	N=48 0.0					
	D	1.50	N>50*				...below 1.50m, becoming dark brown	
	SPT/S	1.60						
BH complete: 21/07/2025 BH depth: 2.10m (refusal) Water depth: Dry Dynamic Probe follow-on from 2.10m, see DP01				2.10	51.28		End of hole at 2.10m	
Key: U = Undisturbed B = Bulk D = Small disturbed W = Water ES = glass jar & plastic tub E = glass jar SPT/S = split spoon SPT/C = solid cone PP = Pocket Penetrometer [kg/cm²] HV = Hand Vane [kPa] PID = Photo Ionisation Detector [ppm - Isobutylene Equivalent, PhoCheck Tiger, 10.6eV lamp] * = full SPT penetration not achieved - see summary sheet								Borehole type: Dynamic Sampler
Remarks: A) Co-ordinates and levels obtained by SVS Ltd B) Installed with 0.50m plain and 1.10m slotted pipe (50mm)								Borehole No: WS01

Site & Location: Sonning Golf Club (Housing) Duffield Road, Sonning, Reading, Berkshire, RG4 6GJ							Borehole No: WS03		
Client: Sonning Golf Club Ltd					Coordinates: 476383E, 174749N		Sheet 1 of 1		
Engineer: Aventus Design Ltd					Ground Level: +54.61mOD		Report No: 11043a/CA		
Progress & Observations	Samples & Tests		Field Test Results	Strata		Legend	Strata Descriptions	Backfill / Installation	
	Type	Depth (m)		Depth (m)	Level (m)				
BH commenced: 22/07/2025 Inspection pit to 0.50m BH dia. 100mm reducing with depth	D	0.00	0.0	0.15	54.46		Grass over brown, slightly silty, gravelly, sandy TOPSOIL.		1
	ES	0.00					POSSIBLE MADE GROUND: Light greyish-brown very gravelly fine to coarse sand. Gravel is angular to subrounded fine to coarse, flint.		
	PID	0.15							
	PID	0.40	0.0	...below 1.00m, becoming light brown to light grey					
	D	0.75	0.75	53.86	Medium dense becoming very dense dark orangish-brown silty very sandy GRAVEL. Gravel is angular to subrounded fine to coarse flint.				
BH complete: 22/07/2025 BH depth: 2.00m (refusal) Water depth: Dry Dynamic Probe follow-on from 2.00m, see DP03	D	1.00	N=21 0.0	2.00	52.61		End of hole at 2.00m	2	
	SPT/S	1.00							
	SPT/S	1.60	N>50*					3	
Key: U = Undisturbed B = Bulk D = Small disturbed W = Water ES = glass jar & plastic tub E = glass jar SPT/S = split spoon SPT/C = solid cone PP = Pocket Penetrometer [kg/cm²] HV = Hand Vane [kPa] PID = Photo Ionisation Detector [ppm - Isobutylene Equivalent, PhoCheck Tiger, 10.6eV lamp] * = full SPT penetration not achieved - see summary sheet								Borehole type: Dynamic Sampler	
Remarks: A) Co-ordinates and levels obtained by SVS Ltd B) Backfilled with arisings								Borehole No: WS03	

Site & Location: Sonning Golf Club (Housing) Duffield Road, Sonning, Reading, Berkshire, RG4 6GJ							Borehole No: WS04		
Client: Sonning Golf Club Ltd					Coordinates: 476421E, 174785N		Sheet 1 of 1		
Engineer: Aventus Design Ltd					Ground Level: +54.22mOD		Report No: 11043a/CA		
Progress & Observations	Samples & Tests		Field Test Results	Strata		Legend	Strata Descriptions	Backfill / Installation	
	Type	Depth (m)		Depth (m)	Level (m)				
BH commenced: 22/07/2025	D	0.00	0.0	0.15	54.07		Grass over light brownish-light grey, gravelly, sandy TOPSOIL.		1
	ES	0.00							
D	0.10								
ES	0.10								
PID	0.10								
Inspection pit to 0.50m	PID	0.50	0.0	1.00	53.22		End of hole at 1.00m		2
BH dia. 100mm reducing with depth									
BH complete: 22/07/2025 BH depth: 1.00m (refusal) Water depth: Dry Dynamic Probe follow-on from 1.00m, see DP04									
									3
Key: U = Undisturbed B = Bulk D = Small disturbed W = Water ES = glass jar & plastic tub E = glass jar SPT/S = split spoon SPT/C = solid cone PP = Pocket Penetrometer [kg/cm²] HV = Hand Vane [kPa] PID = Photo Ionisation Detector [ppm - Isobutylene Equivalent, PhoCheck Tiger, 10.6eV lamp] * = full SPT penetration not achieved - see summary sheet								Borehole type: Dynamic Sampler	
Remarks: A) Co-ordinates and levels obtained by SVS Ltd B) Backfilled with arisings								Borehole No: WS04	



Sonning Golf Club (Housing)							Borehole No: WS05		
Duffield Road, Sonning, Reading, Berkshire, RG4 6GJ									
Client: Sonning Golf Club Ltd					Coordinates: 476463E, 174763N		Sheet 1 of 1		
Engineer: Aventus Design Ltd					Ground Level: +53.84mOD		Report No: 11043a/CA		
Progress & Observations	Samples & Tests		Field Test Results	Strata		Legend	Strata Descriptions	Backfill / Installation	
	Type	Depth (m)		Depth (m)	Level (m)				
BH commenced: 22/07/2025 Inspection pit to 0.50m BH dia. 100mm reducing with depth	D ES	0.00 0.00	0.0	0.15	53.69		Grass over brownish-light grey, slightly silty, gravelly, sandy TOPSOIL.		1
	D ES PID	0.15 0.15 0.15					POSSIBLE MADE GROUND: Light brown slightly silty to silty very gravelly fine to coarse sand. Gravel is angular to subangular, fine to coarse, flint.		
	D PID	0.50 0.50	0.0	0.50	53.34		Medium dense yellowish-orange, silty slightly gravelly fine to medium SAND. Gravel is angular to subangular fine to medium flint.		
	D SPT/S PID	1.00 1.00 1.00					N=25 0.0		
	D	1.40	1.40	52.44		Medium dense becoming very dense dark orangish-brown silty very sandy GRAVEL. Gravel is angular to subangular fine to coarse flint.			
D SPT/S	2.00 2.00	N>50*							
BH complete: 22/07/2025 BH depth: 2.40m (refusal) Water depth: Dry Dynamic Probe follow-on from 2.40m, see DP05			2.40	51.44		End of hole at 2.40m		2	
								3	
Key: U = Undisturbed B = Bulk D = Small disturbed W = Water ES = glass jar & plastic tub E = glass jar SPT/S = split spoon SPT/C = solid cone PP = Pocket Penetrometer [kg/cm²] HV = Hand Vane [kPa] PID = Photo Ionisation Detector [ppm - Isobutylene Equivalent, PhoCheck Tiger, 10.6eV lamp] * = full SPT penetration not achieved - see summary sheet								Borehole type: Dynamic Sampler	
Remarks: A) Co-ordinates and levels obtained by SVS Ltd B) Installed with 1.30m plain and 1.10m slotted pipe (50mm)								Borehole No: WS05	

Site & Location: Sonning Golf Club (Housing) Duffield Road, Sonning, Reading, Berkshire, RG4 6GJ							Borehole No: WS06	
Client: Sonning Golf Club Ltd					Coordinates: 476477E, 174795N		Sheet 1 of 1	
Engineer: Aventus Design Ltd					Ground Level: +53.80mOD		Report No: 11043a/CA	
Progress & Observations	Samples & Tests		Field Test Results	Strata		Legend	Strata Descriptions	Backfill / Installation
	Type	Depth (m)		Depth (m)	Level (m)			
BH commenced: 22/07/2025 Inspection pit to 0.50m BH dia. 100mm reducing with depth	D ES	0.00 0.00	0.0	0.20	53.60		Grass over brownish-light grey, gravelly, sandy TOPSOIL.	 1
	D ES PID	0.20 0.20 0.20					POSSIBLE MADE GROUND: Light greyish-brown slightly clayey silty very gravelly fine to medium sand. Gravel is angular to subrounded fine to coarse flint.	
	D ES PID	0.50 0.50					Medium dense becoming very dense dark orangish-brown silty SAND and GRAVEL. Gravel is angular to subangular fine to coarse flint.	
	D SPT/S PID	1.00 1.00 1.00	N=23 0.0		End of hole at 1.90m	2		
SPT/S	1.60	N>50*	3					
BH complete: 22/07/2025 BH depth: 1.90m (refusal) Water depth: Dry Dynamic Probe follow-on from 1.90m, see DP06				1.90	51.90			
Key: U = Undisturbed B = Bulk D = Small disturbed W = Water ES = glass jar & plastic tub E = glass jar SPT/S = split spoon SPT/C = solid cone PP = Pocket Penetrometer [kg/cm²] HV = Hand Vane [kPa] PID = Photo Ionisation Detector [ppm - Isobutylene Equivalent, PhoCheck Tiger, 10.6eV lamp] * = full SPT penetration not achieved - see summary sheet								Borehole type: Dynamic Sampler
Remarks: A) Co-ordinates and levels obtained by SVS Ltd B) Installed with 0.70m plain and 1.0m slotted pipe (19mm)								Borehole No: WS06

Site & Location: Sonning Golf Club (Housing) Duffield Road, Sonning, Reading, Berkshire, RG4 6GJ							Borehole No: WS07	
Client: Sonning Golf Club Ltd					Coordinates: 476495E, 174793N		Sheet 1 of 1	
Engineer: Aventus Design Ltd					Ground Level: +53.86mOD		Report No: 11043a/CA	
Progress & Observations	Samples & Tests		Field Test Results	Strata		Legend	Strata Descriptions	Backfill / Installation
	Type	Depth (m)		Depth (m)	Level (m)			
BH commenced: 22/07/2025 Inspection pit to 0.50m BH dia. 100mm reducing with depth	D ES	0.00 0.00	0.0	0.15	53.72		Grass over brownish-light grey, gravelly, sandy TOPSOIL.	
	D ES PID	0.15 0.15					POSSIBLE MADE GROUND: Light greyish-brown slightly silty very gravelly fine to medium sand. Gravel is angular to subangular fine to coarse flint.	
	D PID	0.50 0.50	0.0	0.50	53.36		Dense yellowish-orange very silty gravelly fine to coarse SAND. Gravel is angular to subangular fine to coarse flint.	
	D SPT/S PID	1.00 1.00 1.00						
	D	1.30	N=37 0.0	1.30	52.56		Dense becoming very dense dark orangish-brown slightly silty very sandy GRAVEL. Gravel is angular to subangular fine to coarse flint.	
	SPT/S	1.50						
BH complete: 22/07/2025 BH depth: 1.90m (refusal) Water depth: Dry Dynamic Probe follow-on from 1.90m, see DP07.				1.90	51.96		End of hole at 1.90m	
Key: U = Undisturbed B = Bulk D = Small disturbed W = Water ES = glass jar & plastic tub E = glass jar SPT/S = split spoon SPT/C = solid cone PP = Pocket Penetrometer [kg/cm ²] HV = Hand Vane [kPa] PID = Photo Ionisation Detector [ppm - Isobutylene Equivalent, PhoCheck Tiger, 10.6eV lamp] * = full SPT penetration not achieved - see summary sheet							Borehole type: Dynamic Sampler	
Remarks: A) Co-ordinates and levels obtained by SVS Ltd B) Installed with 0.50m plain and 1.00m slotted pipe (19mm)							Borehole No: WS07	

Site & Location: Sonning Golf Club (Housing) Duffield Road, Sonning, Reading, Berkshire, RG4 6GJ							Borehole No: WS08				
Client: Sonning Golf Club Ltd					Coordinates: 476457E, 174819N		Sheet 1 of 1				
Engineer: Aventus Design Ltd					Ground Level: +54.64mOD		Report No: 11043a/CA				
Progress & Observations	Samples & Tests		Field Test Results	Strata		Legend	Strata Descriptions	Backfill / Installation			
	Type	Depth (m)		Depth (m)	Level (m)						
BH commenced: 22/07/2025	D	0.00	0.0	0.10	54.54		Grass over brown, gravelly, sandy TOPSOIL.			1	
	ES	0.00						POSSIBLE MADE GROUND: Light greyish-brown slightly silty very gravelly fine to coarse sand. Gravel is angular to subrounded, fine to coarse, flint.			
	D	0.10						Dense becoming very dense orangish-brown slightly silty very sandy GRAVEL. Gravel is angular to subangular fine to coarse flint.			
	ES	0.10									
	PID	0.10									
Inspection pit to 0.50m	D	0.50	0.0	0.50	54.14						
	PID	0.50									
BH dia. 100mm reducing with depth	D	1.00	N=43								
	SPT/S	1.00									
	PID	1.00									
			0.0								
	SPT/S	1.60	N=60								

Site & Location: Sonning Golf Club (Housing) Duffield Road, Sonning, Reading, Berkshire, RG4 6GJ							Borehole No: WS10	
Client: Sonning Golf Club Ltd					Coordinates: 476514E, 174827N		Sheet 1 of 1	
Engineer: Aventus Design Ltd					Ground Level: +53.91mOD		Report No: 11043a/CA	
Progress & Observations	Samples & Tests		Field Test Results	Strata		Legend	Strata Descriptions	Backfill / Installation
	Type	Depth (m)		Depth (m)	Level (m)			
BH commenced: 22/07/2025 <								

Site & Location: Sonning Golf Club (Housing) Duffield Road, Sonning, Reading, Berkshire, RG4 6GJ							Borehole No: WS11		
Client: Sonning Golf Club Ltd					Coordinates: 476494E, 174862N		Sheet 1 of 1		
Engineer: Aventus Design Ltd					Ground Level: +54.26mOD		Report No: 11043a/CA		
Progress & Observations	Samples & Tests		Field Test Results	Strata		Legend	Strata Descriptions	Backfill / Installation	
	Type	Depth (m)		Depth (m)	Level (m)				
BH commenced: 22/07/2025	D ES	0.00 0.00	0.0	0.15	54.11		Grass over brown, gravelly, sandy TOPSOIL.		1
Inspection pit to 0.50m	D ES PID	0.15 0.15 0.15					Very dense light brownish-yellow, very gravelly fine to medium SAND. Gravel is angular to subangular fine to coarse flint.		
	SPT/S PID	0.90 0.90		N>50* 0.0	1.15	53.11			
BH dia. 100mm reducing with depth									
BH complete: 22/07/2025 BH depth: 1.15m (refusal) Water depth: Dry Dynamic Probe follow-on from 1.15m, see DP11									
Key: U = Undisturbed B = Bulk D = Small disturbed W = Water ES = glass jar & plastic tub E = glass jar SPT/S = split spoon SPT/C = solid cone PP = Pocket Penetrometer [kg/cm²] HV = Hand Vane [kPa] PID = Photo Ionisation Detector [ppm - Isobutylene Equivalent, PhoCheck Tiger, 10.6eV lamp] * = full SPT penetration not achieved - see summary sheet								Borehole type: Dynamic Sampler	
Remarks: A) Co-ordinates and levels obtained by SVS Ltd B) Backfilled with arisings								Borehole No: WS11	

Site & Location: Sonning Golf Club (Housing) Duffield Road, Sonning, Reading, Berkshire, RG4 6GJ							Borehole No: WS12	
Client: Sonning Golf Club Ltd					Coordinates: 476538E, 174855N		Sheet 1 of 1	
Engineer: Aventus Design Ltd					Ground Level: +53.88mOD		Report No: 11043a/CA	
Progress & Observations	Samples & Tests		Field Test Results	Strata		Legend	Strata Descriptions	Backfill / Installation
	Type	Depth (m)		Depth (m)	Level (m)			
BH commenced: 23/07/2025 Inspection pit to 0.30m BH dia. 100mm reducing with depth BH complete: 23/07/2025 BH depth: 1.20m (refusal) Water depth: Dry Dynamic Probe follow-on from 1.20m, see DP12	D	0.00	0.0	0.08	53.80		Grass over brown slightly silty gravelly sandy TOPSOIL.	
	D ES PID	0.08 0.08 0.08					POSSIBLE MADE GROUND: Light greyish-brown slightly silty gravelly to very gravelly fine to medium sand. Gravel is angular to subangular fine to coarse flint.	
	D PID	0.50 0.50		0.50	53.38		Dense orangish-brown slightly silty very sandy GRAVEL. Gravel is angular to subrounded fine to coarse flint.	
	SPT/S	0.90						
	PID	1.00	0.0					
			1.20	52.68		End of hole at 1.20m		
Key: U = Undisturbed B = Bulk D = Small disturbed W = Water ES = glass jar & plastic tub E = glass jar SPT/S = split spoon SPT/C = solid cone PP = Pocket Penetrometer [kg/cm²] HV = Hand Vane [kPa] PID = Photo Ionisation Detector [ppm - Isobutylene Equivalent, PhoCheck Tiger, 10.6eV lamp] * = full SPT penetration not achieved - see summary sheet								
Remarks: A) Co-ordinates and levels obtained by SVS Ltd B) Installed with 0.20m plain and 0.45m slotted pipe (50mm)								Borehole type: Dynamic Sampler
								Borehole No: WS12

Site & Location: Sonning Golf Club (Housing) Duffield Road, Sonning, Reading, Berkshire, RG4 6GJ								Borehole No: WS13		
Client: Sonning Golf Club Ltd					Coordinates: 476528E, 174896N		Sheet 1 of 1			
Engineer: Aventus Design Ltd					Ground Level: +54.17mOD		Report No: 11043a/CA			
Progress & Observations	Samples & Tests		Field Test Results	Strata		Legend	Strata Descriptions	Backfill / Installation		
	Type	Depth (m)		Depth (m)	Level (m)					
BH commenced: 22/07/2025	D ES	0.00 0.00	0.0	0.20	53.97		Grass over brown, slightly silty, gravelly, sandy TOPSOIL.		1	
Inspection pit to 0.30m	PID	0.20		0.20	53.97					POSSIBLE MADE GROUND: Light greyish-brown slightly silty very gravelly fine to coarse sand. Gravel is angular to subrounded fine to coarse flint. Very dense orangish-brown slightly silty very sandy GRAVEL. Gravel is angular to subrounded fine to coarse flint.
	D ES	0.30 0.30		0.30	53.87					
BH dia. 100mm reducing with depth	D PID	0.60 0.60	0.0				End of hole at 1.30m		2	
	SPT/S PID	1.00 1.00	N>50* 0.0							
BH complete: 22/07/2025 BH depth: 1.30m (refusal) Water depth: Dry Dynamic Probe follow-on from 1.30m, see DP13				1.30	52.87				3	
Key: U = Undisturbed B = Bulk D = Small disturbed W = Water ES = glass jar & plastic tub E = glass jar SPT/S = split spoon SPT/C = solid cone PP = Pocket Penetrometer [kg/cm²] HV = Hand Vane [kPa] PID = Photo Ionisation Detector [ppm - Isobutylene Equivalent, PhoCheck Tiger, 10.6eV lamp] * = full SPT penetration not achieved - see summary sheet								Borehole type: Dynamic Sampler		
Remarks: A) Co-ordinates and levels obtained by SVS Ltd B) Backfilled with arisings								Borehole No: WS13		

Site & Location: Sonning Golf Club (Housing) Duffield Road, Sonning, Reading, Berkshire, RG4 6GJ							Borehole No: WS14	
Client: Sonning Golf Club Ltd					Coordinates: 476542E, 174880N		Sheet 1 of 1	
Engineer: Aventus Design Ltd					Ground Level: +53.90mOD		Report No: 11043a/CA	
Progress & Observations	Samples & Tests		Field Test Results	Strata		Legend	Strata Descriptions	Backfill / Installation
	Type	Depth (m)		Depth (m)	Level (m)			
BH commenced: 23/07/2025	ES D ES PID	0.00 0.05 0.05 0.05	0.0	0.05	53.85		Grass over brown, slightly silty, gravelly, sandy TOPSOIL.	
Inspection pit to 0.30m							POSSIBLE MADE GROUND: Light greyish-brown slightly silty very gravelly fine to coarse sand. Gravel is angular to subrounded fine to coarse flint.	
	D PID	0.40 0.40	0.0	0.40	53.50		Very dense orangish-brown, slightly silty very sandy GRAVEL. Gravel is angular to subangular fine to coarse flint.	
BH dia. 100mm reducing with depth	D SPT/S PID	1.00 1.00 1.00	N>50* 0.0					1
	SPT/S	1.30	N>50*					
BH complete: 23/07/2025 BH depth: 1.60m (refusal and collapse to 1.30m bgl) Water depth: Dry Dynamic Probe follow-on from 1.30m, see DP14				1.60	52.30		End of hole at 1.60m	2
								3
Key: U = Undisturbed B = Bulk D = Small disturbed W = Water ES = glass jar & plastic tub E = glass jar SPT/S = split spoon SPT/C = solid cone PP = Pocket Penetrometer [kg/cm²] HV = Hand Vane [kPa] PID = Photo Ionisation Detector [ppm - Isobutylene Equivalent, PhoCheck Tiger, 10.6eV lamp] * = full SPT penetration not achieved - see summary sheet								Borehole type: Dynamic Sampler
Remarks: A) Co-ordinates and levels obtained by SVS Ltd B) Installed with 0.25m plain and 0.60m slotted pipe (50mm)								Borehole No: WS14

Site & Location: Sonning Golf Club (Housing) Duffield Road, Sonning, Reading, Berkshire, RG4 6GJ							Borehole No: WS15	
Client: Sonning Golf Club Ltd					Coordinates: 476568E, 174881N		Sheet 1 of 1	
Engineer: Aventus Design Ltd					Ground Level: +53.70mOD		Report No: 11043a/CA	
Progress & Observations	Samples & Tests		Field Test Results	Strata		Legend	Strata Descriptions	Backfill / Installation
	Type	Depth (m)		Depth (m)	Level (m)			
BH commenced: 23/07/2025	D ES	0.00 0.00	0.0	0.15	53.55		Grass over brown, slightly silty, gravelly, sandy TOPSOIL.	
Inspection pit to 0.30m	D ES PID	0.15 0.15 0.15					POSSIBLE MADE GROUND: Light greyish-brown slightly silty gravelly fine to coarse sand. Gravel is angular to subrounded fine to coarse flint.	
	D ES PID	0.50 0.50		0.50	53.20	Orangish-brown silty very gravelly fine to coarse SAND. Gravel is angular to subrounded fine to coarse flint.		
	D PID	0.90 0.90	0.0 N=73	0.90	52.80	Very dense dark orange mottled light brownish-light grey silty slightly gravelly fine to coarse SAND. Gravel is angular to subangular fine to coarse flint.		
BH dia. 100mm reducing with depth	SPT/S	1.00		1.30	52.40	Very dense dark orangish-brown, slightly silty very sandy GRAVEL. Gravel is angular to subangular fine to coarse flint.		
BH complete: 23/07/2025 BH depth: 1.70m (refusal) Water depth: Dry Dynamic Probe follow-on from 1.70m, see DP15	SPT/S	1.50	N>50*	1.70	52.00		End of hole at 1.70m	
Key: U = Undisturbed B = Bulk D = Small disturbed W = Water ES = glass jar & plastic tub E = glass jar SPT/S = split spoon SPT/C = solid cone PP = Pocket Penetrometer [kg/cm²] HV = Hand Vane [kPa] PID = Photo Ionisation Detector [ppm - Isobutylene Equivalent, PhoCheck Tiger, 10.6eV lamp] * = full SPT penetration not achieved - see summary sheet								Borehole type: Dynamic Sampler
Remarks: A) Co-ordinates and levels obtained by SVS Ltd B) Installed with 0.40m plain and 1.00m slotted pipe (50mm)								Borehole No: WS15

Site & Location	Sonning Golf Club (Housing) Duffield Road, Sonning, Reading, Berkshire, RG4 6GJ	Report No:	11043a/CA
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STANDARD PENETRATION TEST SUMMARY

BH ID	Depth (m)	Test type	N value (Note b)	Blow-counts and penetration						Casing depth (m)	Water depth (m)	Remarks
				Seating blows		Test blows						
WS01	1.00	S	N=48	5	7	9	11	13	15		Dry	73% energy ratio
WS01	1.60	S	(45)	5	10	14	16	15			Dry	73% energy ratio
WS02	1.00	S	N=10	2	2	2	2	3	3		Dry	73% energy ratio
WS02	2.00	S	N=52	10	10	14	9	12	17		Dry	73% energy ratio
WS02	2.50	S	N=38	12	13	11	10	10	7		Dry	73% energy ratio
WS03	1.00	S	N=21	3	4	5	5	5	6		Dry	73% energy ratio
WS03	1.60	S	(42)	8	12	15	15	12			Dry	73% energy ratio
WS05	1.00	S	N=25	4	5	5	5	6	9		Dry	73% energy ratio
WS05	2.00	S	(44)	11	12	14	14	16			Dry	73% energy ratio
WS06	1.00	S	N=23	4	5	6	5	6	6		Dry	73% energy ratio
WS06	1.60	S	(58)	5	11	15	22	21			Dry	73% energy ratio
WS07	1.00	S	N=37	4	3	5	10	11	11		Dry	73% energy ratio
WS07	1.50	S	(50)	11	16	17	15	18			Dry	73% energy ratio
WS08	1.00	S	N=43	8	10	10	10	11	12		Dry	76% energy ratio
WS08	1.60	S	N=60	8	9	12	13	16	19		Dry	76% energy ratio
WS09	1.00	S	N=70	12	12	15	15	20	20		Dry	76% energy ratio
WS09	1.60	S	(30)	20	22	30					Dry	76% energy ratio
WS10	1.00	S	N=42	6	12	11	11	10	10		Dry	73% energy ratio
WS10	1.50	S	(58)	5	11	17	18	23			Dry	73% energy ratio
WS11	0.90	S	(39)	22	36	39					Dry	76% energy ratio
WS12	0.90	S	N=48	6	15	21	27	0	0		Dry	73% energy ratio
WS13	1.00	S	(44)	19	20	20	24				Dry	76% energy ratio
WS14	1.00	S	(73)	15	18	23	25	25			Dry	73% energy ratio
WS14	1.30	S	(62)	19	25	27	35				Dry	73% energy ratio
WS15	1.00	S	N=73	10	12	12	15	19	27		Dry	73% energy ratio
WS15	1.50	S	(55)	18	25	30	25				Dry	73% energy ratio

a) Standard Penetration Test : BS EN ISO 22476:2005 Part 3

b) Where full penetration was not achieved, the total test blow-counts are reported

c) Hammer Energy Ratio, Er = 73% & 76%%

SPT Hammer Energy Test Report

in accordance with BS EN ISO 72476-3:2005

Southern Testing
Unit 11
Charwoods Road
East Grinstead
West Sussex
RH19 2HU

SPT Hammer Ref: 2014RP
Test Date: 29/03/2025
Report Date: 28/03/2025
File Name: 2014RP.spt
Test Operator: BOB

Instrumented Rod Data

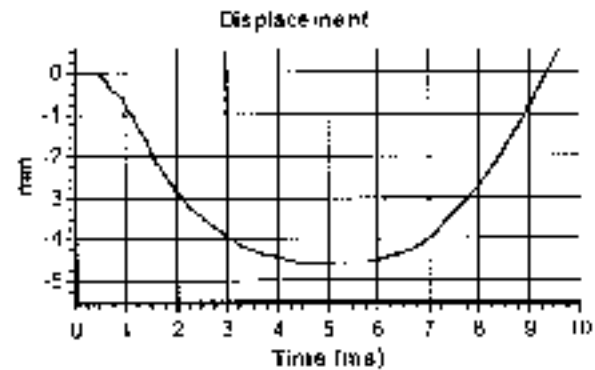
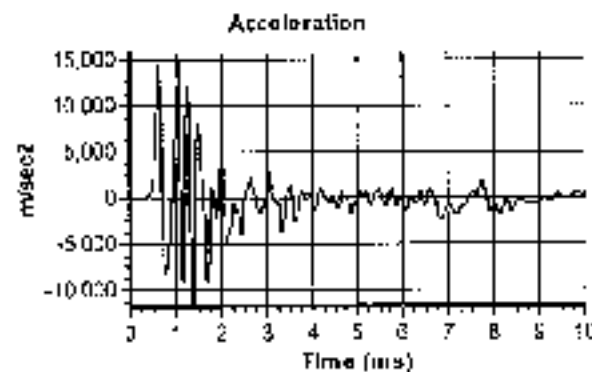
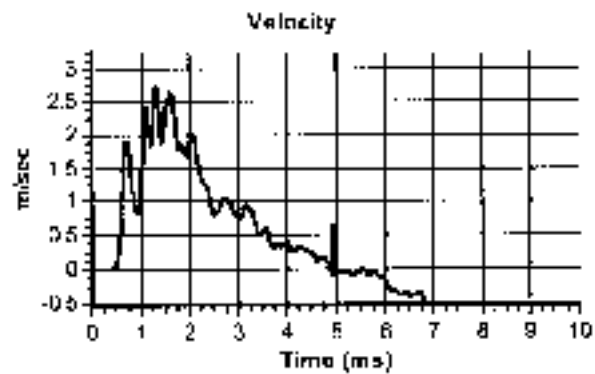
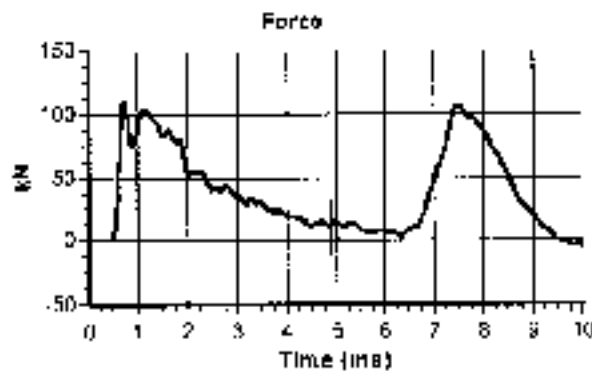
Diameter d_r (mm): 51
Wall Thickness t_r (mm): 6.7
Assumed Modulus E_s (GPa): 208
Accelerometer No.1: 73547
Accelerometer No.2: 64789

SPT Hammer Information

Hammer Mass m (kg): 63.5
Falling Height h (mm): 760
SPT String Length l (m): 14.7

Comments / Location

CHARWOODS



Calculations

Area of Rod A (mm²): 996
Theoretical Energy E_{theor} (J): 473
Measured Energy E_{meas} (J): 345

Energy Ratio E_r (%): **73**

Signed: Bob Stewart
Title: Technician

The recommended calibration interval is 12 months

SPT Hammer Energy Test Report

In accordance with BSEN ISO 22476-3:2005

Southern Testing
Unit 11
Charlwoods Road
East Grinstead
West Sussex
RH19 2HU

SPT Hammer Ref: 110113
Test Date: 16/09/2024
Report Date: 16/09/2024
File Name: 110113.spt
Test Operator: BOB

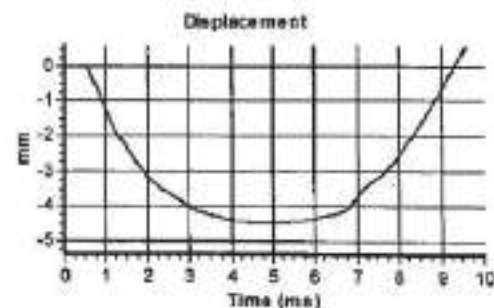
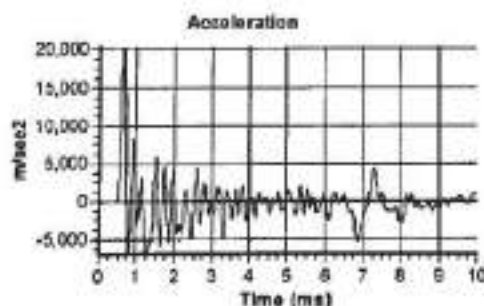
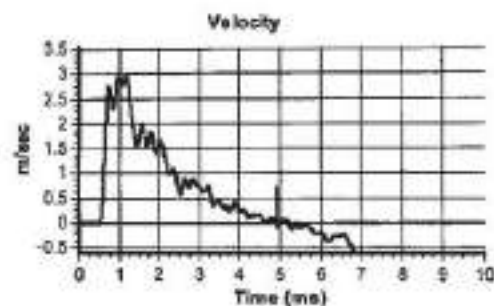
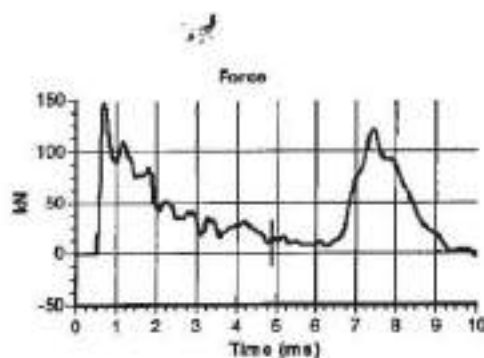
Instrumented Rod Data

Diameter d_r (mm): 54
Wall Thickness t_r (mm): 6.7
Assumed Modulus E_r (GPa): 208
Accelerometer No.1: 73547
Accelerometer No.2: 64789

SPT Hammer Information

Hammer Mass m (kg): 63.5
Falling Height h (mm): 760
SPT String Length L (m): 14.7

Comments / Location
CHARLWOODS



Calculations

Area of Rod A (mm²): 996
Theoretical Energy E_{theor} (J): 473
Measured Energy E_{meas} (J): 357

Energy Ratio E_r (%): **76**

Signed: Bob Stewart
Title: Technician

The recommended calibration interval is 12 months

Site & Location	Sonning Golf Club (Housing) Duffield Road, Sonning, Reading, Berkshire, RG4 6GJ		Trial Pit No:	TP01	
Client:	Sonning Golf Club Ltd	Coords: 476448, 174770		Report No:	11043a/CA
Engineer:	Aventus Design Ltd	Level: +53.941mOD			

Depth (m)	Strata description	Samples/tests		
		Depth (m)	Type	Test results
GL to 0.10m	Grass over light brown gravelly sandy TOPSOIL. Gravel is angular to subrounded, fine to coarse flint. Frequent roots and rootlets.	0.0-0.10	D/ES	
0.10m to 0.30m	MADE GROUND: light brown slightly silty very sandy gravel. Gravel is angular to rounded, fine to coarse flint. Low cobble content of flint. Frequent roots and rootlets. Occasional brick fragments.	0.20-0.25	D/ES	
0.30m to 0.90m	POSSIBLE MADE GROUND: Light greyish brown silty very sandy gravel. Gravel is angular to subrounded fine to coarse flint. Low cobble content of flint.	0.35-0.40	D/ES	
0.90m to 1.50m	Orangish-brown clayey silty very gravelly fine to coarse SAND. Gravel is angular to rounded fine to coarse flint. Low cobble content of flint. Occasional pockets of light grey very sandy clay.	0.50-0.90	B	
		1.00-1.50	B	



Date of excavation:	22 nd July 2025	Groundwater:	Dry		
Equipment:	DX27z 2.5 ton excavator				
Stability:	Stable	Logged by:	CA/RL	Checked by:	SCW
Remarks: Infiltration testing undertaken Length: 1.40m, Width: 0.48m, Depth: 1.50m					

Key: D = Small disturbed sample, B = Bulk disturbed sample, HV = Hand Shear Vane test (kN/m²), P = Pocket Penetrometer (kg/cm²)

Site & Location	Sonning Golf Club (Housing) Duffield Road, Sonning, Reading, Berkshire, RG4 6GJ		Trial Pit No:	TP02
Client:	Sonning Golf Club Ltd	Coords: 476467, 174738	Report No:	11043a/CA
Engineer:	Aventus Design Ltd	Level: +53.488mOD		

Depth (m)	Strata description	Samples/tests		
		Depth (m)	Type	Test results
GL to 0.30m	MADE GROUND: grass over light brown slightly silty gravelly fine to medium sand. Gravel is angular to subrounded, fine to coarse flint. Occasional brick and chalk fragments.	0.0-0.25	D/ES	
0.30m to 0.70m	POSSIBLE MADE GROUND: Light greyish brown slightly silty gravelly fine to medium sand. Gravel is angular to subrounded, fine to coarse flint.	0.30-0.40	D/ES	
		0.55-0.70	B	
0.70m to 1.00m	Orangish-brown slightly silty very gravelly fine to coarse SAND. Gravel is angular to rounded, fine to coarse flint. Low cobble content of flint.	0.70-1.00	B	



Date of excavation:	22 nd July 2025	Groundwater:	Dry		
Equipment:	DX27z 2.5 ton excavator				
Stability:	Stable	Logged by:	CA/RL	Checked by:	SCW
Remarks: Infiltration testing undertaken Length: 1.35m, Width: 0.50m, Depth: 1.00m					

Key: D = Small disturbed sample, B = Bulk disturbed sample, HV = Hand Shear Vane test (kN/m²), P = Pocket Penetrometer (kg/cm²)

Site & Location	Sonning Golf Club (Housing) Duffield Road, Sonning, Reading, Berkshire, RG4 6GJ		Trial Pit No:	TP03	
Client:	Sonning Golf Club Ltd	Coords: 476465, 174787		Report No:	11043a/CA
Engineer:	Aventus Design Ltd	Level: +53.881mOD			

Depth (m)	Strata description	Samples/tests		
		Depth (m)	Type	Test results
GL to 0.10m	Grass over brown gravelly sandy TOPSOIL. Gravel is angular to subrounded, fine to coarse flint.	0.0-0.10	D/ES	
0.10m to 0.35m	POSSIBLE MADE GROUND: Light greyish brown slightly silty very gravelly fine to medium sand. Gravel is angular to subrounded, fine to coarse flint.	0.10-0.35	D/ES	
0.35m to 2.00m	Orangish-brown silty sandy to very sandy GRAVEL. Gravel is angular to rounded fine to coarse flint. Low cobble content of flint. ...below 0.90m, becoming dark orangish brown. ...below 1.00m, occasional pockets of light grey very sandy clay.	0.50	B	
		1.00	B	
		1.30	D	
		1.50	B	
		1.75	B	
		2.00	B	



Date of excavation:	23 rd July 2025	Groundwater:	Below 0.90m damp soils		
Equipment:	DX27z 2.5 ton excavator				
Stability:	Stable	Logged by:	CA/RL	Checked by:	SCW
Remarks: Infiltration testing undertaken Length: 1.75m, Width: 0.50m, Depth: 2.00m					

Key: D = Small disturbed sample, B = Bulk disturbed sample, HV = Hand Shear Vane test (kN/m²), P = Pocket Penetrometer (kg/cm²)

Site & Location	Sonning Golf Club (Housing) Duffield Road, Sonning, Reading, Berkshire, RG4 6GJ		Trial Pit No:	TP04
Client:	Sonning Golf Club Ltd	Coords: 476500, 174839	Report No:	11043a/CA
Engineer:	Aventus Design Ltd	Level: +53.958mOD		

Depth (m)	Strata description	Samples/tests		
		Depth (m)	Type	Test results
GL to 0.05m	Grass over brown gravelly sandy TOPSOIL. Gravel is angular to subrounded, fine to coarse flint.	0.0-0.05	D/ES	
0.05m to 0.30m	POSSIBLE MADE GROUND: Light greyish brown slightly silty very gravelly fine to medium sand. Gravel is angular to subrounded, fine to coarse flint.	0.05-0.30	D	
0.30m to 1.00m	Orangish-brown silty very sandy GRAVEL. Gravel is angular to rounded, fine to coarse flint. Low cobble content of flint.	0.50	B	
		1.00	B	



Date of excavation:	23 rd July 2025	Groundwater:	Dry		
Equipment:	DX27z 2.5 ton excavator				
Stability:	Stable	Logged by:	CA/RL	Checked by:	SCW
Remarks: Infiltration testing undertaken Length: 1.30m, Width: 0.50m, Depth: 1.00m					

Key: D = Small disturbed sample, B = Bulk disturbed sample, HV = Hand Shear Vane test (kN/m²), P = Pocket Penetrometer (kg/cm²)

Site & Location	Sonning Golf Club (Housing) Duffield Road, Sonning, Reading, Berkshire, RG4 6GJ		Trial Pit No:	TP05	
Client:	Sonning Golf Club Ltd		Coords: 476514, 174856	Report No: 11043a/CA	
Engineer:	Aventus Design Ltd		Level: +53.973mOD		

Depth (m)	Strata description	Samples/tests		
		Depth (m)	Type	Test results
GL to 0.05m	Grass over brown gravelly sandy TOPSOIL. Gravel is angular to subrounded, fine to coarse flint. Frequent rootlets.	0.0-0.05	D/ES	
0.05m to 0.25m	POSSIBLE MADE GROUND: Light greyish brown slightly silty very gravelly fine to medium sand. Gravel is angular to subrounded, fine to coarse flint. Low cobble content of flint.	0.10-0.20	D/ES	
0.25m to 1.60m	Light brown silty very sandy GRAVEL. Gravel is angular to subrounded, fine to coarse flint. Low cobble content of flint. ...below 0.80m, becoming dark orangish brown ...below 1.30m, occasional pockets of light grey very sandy clay	0.50	B	
		1.30	D	
		1.50	D	



Date of excavation:	23 rd July 2025	Groundwater:	Dry		
Equipment:	DX27z 2.5 ton excavator				
Stability:	Stable	Logged by:	CA/RL	Checked by:	SCW
Remarks: Infiltration testing undertaken Length: 1.60m, Width: 0.50m, Depth: 1.60m					

Key: D = Small disturbed sample, B = Bulk disturbed sample, HV = Hand Shear Vane test (kN/m²), P = Pocket Penetrometer (kg/cm²)

Site & Location	Sonning Golf Club (Housing) Duffield Road, Sonning, Reading, Berkshire, RG4 6GJ		Trial Pit No:	TP06	
Client:	Sonning Golf Club Ltd	Coords: 476560, 174901		Report No:	11043a/CA
Engineer:	Aventus Design Ltd	Level: +53.933mOD			

Depth (m)	Strata description	Samples/tests		
		Depth (m)	Type	Test results
GL to 0.08m	Grass over brown gravelly sandy TOPSOIL. Gravel is angular to subrounded, fine to coarse flint.	0.0-0.08	D/ES	
0.08m to 0.26m	POSSIBLE MADE GROUND: Light greyish brown slightly silty very gravelly fine to medium sand. Gravel is angular to subrounded, fine to coarse flint.	0.10-0.20	D/ES	
0.26m to 2.05m	Light brown slightly silty to silty very sandy GRAVEL. Gravel is angular to subrounded, fine to coarse flint. Low cobble content of flint. ...below 0.90m, becoming dark orangish brown. ...below 1.50m, rare pockets of light-grey sandy clay ...below 1.80m, occasional black manganese staining	0.50	B	
		1.50	B	
		1.80	D	
		2.00	B	



Date of excavation:	23 rd July 2025	Groundwater:	Dry		
Equipment:	DX27z 2.5 ton excavator				
Stability:	Stable	Logged by:	CA/RL	Checked by:	SCW
Remarks: Infiltration testing undertaken Length: 1.90m, Width: 0.50m, Depth: 2.05m					

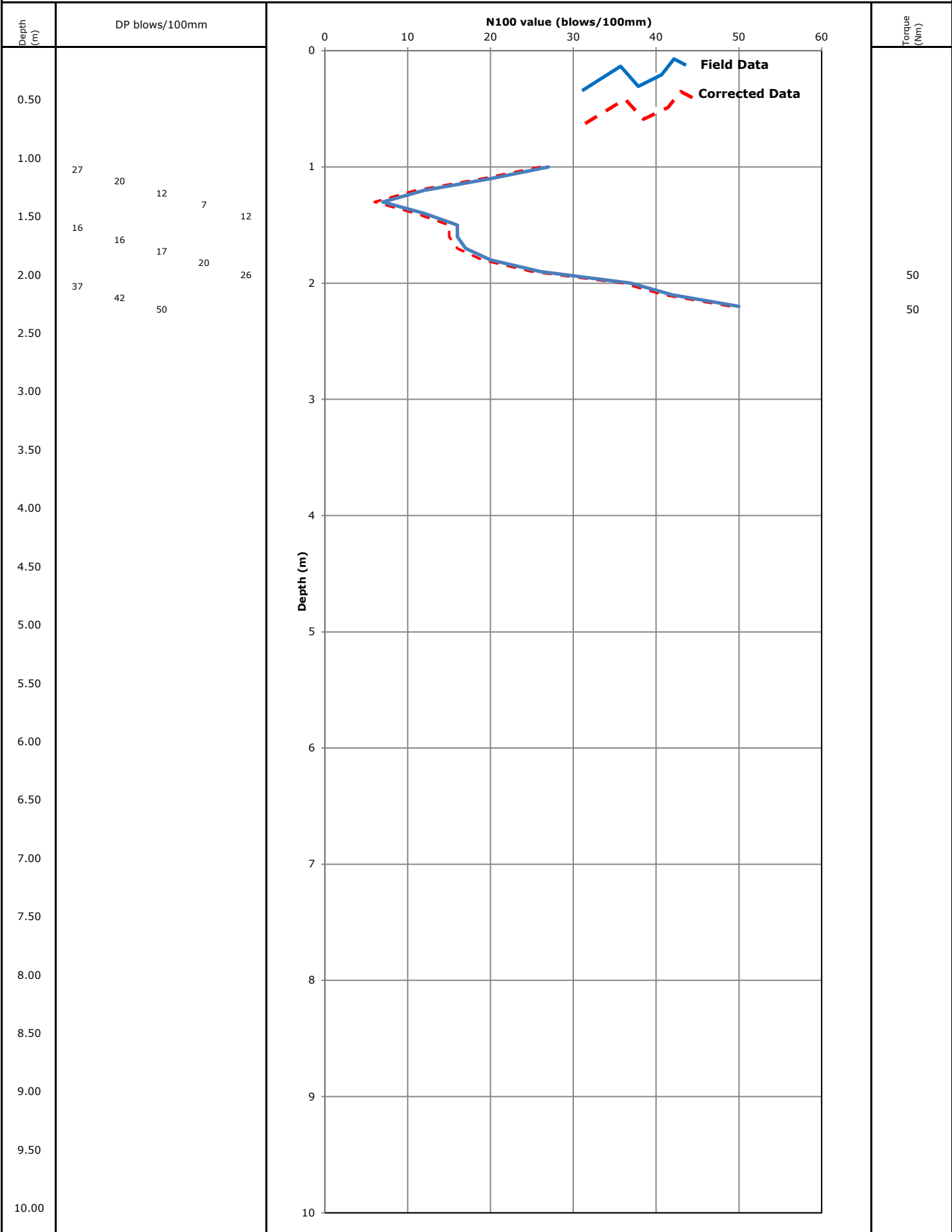
Key: D = Small disturbed sample, B = Bulk disturbed sample, HV = Hand Shear Vane test (kN/m²), P = Pocket Penetrometer (kg/cm²)

Site & Location		Sonning Golf Club (Housing) Duffield Road, Sonning, Reading, Berkshire, RG4 6GJ				DP No: DP02	
Client:		Sonning Golf Club Ltd		Co-ords (E-N): 476419 174737		Sheet No: 1 of 1	
Eng:		Aventus Design Ltd		Ground level (mOD): 53.99		Report No: 11043/CA	
Dynamic probe record							
Depth (m)	DP blows/100mm				N100 value (blows/100mm)		Torque (Nm)
0.50							
1.00							
1.50							
2.00							
2.50							
3.00	7	7	9	10	12		
3.50	11	10	9	9	9		
4.00	9	10	10	8	8	20	
4.50	7	9	10	11	9		
5.00	9	5	2	3	3	20	
5.50	2	3	3	3	3		
6.00	2	2	4	3	4	50	
6.50	3	4	4	4	4		
7.00	5	5	5	5	6	70	
7.50	5	5	6	6	7		
8.00	7	7	8	7	8	60	
8.50	8	8	8	8	7		
9.00	7	9	10	8	8	70	
9.50	7	8	8	9	11		
10.00						70	
Probing by: SPG Site Investigation Ltd				Remarks:			
Equipment: DPSH-B		Hammer weight (kg): 63.5		Date: 21 Jul 25		N100 values adjusted according to Butcher et al. 1995	
Cone area (cm2): 20		Hammer drop (mm): 750		Rod dia (mm) 35			
				Soil Consultants			

Site & Location		Sonning Golf Club (Housing) Duffield Road, Sonning, Reading, Berkshire, RG4 6GJ			DP No: DP03	
Client:		Sonning Golf Club Ltd		Co-ords (E-N):	476383 174749	Sheet No: 1 of 1
Eng:		Aventus Design Ltd		Ground level (mOD):	54.61	Report No: 11043/CA
Dynamic probe record						
Depth (m)	DP blows/100mm	N100 value (blows/100mm)				Torque (Nm)
0.50		0 10 20 30 40 50 60 0 1 2 3 4 5 6 7 8 9 10 Field Data Corrected Data				
1.00						
1.50						
2.00	33	30 40				
2.50	36 27 31					10
3.00						
3.50						
4.00						
4.50						
5.00						
5.50						
6.00						
6.50						
7.00						
7.50						
8.00						
8.50						
9.00						
9.50						
10.00						
Probing by: SPG Site Investigation Ltd			Remarks:		Soil Consultants	
Equipment: DPSH-B	Hammer weight (kg): 63.5	Date: 22 Jul 25	N100 values adjusted according to Butcher et al. 1995			
Cone area (cm2): 20	Hammer drop (mm): 750	Rod dia (mm) 35				

Site & Location	Sonning Golf Club (Housing) Duffield Road, Sonning, Reading, Berkshire, RG4 6GJ			DP No:	DP04
Client:	Sonning Golf Club Ltd	Co-ords (E-N):	476421 174785	Sheet No:	1 of 1
Eng:	Aventus Design Ltd	Ground level (mOD):	54.22	Report No:	11043a/CA

Dynamic probe record



Probing by: SPG Site Investigation Ltd			Remarks: N100 values adjusted according to Butcher et al. 1995		
Equipment: DPSH-B	Hammer weight (kg): 63.5	Date: 22 Jul 25			
Cone area (cm2): 20	Hammer drop (mm): 750	Rod dia (mm) 35			

Site & Location		Sonning Golf Club (Housing) Duffield Road, Sonning, Reading, Berkshire, RG4 6GJ				DP No: DP06	
Client:		Sonning Golf Club Ltd		Co-ords (E-N): 476477 174795		Sheet No: 1 of 1	
Eng:		Aventus Design Ltd		Ground level (mOD): 53.80		Report No: 11043a/CA	
Dynamic probe record							
Depth (m)	DP blows/100mm		N100 value (blows/100mm)				Torque (Nm)
0.50			Field Data Corrected Data				
1.00							
1.50							
2.00	50	46 37	50 46 37				50
2.50							
3.00							
3.50							
4.00							
4.50							
5.00							
5.50							
6.00							
6.50							
7.00							
7.50							
8.00							
8.50							
9.00							
9.50							
10.00							
Probing by: SPG Site Investigation Ltd			Remarks: N100 values adjusted according to Butcher et al. 1995			Soil Consultants	
Equipment: DPSH-B	Hammer weight (kg): 63.5	Date: 22 Jul 25					
Cone area (cm2): 20	Hammer drop (mm): 750	Rod dia (mm) 35					

Site & Location		Sonning Golf Club (Housing) Duffield Road, Sonning, Reading, Berkshire, RG4 6GJ				DP No: DP09	
Client:		Sonning Golf Club Ltd		Co-ords (E-N): 476481 174846		Sheet No: 1 of 1	
Eng:		Aventus Design Ltd		Ground level (mOD): 54.27		Report No: 11043a/CA	
Dynamic probe record							
Depth (m)	DP blows/100mm		N100 value (blows/100mm)				Torque (Nm)
0.50			0102030405060				

Site & Location		Sonning Golf Club (Housing) Duffield Road, Sonning, Reading, Berkshire, RG4 6GJ			DP No: DP10	
Client:		Sonning Golf Club Ltd		Co-ords (E-N):	476514 174827	Sheet No: 1 of 1
Eng:		Aventus Design Ltd		Ground level (mOD):	53.91	Report No: 11043/CA
Dynamic probe record						
Depth (m)	DP blows/100mm	N100 value (blows/100mm)				Torque (Nm)
0.50		0102030405060 0 1 2 3 4 5 6 7 8 9 10 Field Data Corrected Data				
1.00						
1.50						
2.00	41 50					50
2.50						
3.00						
3.50						
4.00						
4.50						
5.00						
5.50						
6.00						
6.50						
7.00						
7.50						
8.00						
8.50						
9.00						
9.50						
10.00						
Probing by: SPG Site Investigation Ltd				Remarks:		
Equipment: DPSH-B		Hammer weight (kg): 63.5		Date: 22 Jul 25		
Cone area (cm2): 20		Hammer drop (mm): 750		Rod dia (mm) 35		
				N100 values adjusted according to Butcher et al. 1995		

Site & Location		Sonning Golf Club (Housing) Duffield Road, Sonning, Reading, Berkshire, RG4 6GJ				DP No: DP11	
Client:		Sonning Golf Club Ltd		Co-ords (E-N):	476494 174862	Sheet No: 1 of 1	
Eng:		Aventus Design Ltd		Ground level (mOD): 54.26		Report No: 11043a/CA	
Dynamic probe record							
Depth (m)	DP blows/100mm	N100 value (blows/100mm)					Torque (Nm)
0.50	50	0102030405060 0 1 2 3 4 5 6 7 8 9 10 Field Data Corrected Data					50
1.00							
1.50							
2.00							
2.50							
3.00							
3.50							
4.00							
4.50							
5.00							
5.50							
6.00							
6.50							
7.00							
7.50							
8.00							
8.50							
9.00							
9.50							
10.00							
Probing by: SPG Site Investigation Ltd			Remarks:				
Equipment: DPSH-B	Hammer weight (kg): 63.5	Date: 22 Jul 25	N100 values adjusted according to Butcher et al. 1995				
Cone area (cm2): 20	Hammer drop (mm): 750	Rod dia (mm) 35					

Site & Location		Sonning Golf Club (Housing) Duffield Road, Sonning, Reading, Berkshire, RG4 6GJ				DP No: DP12	
Client:		Sonning Golf Club Ltd		Co-ords (E-N): 476538 174855		Sheet No: 1 of 1	
Eng:		Aventus Design Ltd		Ground level (mOD): 53.88		Report No: 11043/CA	
Dynamic probe record							
Depth (m)	DP blows/100mm	N100 value (blows/100mm)					Torque (Nm)
0.50	50	0 10 20 30 40 50 60 0 1 2 3 4 5 6 7 8 9 10 Field Data Corrected Data					50
1.00							
1.50							
2.00							
2.50							
3.00							
3.50							
4.00							
4.50							
5.00							
5.50							
6.00							
6.50							
7.00							
7.50							
8.00							
8.50							
9.00							
9.50							
10.00							
Probing by: SPG Site Investigation Ltd				Remarks:		Soil Consultants	
Equipment: DPSH-B		Hammer weight (kg): 63.5	Date: 23 Jul 25	N100 values adjusted according to Butcher et al. 1995			
Cone area (cm2): 20		Hammer drop (mm): 750	Rod dia (mm) 35				

Site & Location		Sonning Golf Club (Housing) Duffield Road, Sonning, Reading, Berkshire, RG4 6GJ			DP No: DP13	
Client:		Sonning Golf Club Ltd		Co-ords (E-N):	476528 174896	Sheet No: 1 of 1
Eng:		Aventus Design Ltd		Ground level (mOD):	54.17	Report No: 11043/CA
Dynamic probe record						
Depth (m)	DP blows/100mm	N100 value (blows/100mm)				Torque (Nm)
0.50	50	0102030405060 0 1 2 3 4 5 6 7 8 9 10 Field Data Corrected Data				50
1.00						
1.50						
2.00						
2.50						
3.00						
3.50						
4.00						
4.50						
5.00						
5.50						
6.00						
6.50						
7.00						
7.50						
8.00						
8.50						
9.00						
9.50						
10.00						
Probing by: SPG Site Investigation Ltd				Remarks:		
Equipment: DPSH-B	Hammer weight (kg): 63.5	Date: 22 Jul 25		N100 values adjusted according to Butcher et al. 1995		
Cone area (cm2): 20	Hammer drop (mm): 750	Rod dia (mm) 35				

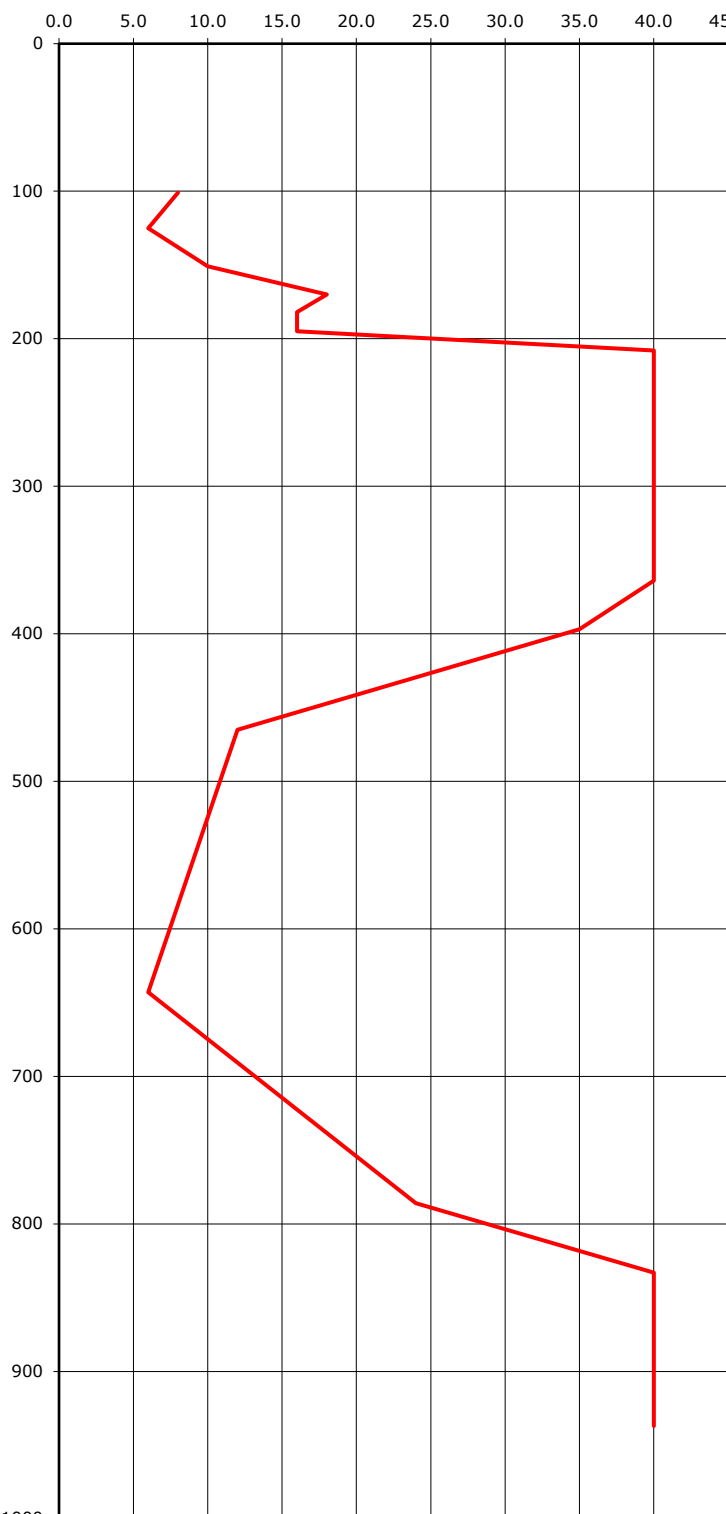
Site & Location		Sonning Golf Club (Housing) Duffield Road, Sonning, Reading, Berkshire, RG4 6GJ			DP No: DP14	
Client:		Sonning Golf Club Ltd		Co-ords (E-N):	476542 174880	Sheet No: 1 of 1
Eng:		Aventus Design Ltd		Ground level (mOD):	53.90	Report No: 11043/CA
Dynamic probe record						
Depth (m)	DP blows/100mm	N100 value (blows/100mm)				Torque (Nm)
0.50	50	0102030405060 0 1 2 3 4 5 6 7 8 9 10 Field Data Corrected Data				50
1.00						
1.50						
2.00						
2.50						
3.00						
3.50						
4.00						
4.50						
5.00						
5.50						
6.00						
6.50						
7.00						
7.50						
8.00						
8.50						
9.00						
9.50						
10.00						
Probing by: SPG Site Investigation Ltd				Remarks:		
Equipment: DPSH-B	Hammer weight (kg): 63.5	Date: 23 Jul 25	N100 values adjusted according to Butcher et al. 1995			
Cone area (cm2): 20	Hammer drop (mm): 750	Rod dia (mm) 35				

Site & Location		Sonning Golf Club (Housing) Duffield Road, Sonning, Reading, Berkshire, RG4 6GJ			DP No: DP15	
Client:		Sonning Golf Club Ltd		Co-ords (E-N):	476568 174881	Sheet No: 1 of 1
Eng:		Aventus Design Ltd		Ground level (mOD)	53.70	Report No: 11043/CA
Dynamic probe record						
Depth (m)	DP blows/100mm	N100 value (blows/100mm)				Torque (Nm)
0.50	45 50	0102030405060 0 Field Data Corrected Data				50
1.00						
1.50						
2.00						
2.50						
3.00						
3.50						
4.00						
4.50						
5.00						
5.50						
6.00						
6.50						
7.00						
7.50						
8.00						
8.50						
9.00						
9.50						
10.00						
Probing by: SPG Site Investigation Ltd			Remarks:		Soil Consultants	
Equipment: DPSH-B	Hammer weight (kg): 63.5	Date: 23 Jul 25	N100 values adjusted according to Butcher et al. 1995			
Cone area (cm2): 20	Hammer drop (mm): 750	Rod dia (mm) 35				

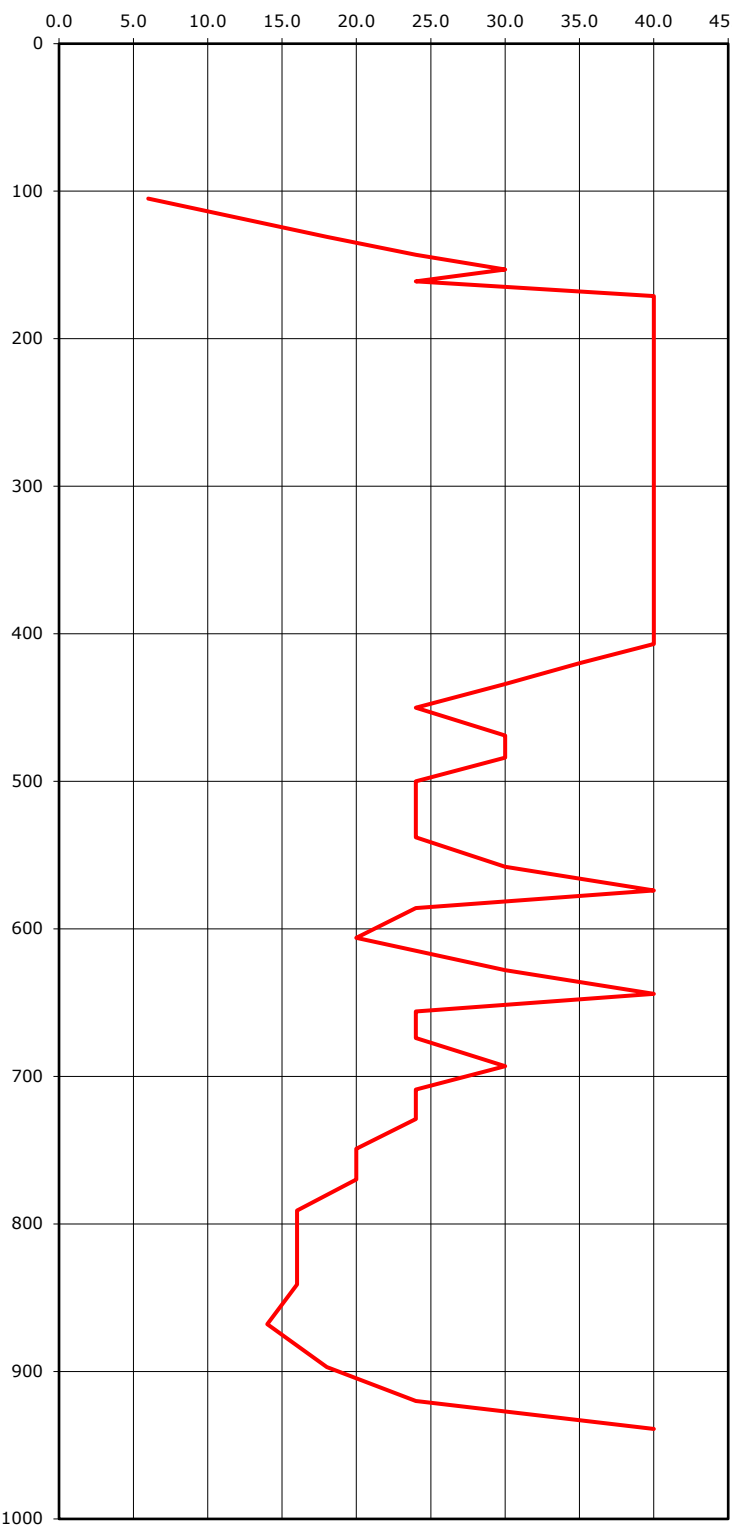
Site & Location		Sonning Golf Club (Housing) Duffield Road, Sonning, Reading, Berkshire, RG4 6GJ		TRL Probe No: TRL 01	
Client:		Sonning Golf Club Ltd		(Sheet 1 of 1)	
Engineers:		Aventus Design Ltd		Report No: 11043a/CA	
TRL Dynamic Cone Penetration test result					
Blow Count	Depth (mm)	mm per blow	CBR (%)	PLOT OF CBR VS DEPTH	
Commencement Depth	0	16	12.0	Estimated CBR (%) 0.05.010.015.020.025.030.035.040.045.0 0 100 200 300 400 500 600 700 800 900 1000 Depth below ground level (mm)	
1	16	11	20.0		
2	27	8	30.0		
3	35	11	20.0		
4	46	10	24.0		
5	56	11	20.0		
6	67	8	30.0		
7	75	8	30.0		
8	83	9	27.0		
10	100	7	35.0		
12	114	6	40.0		
14	126	9	27.0		
16	143	7	40.0		
18	156	6	40.0		
20	167	5	40.0		
22	177	5	40.0		
24	187	7	35.0		
29	222	8	30.0		
34	260	7	30.0		
39	297	6	40.0		
44	328	3	40.0		
49	343	4	40.0		
54	362	3	40.0		
59	379	3	40.0		
64	395	3	40.0		
69	409	1	40.0		
74	416	1	40.0		
84	426	0	40.0		
94	428	0	40.0		
104	428	0	40.0		
				Date of test: 18/08/25	
				Note: CBR value plots at top of the drive increment	
Remarks:					

Site & Location		Sonning Golf Club (Housing) Duffield Road, Sonning, Reading, Berkshire, RG4 6GJ		TRL Probe No: TRL 02	
Client:		Sonning Golf Club Ltd		(Sheet 1 of 1)	
Engineers:		Aventus Design Ltd		Report No: 11043a/CA	
TRL Dynamic Cone Penetration test result					
Blow Count	Depth (mm)	mm per blow	CBR (%)	PLOT OF CBR VS DEPTH	
Commencement Depth	107	38	4.0	Estimated CBR (%) 0.05.010.015.020.025.030.035.040.045.0 0 100 200 300 400 500 600 700 800 900 1000 Depth below ground level (mm)	
1	145	21	8.0		
2	166	25	8.0		
3	191	10	24.0		
4	201	10	24.0		
5	211	9	24.0		
6	220	5	40.0		
7	225	8	30.0		
8	233	8	30.0		
9	241	8	30.0		
10	249	6	40.0		
11	255	8	30.0		
12	263	7	35.0		
13	270	7	35.0		
14	277	7	35.0		
16	291	5	40.0		
18	300	7	40.0		
20	313	8	30.0		
22	328	5	40.0		
24	337	5	40.0		
26	347	7	35.0		
28	361	7	40.0		
30	374	5	40.0		
32	384	7	40.0		
34	397	8	30.0		
36	413	6	40.0		
41	445	7	35.0		
46	480	5	40.0		
51	507	6	40.0		
56	539	7	35.0		
61	575	6	40.0		
66	607	3	40.0		
71	624	1	40.0		
76	630	1	40.0		
86	643	0	40.0		
96	646	1	40.0		
116	656	0	40.0		
			Date of test:	24/07/25	Note:
			CBR value plots at top of the drive increment		
Remarks:					

Site & Location	Sonning Golf Club (Housing) Duffield Road, Sonning, Reading, Berkshire, RG4 6GJ			TRL Probe No:	TRL 03
Client:	Sonning Golf Club Ltd			(Sheet 1 of 1)	
Engineers:	Aventus Design Ltd			Report No:	11043a/CA
TRL Dynamic Cone Penetration test result					
Blow Count	Depth (mm)	mm per blow	CBR (%)	PLOT OF CBR VS DEPTH	
Commencement Depth	129	32	5.0	Estimated CBR (%) 0.0 5.0 10.0 15.0 20.0 25.0 30.0 35.0 40.0 45.0 0 100 200 300 400 500 600 700 800 900 1000 Depth below ground level (mm)	
1	161	16	12.0		
2	177	14	14.0		
3	191	10	24.0		
4	201	9	24.0		
5	210	7	40.0		
7	223	6	40.0		
9	235	3	40.0		
11	240	5	40.0		
13	250	2	40.0		
18	262	3	40.0		
23	279	2	40.0		
33	300	3	40.0		
Remarks:					

Site & Location		Sonning Golf Club (Housing) Duffield Road, Sonning, Reading, Berkshire, RG4 6GJ		TRL Probe No: TRL 04	
Client:		Sonning Golf Club Ltd		(Sheet 1 of 1)	
Engineers:		Aventus Design Ltd		Report No: 11043a/CA	
TRL Dynamic Cone Penetration test result					
Blow Count	Depth (mm)	mm per blow	CBR (%)	PLOT OF CBR VS DEPTH	
Commencement Depth	101	24	8.0	Estimated CBR (%) 	
1	125	26	6.0		
2	151	19	10.0		
3	170	12	18.0		
4	182	13	16.0		
5	195	13	16.0		
6	208	6	40.0		
7	214	5	40.0		
8	219	3	40.0		
13	235	2	40.0		
18	245	2	40.0		
28	262	3	40.0		
38	287	2	40.0		
48	304	2	40.0		
58	320	2	40.0		
68	336	3	40.0		
78	364	3	40.0		
88	397	7	35.0		
98	465	18	12.0		
108	643	29	6.0		
113	786	9	24.0		
118	833	5	40.0		
123	858	4	40.0		
128	877	4	40.0		
133	899	4	40.0		
138	917	2	40.0		
148	937	2	40.0		
				Date of test: 24/07/25	
				Note: CBR value plots at top of the drive increment	
Remarks:					

Site & Location		Sonning Golf Club (Housing) Duffield Road, Sonning, Reading, Berkshire, RG4 6GJ		TRL Probe No: TRL 05	
Client:		Sonning Golf Club Ltd		(Sheet 1 of 1)	
Engineers:		Aventus Design Ltd		Report No: 11043a/CA	
TRL Dynamic Cone Penetration test result					
Blow Count	Depth (mm)	mm per blow	CBR (%)	PLOT OF CBR VS DEPTH	
Commencement Depth	115	26	6.0	Estimated CBR (%) Depth below ground level (mm)	
1	141	11	20.0		
2	152	11	20.0		
3	163	6	40.0		
4	169	9	24.0		
5	178	7	35.0		
6	185	9	24.0		
7	194	6	40.0		
9	206	5	40.0		
11	216	6	40.0		
13	227	4	40.0		
15	234	4	40.0		
17	242	6	40.0		
22	270	7	35.0		
27	306	6	40.0		
32	337	7	35.0		
37	372	8	30.0		
42	412	9	24.0		
47	457	10	24.0		
52	506	12	18.0		
57	568	71	2.0		
59	709	17	12.0		
61	743	13	16.0		
63	768	10	24.0		
65	787	12	18.0		
67	810	10	24.0		
69	829	9	27.0		
71	846	7	35.0		
73	860	5	40.0		
75	869	4	40.0		
80	890	4	40.0		
85	910	5	40.0		
				Date of test: 24/07/25	
				Note: CBR value plots at top of the drive increment	
Remarks:					

Site & Location		Sonning Golf Club (Housing) Duffield Road, Sonning, Reading, Berkshire, RG4 6GJ		TRL Probe No: TRL 06	
Client:		Sonning Golf Club Ltd		(Sheet 1 of 1)	
Engineers:		Aventus Design Ltd		Report No: 11043a/CA	
TRL Dynamic Cone Penetration test result					
Blow Count	Depth (mm)	mm per blow	CBR (%)	PLOT OF CBR VS DEPTH	
Commencement Depth	105	26	6.0	Estimated CBR (%) 	
1	131	12	18.0		
2	143	10	24.0		
3	153	8	30.0		
4	161	10	24.0		
5	171	5	40.0		
6	176	6	40.0		
8	188	5	40.0		
10	197	6	40.0		
12	209	4	40.0		
16	226	6	40.0		
18	238	5	40.0		
22	259	6	40.0		
24	271	6	40.0		
28	293	7	40.0		
30	306	5	40.0		
34	324	7	40.0		
36	337	6	40.0		
38	348	6	40.0		
40	360	4	40.0		
42	368	5	40.0		
44	377	4	40.0		
46	384	6	40.0		
48	396	6	40.0		
50	407	7	40.0		
52	420	7	35.0		
54	434	8	30.0		
56	450	10	24.0		
58	469	8	30.0		
60	484	8	30.0		
62	500	10	24.0		
64	519	10	24.0		
66	538	10	24.0		
68	558	8	30.0		
70	574	6	40.0		
72	586	10	24.0		
74	606	11	20.0		
76	628	8	30.0		
78	644	6	40.0		
80	656	9	24.0		
82	674	10	24.0		
84	693	8	30.0		
86	709	10	24.0		
88	729	10	24.0		
90	749	11	20.0		
92	770	11	20.0		
94	791	13	16.0		
96	816	13	16.0		
98	841	14	16.0		
100	868	15	14.0		
102	897	12	18.0		
104	920	10	24.0		
106	939	0	40.0		
			Date of test:	24/07/25	Note:
			CBR value plots at top of the drive increment		
Remarks:					

Site & Location		Sonning Golf Club (Housing) Duffield Road, Sonning, Reading, Berkshire, RG4 6GJ		TRL Probe No: TRL 07	
Client:		Sonning Golf Club Ltd		(Sheet 1 of 1)	
Engineers:		Aventus Design Ltd		Report No: 11043a/CA	
TRL Dynamic Cone Penetration test result					
Blow Count	Depth (mm)	mm per blow	CBR (%)	PLOT OF CBR VS DEPTH	
Commencement Depth	105	26	6.0	Estimated CBR (%) Depth below ground level (mm)	
1	131	20	10.0		
2	151	16	12.0		
3	167	10	24.0		
4	177	7	35.0		
5	184	8	30.0		
7	199	5	40.0		
8	204	5	40.0		
10	214	5	40.0		
12	224	5	40.0		
14	233	4	40.0		
17	245	3	40.0		
20	255	3	40.0		
23	265	2	40.0		
26	270	2	40.0		
30	278	2	40.0		
35	286	4	40.0		
45	326	5	40.0		
50	350	5	40.0		
52	360	6	40.0		
54	371	7	40.0		
56	384	6	40.0		
58	395	10	24.0		
60	415	10	24.0		
61	425	11	20.0		
62	436	11	20.0		
63	447	11	20.0		
64	458	6	40.0		
65	464	7	40.0		
67	477	6	40.0		
68	483	6	40.0		
70	494	6	40.0		
72	506	6	40.0		
74	517	5	40.0		
76	527	5	40.0		
78	537	6	40.0		
80	549	6	40.0		
84	574	6	40.0		
88	596	7	35.0		
92	623	7	35.0		
96	651	6	40.0		
100	674	5	40.0		
104	695	8	27.0		
108	728	5	40.0		
112	748	4	40.0		
114	755	4	40.0		
116	763	3	40.0		
119	771	3	40.0		
122	781	1	40.0		
125	784	1	40.0		
129	787	3	40.0		
134	800	0	40.0		
139	800	0	40.0		
Date of test:		24/07/25		Note:	
				CBR value plots at top of the drive increment	
Remarks:					

Site & Location		Sonning Golf Club (Housing) Duffield Road, Sonning, Reading, Berkshire, RG4 6GJ		TRL Probe No: TRL 08	
Client:		Sonning Golf Club Ltd		(Sheet 1 of 1)	
Engineers:		Aventus Design Ltd		Report No: 11043a/CA	
TRL Dynamic Cone Penetration test result					
Blow Count	Depth (mm)	mm per blow	CBR (%)	PLOT OF CBR VS DEPTH	
Commencement Depth	100	20	10.0	Estimated CBR (%) 0.05.010.015.020.025.030.035.040.045.0 0 100 200 300 400 500 600 700 800 900 1000 Depth below ground level (mm)	
1	120	15	14.0		
2	135	10	24.0		
3	145	7	35.0		
4	152	8	30.0		
6	168	7	35.0		
8	182	3	40.0		
10	188	5	40.0		
12	198	4	40.0		
14	205	3	40.0		
16	210	4	40.0		
21	228	3	40.0		
26	241	3	40.0		
31	258	3	40.0		
36	273	4	40.0		
41	291	3	40.0		
46	307	3	40.0		
51	323	4	40.0		
56	343	4	40.0		
61	361	4	40.0		
66	382	5	40.0		
71	405	4	40.0		
76	426	5	40.0		
81	450	6	40.0		
86	481	6	40.0		
91	510	6	40.0		
96	540	8	30.0		
101	580	8	30.0		
106	620	8	30.0		
111	658	8	27.0		
116	699	8	27.0		
121	741	10	24.0		
126	790	10	24.0		
131	839	8	30.0		
136	878	7	35.0		
141	913	5	40.0		
				Date of test: 24/07/25	
				Note: CBR value plots at top of the drive increment	
Remarks:					

Site & Location		Sonning Golf Club (Housing) Duffield Road, Sonning, Reading, Berkshire, RG4 6GJ			TRL Probe No: TRL 09	
Client:		Sonning Golf Club Ltd			(Sheet 1 of 1)	
Engineers:		Aventus Design Ltd			Report No: 11043a/CA	
TRL Dynamic Cone Penetration test result						
Blow Count	Depth (mm)	mm per blow	CBR (%)	PLOT OF CBR VS DEPTH		
Commencement Depth	106	19	10.0	Estimated CBR (%)		
1	125	10	24.0			
2	135	9	24.0			
3	144	6	40.0			
4	150	13	16.0			
5	163	8	27.0			
10	205	5	40.0			
15	230	4	40.0			
20	250	8	30.0			
25	290	9	24.0			
30	335	10	24.0			
35	385	9	24.0			
40	432	10	24.0			
45	481	10	24.0			
50	529	9	24.0			
55	576	6	40.0			
60	604	5	40.0			
65	627	8	27.0			
70	669	7	35.0			
75	703	8	30.0			
80	741	8	30.0			
82	756	9	27.0			
84	773	8	30.0			
86	789	8	30.0			
91	828	7	35.0			
96	864	8	30.0			
101	902	7	35.0			
106	936	4	40.0			
				Date of test: 24/07/25		
				Note: CBR value plots at top of the drive increment		
Remarks:						

Site & Location		Sonning Golf Club (Housing) Duffield Road, Sonning, Reading, Berkshire, RG4 6GJ		TRL Probe No: TRL 10	
Client:		Sonning Golf Club Ltd		(Sheet 1 of 1)	
Engineers:		Aventus Design Ltd		Report No: 11043a/CA	
TRL Dynamic Cone Penetration test result					
Blow Count	Depth (mm)	mm per blow	CBR (%)	PLOT OF CBR VS DEPTH	
Commencement Depth	118	15	14.0	Estimated CBR (%) 0.05.010.015.020.025.030.035.040.045.0 0 100 200 300 400 500 600 700 800 900 1000	
1	133	13	16.0		
2	146	10	24.0		
3	156	10	24.0		
4	166	5	40.0		
5	171	8	30.0		
7	187	7	40.0		
9	200	5	40.0		
11	210	5	40.0		
13	220	4	40.0		
15	228	4	40.0		
20	247	3	40.0		
25	260	3	40.0		
30	274	1	40.0		
35	280	2	40.0		
40	291	1	40.0		
45	298	2	40.0		
55	314	3	40.0		
65	347	2	40.0		
75	366	1	40.0		
85	378	2	40.0		
95	396	6	40.0		
105	452	8	30.0		
115	527	6	40.0		
125	590	6	40.0		
135	649	4	40.0		
145	688	3	40.0		
155	716	4	40.0		
165	759	5	40.0		
175	808	7	40.0		
185	874	6	40.0		
195	935	2	40.0		
Date of test: 24/07/25				Note: CBR value plots at top of the drive increment	
Remarks:					

Site & Location		Sonning Golf Club (Housing) Duffield Road, Sonning, Reading, Berkshire, RG4 6GJ		TRL Probe No: TRL 11	
Client:		Sonning Golf Club Ltd		(Sheet 1 of 1)	
Engineers:		Aventus Design Ltd		Report No: 11043a/CA	
TRL Dynamic Cone Penetration test result					
Blow Count	Depth (mm)	mm per blow	CBR (%)	PLOT OF CBR VS DEPTH	
Commencement Depth	109	21	8.0	Estimated CBR (%) Depth below ground level (mm)	
1	130	10	24.0		
2	140	10	24.0		
3	150	9	24.0		
4	159	7	35.0		
6	173	10	24.0		
7	183	6	40.0		
8	189	6	40.0		
10	200	5	40.0		
11	205	5	40.0		
13	214	4	40.0		
18	234	3	40.0		
23	249	3	40.0		
28	265	4	40.0		
33	283	3	40.0		
38	298	3	40.0		
43	313	7	35.0		
48	348	8	30.0		
50	363	8	30.0		
52	378	8	30.0		
54	394	8	30.0		
56	410	2	40.0		
58	413	4	40.0		
60	420	9	24.0		
62	438	5	40.0		
64	448	3	40.0		
66	454	2	40.0		
71	466	3	40.0		
76	482	3	40.0		
81	498	4	40.0		
91	535	4	40.0		
101	579	4	40.0		
111	622	4	40.0		
116	644	4	40.0		
121	666	3	40.0		
126	680	4	40.0		
131	699	6	40.0		
136	727	6	40.0		
141	758	6	40.0		
146	787	6	40.0		
151	816	2	40.0		
156	828	2	40.0		
166	846	3	40.0		
176	874	4	40.0		
186	917	3	40.0		
Date of test: 24/07/25				Note: CBR value plots at top of the drive increment	
Remarks:					

Site & Location		Sonning Golf Club (Housing) Duffield Road, Sonning, Reading, Berkshire, RG4 6GJ		TRL Probe No: TRL 12	
Client:		Sonning Golf Club Ltd		(Sheet 1 of 1)	
Engineers:		Aventus Design Ltd		Report No: 11043a/CA	
TRL Dynamic Cone Penetration test result					
Blow Count	Depth (mm)	mm per blow	CBR (%)	PLOT OF CBR VS DEPTH	
Commencement Depth	104	41	4.0	Estimated CBR (%) 0.05.010.015.020.025.030.035.040.045.0 0 100 200 300 400 500 600 700 800 900 1000	
1	145	28	6.0		
2	173	14	14.0		
3	187	13	16.0		
4	200	7	35.0		
5	207	8	30.0		
7	222	8	30.0		
9	238	6	40.0		
11	250	4	40.0		
13	257	4	40.0		
18	275	3	40.0		
23	290	2	40.0		
28	301	2	40.0		
33	310	2	40.0		
38	318	4	40.0		
48	353	4	40.0		
58	397	5	40.0		
63	420	6	40.0		
68	448	6	40.0		
73	476	3	40.0		
78	490	7	35.0		
83	524	3	40.0		
88	538	2	40.0		
93	548	2	40.0		
98	556	2	40.0		
108	571	1	40.0		
118	581	1	40.0		
128	591	1	40.0		
138	604	0	40.0		
153	610	0	40.0		
168	613	0	40.0		
188	620	1	40.0		
208	630	0	40.0		
228	634	0	40.0		
				Date of test: 24/07/25	
				Note: CBR value plots at top of the drive increment	
Remarks:					

Site &	Sonning Golf Club (Housing)	Report No: 11043a/CA
Location	Duffield Road, Sonning, Reading, Berkshire, RG4 6GJ	

Trial pit soakage test results

TP No: **TP01**

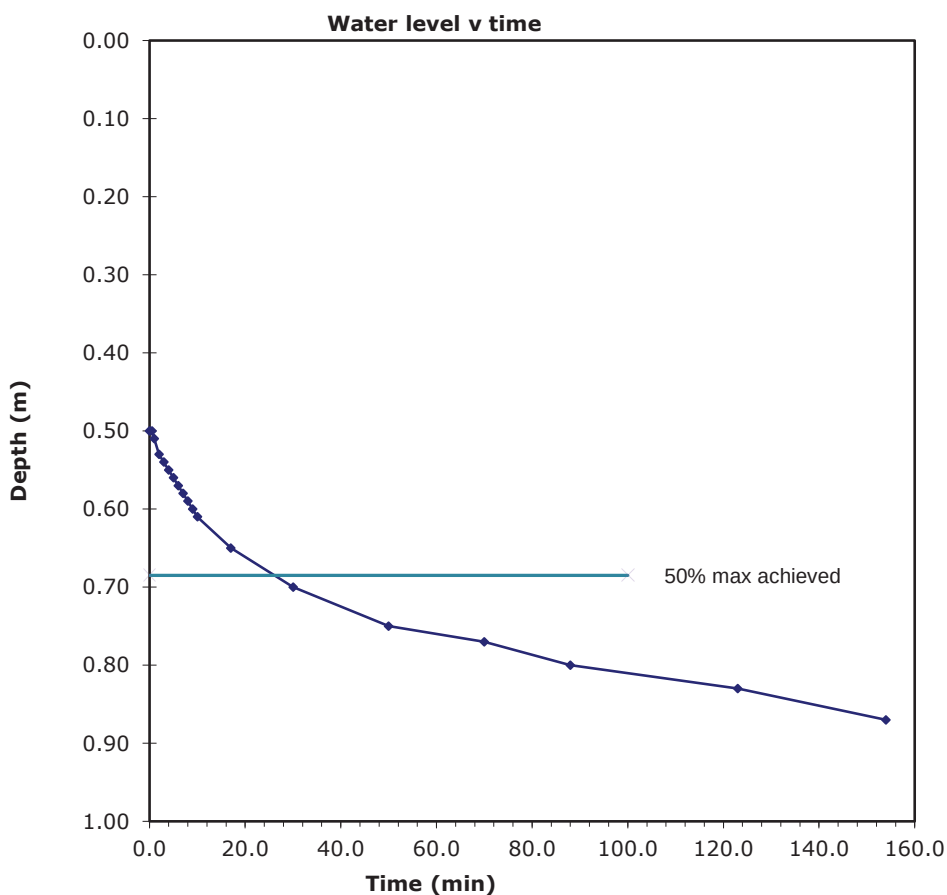
Depth: **1.45** m

Test No: **1**

Dimensions: Width = **0.50** m
Length = **1.40** m
Pit filled with gravel (Y/N) **No**
Voids Ratio

Ground sequence:
GL - 0.10 TOPSOIL
0.10 - 0.30 MADE GROUND
0.30 - 0.90 POSSIBLE MADE GROUND
0.90 - 1.50 Orangish-brown clayey silty very gravelly SAND
GW Standing at: **Dry**

Time (mins)	Depth (mBGL)
0.0	0.500
0.5	0.500
1.0	0.510
2.0	0.530
3.0	0.540
4.0	0.550
5.0	0.560
6.0	0.570
7.0	0.580
8.0	0.590
9.0	0.600
10.0	0.610
17.0	0.650
30.0	0.700
50.0	0.750
70.0	0.770
88.0	0.800
123.0	0.830
154.0	0.870



Depth of water at start of test 0.50 m
Depth of water at end of test 0.87 m
Depth at 75% full 0.59 m
Depth at 25% full 0.78 m

Comments: 400L of water added for test (2min fill time)
Pit collapse to 1.45m after addition of water

Base area of pit 0.70 m²
Effective soakage area a_{s50} 3.61 m²
Volume Change $V_{75}-V_{25}$ 0.13 m³
Time used in calculation t_{p75} 495 sec
Time used in calculation t_{p25} 4470 sec

Soil infiltration rate 9.03E-06 m/sec

The 'soil infiltration rate' is calculated using two selected water levels (BRE DG 365: 2016 "Soakaway design")

Site & Location	Sonning Golf Club (Housing) Duffield Road, Sonning, Reading, Berkshire, RG4 6GJ	Report No: 11043a/CA
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Trial pit soakage test results

TP No: **TP02**

Depth: **1.00** m

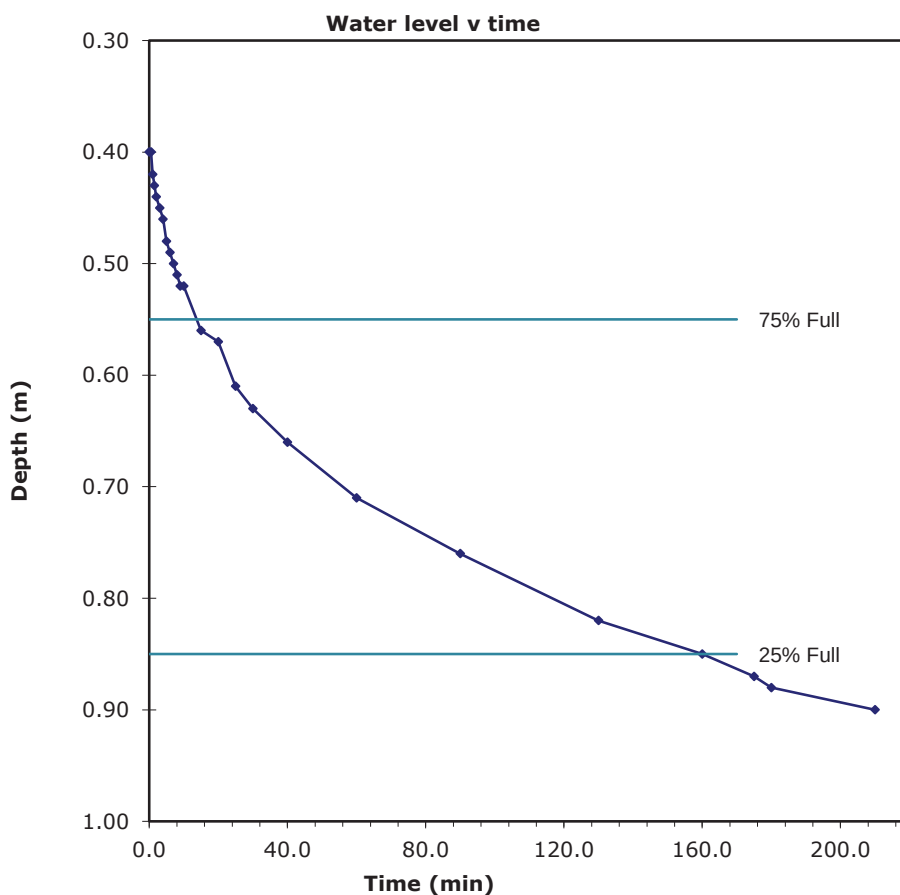
Test No: **1**

Dimensions: Width = **0.50** m
Length = **1.35** m
Pit filled with gravel (Y/N) **No**
Voids Ratio

Ground sequence:
GL - 0.30 MADE GROUND
0.30 - 0.70 POSSIBLE MADE GROUND
0.70 - 1.00 Orangish-brown silty silty very gravelly SAND

GW Standing at: **Dry**

Time (mins)	Depth (mBGL)
0.0	0.400
0.5	0.400
1.0	0.420
1.5	0.430
2.0	0.440
3.0	0.450
4.0	0.460
5.0	0.480
6.0	0.490
7.0	0.500
8.0	0.510
9.0	0.520
10.0	0.520
15.0	0.560
20.0	0.570
25.0	0.610
30.0	0.630
40.0	0.660
60.0	0.710
90.0	0.760
130.0	0.820
160.0	0.850
175.0	0.870
180.0	0.880
210.0	0.900



Depth of water at start of test 0.40 m
Depth of water at end of test 0.90 m
Depth at 75% full 0.55 m
Depth at 25% full 0.85 m

Comments: 300L of water added for test (1min filltime)

Base area of pit 0.68 m²
Effective soakage area a_{s50} 1.79 m²
Volume Change $V_{75}-V_{25}$ 0.20 m³
Time used in calculation t_{p75} 825 sec
Time used in calculation t_{p25} 9600 sec

Soil infiltration rate **1.29E-05 m/sec**

The 'soil infiltration rate' is calculated using two selected water levels (BRE DG 365: 2016 "Soakaway design")



Site &	Sonning Golf Club (Housing)	Report	11043a/CA
Location	Duffield Road, Sonning, Reading, Berkshire, RG4 6GJ	No:	

Trial pit soakage test results

TP No: **TP03**

Depth: **1.87** m

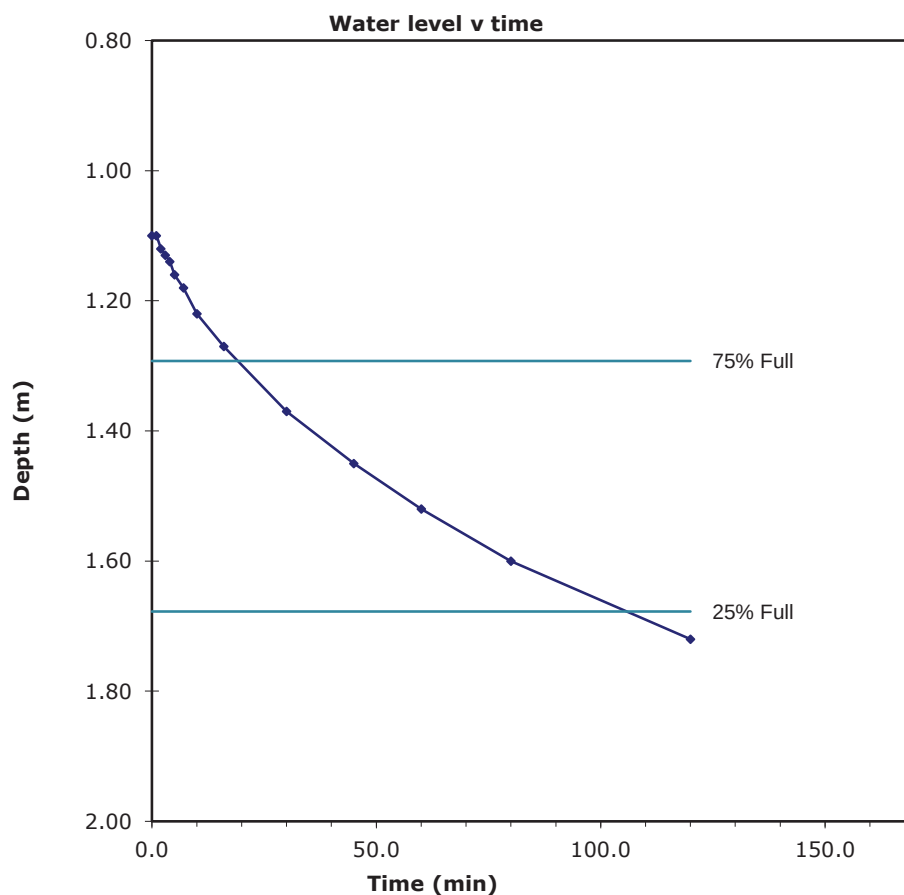
Test No: **1**

Dimensions: Width = **0.50** m
Length = **1.75** m
Pit filled with gravel (Y/N) **No**
Voids Ratio

Ground sequence:
GL - 0.10 TOPSOIL
0.10 - 0.35 POSSIBLE MADE GROUND
0.35 - 2.00 Orangish-brown silty sandy to very sandy GRAVEL

GW Standing at: **Dry**

Time (mins)	Depth (mBGL)
0.0	1.10
1.0	1.100
2.0	1.120
3.0	1.130
4.0	1.140
5.0	1.160
7.0	1.180
10.0	1.220
16.0	1.270
30.0	1.370
45.0	1.450
60.0	1.520
80.0	1.600
120.0	1.720



Depth of water at start of test 1.10 m
Depth of water at end of test 1.72 m
Depth at 75% full 1.29 m
Depth at 25% full 1.68 m

Comments: 1000L of water added for test (3min fill time)
Pit collapse to 1.87m after addition of water

Base area of pit 0.88 m²
Effective soakage area a_{s50} 2.61 m²
Volume Change $V_{75}-V_{25}$ 0.34 m³
Time used in calculation t_{p75} 1149 sec
Time used in calculation t_{p25} 6350 sec

Soil infiltration rate 2.48E-05 m/sec

The 'soil infiltration rate' is calculated using two selected water levels (BRE DG 365: 2016 "Soakaway design")

Site &	Sonning Golf Club (Housing)	Report No: 11043a/CA
Location	Duffield Road, Sonning, Reading, Berkshire, RG4 6GJ	

Trial pit soakage test results

TP No: **TP03**

Depth: **1.87** m

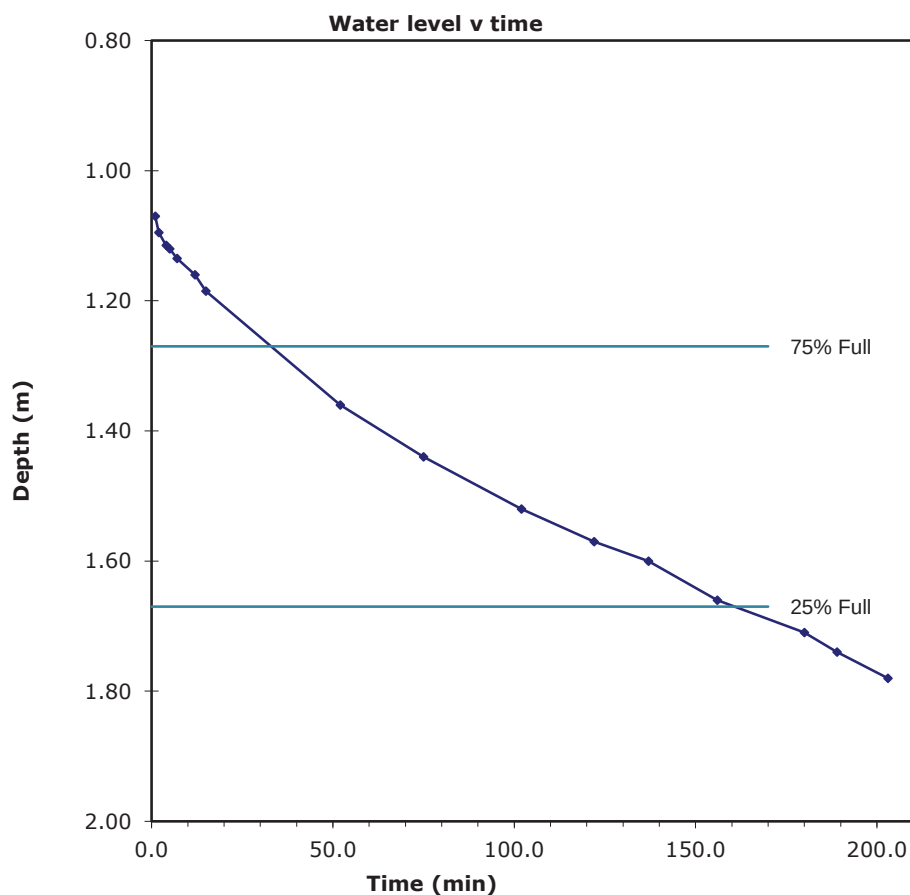
Test No: **2**

Dimensions: Width = **0.50** m
Length = **1.75** m
Pit filled with gravel (Y/N) **No**
Voids Ratio

Ground sequence:
GL - 0.10 TOPSOIL
0.10 - 0.35 POSSIBLE MADE GROUND
0.35 - 2.00 Orangish-brown silty sandy to very sandy GRAVEL

GW Standing at: **Dry**

Time (mins)	Depth (mBGL)
1.0	1.070
2.0	1.095
4.0	1.115
5.0	1.120
7.0	1.135
12.0	1.160
15.0	1.185
52.0	1.360
75.0	1.440
102.0	1.520
122.0	1.570
137.0	1.600
156.0	1.660
180.0	1.710
189.0	1.740
203.0	1.780



Depth of water at start of test 1.07 m
Depth of water at end of test 1.78 m
Depth at 75% full 1.27 m
Depth at 25% full 1.67 m

Comments: 300L of water added for test (3min fill time)

Base area of pit 0.88 m²
Effective soakage area a_{s50} 2.68 m²
Volume Change $V_{75}-V_{25}$ 0.35 m³
Time used in calculation t_{p75} 1978 sec
Time used in calculation t_{p25} 9648 sec

Soil infiltration rate 1.71E-05 m/sec

The 'soil infiltration rate' is calculated using two selected water levels (BRE DG 365: 2016 "Soakaway design")



Site &	Sonning Golf Club (Housing)	Report No: 11043a/CA
Location	Duffield Road, Sonning, Reading, Berkshire, RG4 6GJ	

Trial pit soakage test results

TP No: **TP04**

Depth: **0.98** m

Test No: **1**

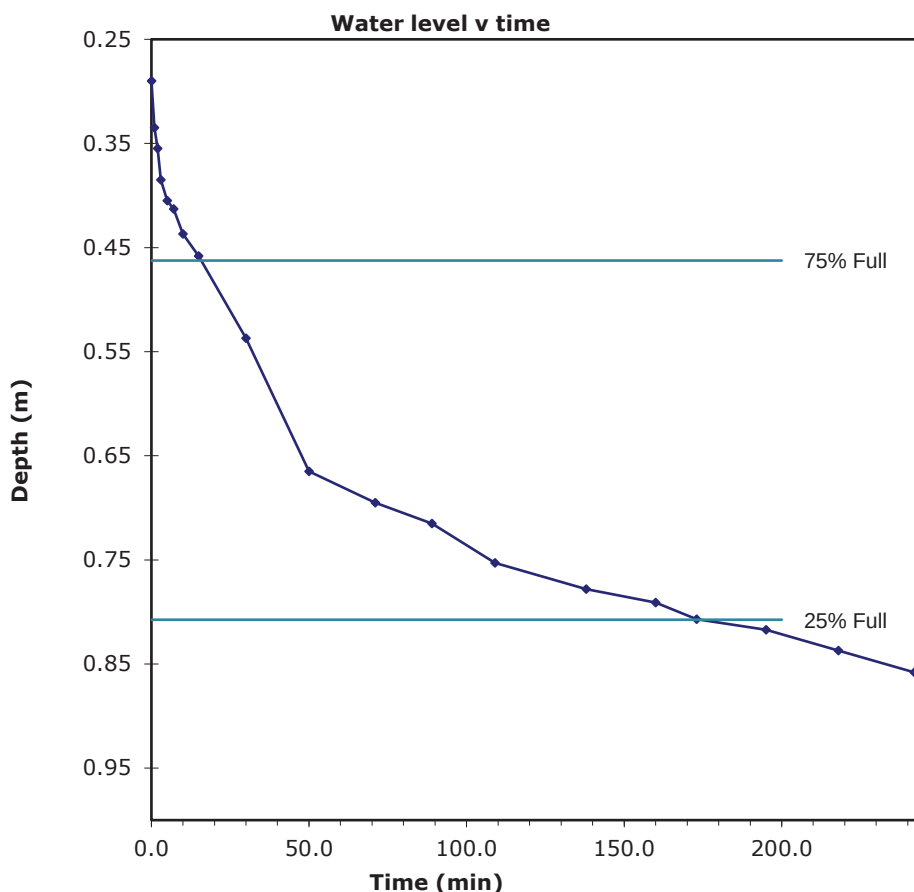
Dimensions: Width = **0.50** m
Length = **1.30** m
Pit filled with gravel (Y/N) **No**
Voids Ratio

Ground sequence:

GL - 0.05 TOPSOIL
0.05 - 0.30 POSSIBLE MADE GROUND
0.30 - 1.00 Orangish-brown silty very sandy GRAVEL

GW Standing at: **Dry**

Time (mins)	Depth (mBGL)
0.0	0.290
1.0	0.335
2.0	0.355
3.0	0.385
5.0	0.405
7.0	0.413
10.0	0.437
15.0	0.458
30.0	0.537
50.0	0.665
71.0	0.695
89.0	0.715
109.0	0.753
138.0	0.778
160.0	0.791
173.0	0.807
195.0	0.817
218.0	0.837
242.0	0.858



Depth of water at start of test 0.29 m

Depth of water at end of test 0.86 m

Depth at 75% full 0.46 m

Depth at 25% full 0.81 m

Comments: 200L of water added for test (1min 15sec fill time)
Pit collapse to 0.98m after addition of water

Base area of pit 0.65 m²

Effective soakage area a_{s50} 1.89 m²

Volume Change $V_{75}-V_{25}$ 0.22 m³

Time used in calculation t_{p75} 951 sec

Time used in calculation t_{p25} 10446 sec

Soil infiltration rate 1.25E-05 m/sec

The 'soil infiltration rate' is calculated using two selected water levels (BRE DG 365: 2016 "Soakaway design")

Site &	Sonning Golf Club (Housing)	Report No: 11043a/CA
Location	Duffield Road, Sonning, Reading, Berkshire, RG4 6GJ	

Trial pit soakage test results

TP No: **TP05**

Depth: **1.54** m

Test No: **1**

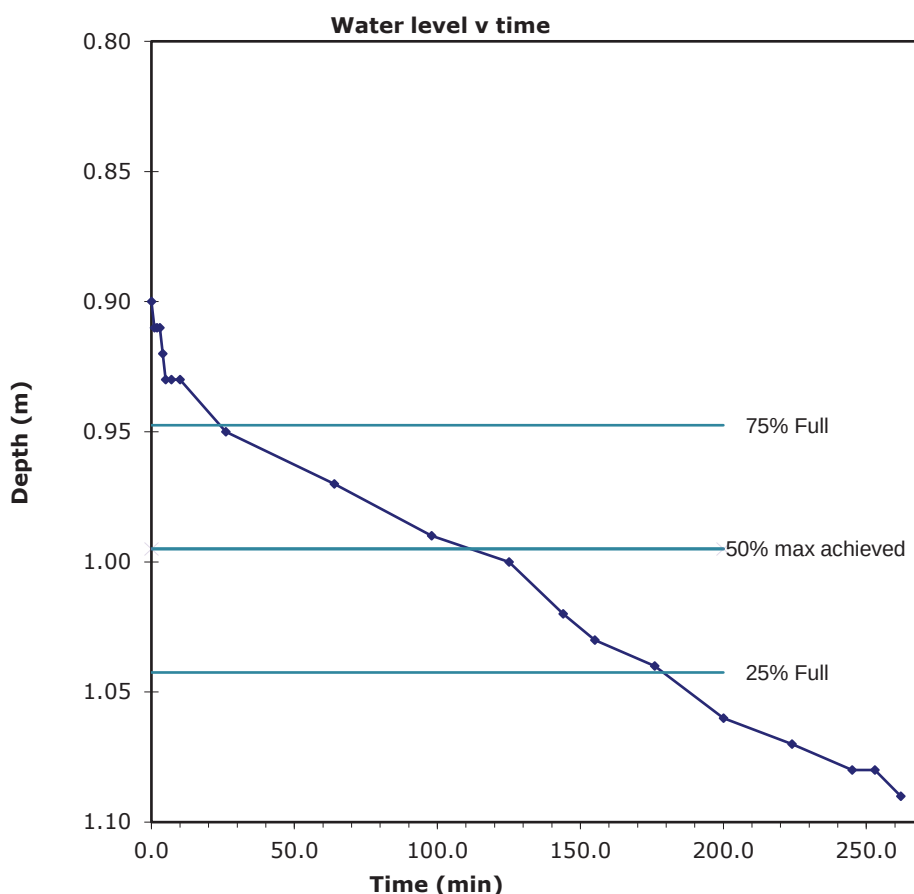
Dimensions: Width = **0.50** m
Length = **1.60** m
Pit filled with gravel (Y/N) **No**
Voids Ratio

Ground sequence:

GL - 0.05 TOPSOIL
0.05 - 0.25 POSSIBLE MADE GROUND
0.25 - 1.60 Light brown slightly silty very sandy GRAVEL

GW Standing at: **Dry**

Time (mins)	Depth (mBGL)
0.0	0.900
1.0	0.910
2.0	0.910
3.0	0.910
4.0	0.920
5.0	0.930
7.0	0.930
10.0	0.930
26.0	0.950
64.0	0.970
98.0	0.990
125.0	1.000
144.0	1.020
155.0	1.030
176.0	1.040
200.0	1.060
224.0	1.070
245.0	1.080
253.0	1.080
262.0	1.090



Depth of water at start of test 0.90 m

Depth of water at end of test 1.09 m

Depth at 75% full 0.95 m

Depth at 25% full 1.04 m

Comments: 900L of water added for test (1min 15sec fill time)
Pit collapse to 1.54m after addition of water

Base area of pit 0.80 m²

Effective soakage area a_{s50} 3.09 m²

Volume Change $V_{75}-V_{25}$ 0.08 m³

Time used in calculation t_{p75} 1440 sec

Time used in calculation t_{p25} 10740 sec

Soil infiltration rate 2.65E-06 m/sec

The 'soil infiltration rate' is calculated using two selected water levels (BRE DG 365: 2016 "Soakaway design")

Site &	Sonning Golf Club (Housing)	Report No: 11043a/CA
Location	Duffield Road, Sonning, Reading, Berkshire, RG4 6GJ	

Trial pit soakage test results

TP No: **TP06**

Depth: **1.89** m

Test No: **1**

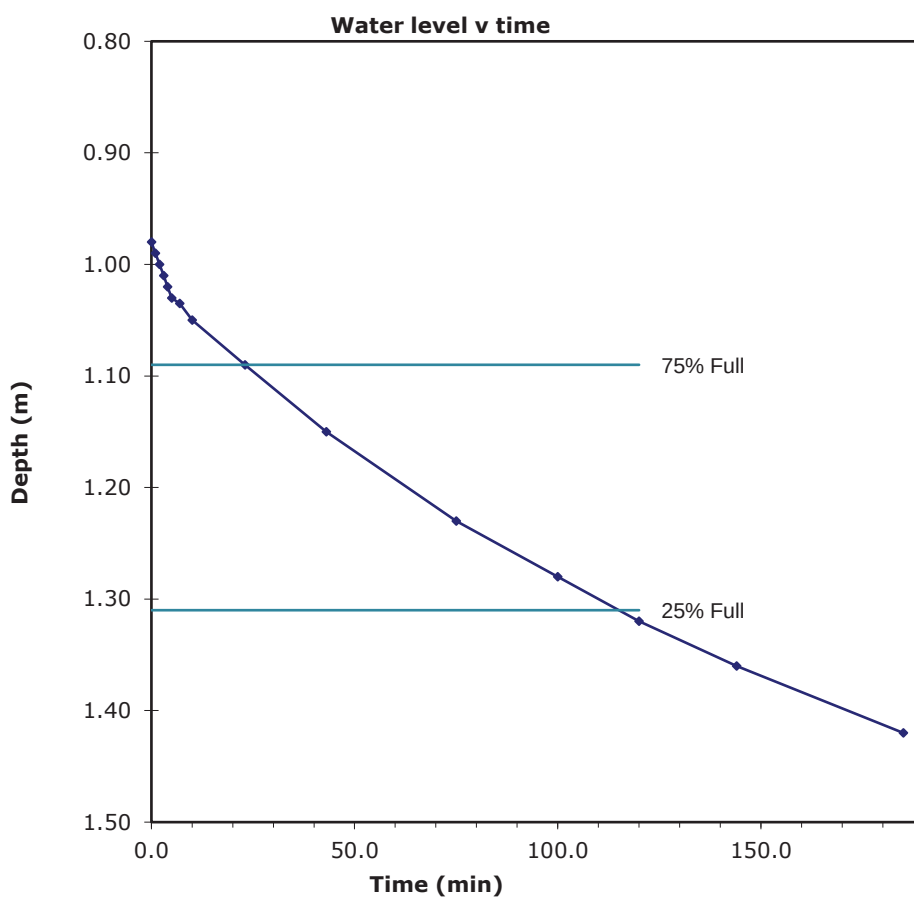
Dimensions: Width = **0.50** m
Length = **1.90** m
Pit filled with gravel (Y/N) **No**
Voids Ratio

Ground sequence:

GL - 0.08 TOPSOIL
0.08 - 0.26 POSSIBLE MADE GROUND
0.26 - 2.05 Light brown slightly silty to silty very sandy GRAVEL

GW Standing at: **Dry**

Time (mins)	Depth (mBGL)
0.0	0.980
1.0	0.990
2.0	1.000
3.0	1.010
4.0	1.020
5.0	1.030
7.0	1.035
10.0	1.050
23.0	1.090
43.0	1.150
75.0	1.230
100.0	1.280
120.0	1.320
144.0	1.360
185.0	1.420



Depth of water at start of test 0.98 m

Depth of water at end of test 1.42 m

Depth at 75% full 1.09 m

Depth at 25% full 1.31 m

Comments: 800L of water added for test (2min fill time)
Pit collapse to 1.89m after addition of water

Base area of pit 0.95 m²

Effective soakage area a_{s50} 4.26 m²

Volume Change $V_{75}-V_{25}$ 0.21 m³

Time used in calculation t_{p75} 1380 sec

Time used in calculation t_{p25} 6900 sec

Soil infiltration rate 8.88E-06 m/sec

The 'soil infiltration rate' is calculated using two selected water levels (BRE DG 365: 2016 "Soakaway design")

Site & Location	Sonning Golf Club (Housing) Duffield Road, Sonning, Reading, Berkshire, RG4 6GJ	Report No: 11043a/CA
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Results of groundwater/gas monitoring

Date:	01/08/2025	<u>Monitoring equipment</u>	
Barometric pressure: a) Trend (24hrs): b) At start (mB):	Rising 1011	Instrument: Calibration check details: Next calibration date:	GA5000. No. G505055 See note 2 below May 2025
Recorded by:	OH	Notes: 1) Barometric pressure trend and ambient air temperature is recorded from metoffice.gov.uk website on the day of the monitoring visit 2) Calibration check is performed at start of monitoring against ambient air and also periodically with a 5% CH ₄ , 5% CO ₂ and 6% O ₂ gas mixture 3) CH ₄ = methane; CO ₂ = carbon dioxide; CO = carbon monoxide; O ₂ = oxygen; H ₂ S = hydrogen sulphide	
Surface ground conditions:	Dry		
Weather conditions:	Mild		
Ambient air temp (°C):	19		

BH ID	Time (24hr)	Pipe dia (mm)	GW depth (mbgl)	Depth to pipe base (mbgl)
WS01	13:08:47	50	Dry	1.64

Time (s)	CH ₄ (%)	CO ₂ (%)	O ₂ (%)	CO (ppm)	H ₂ S (ppm)	PID (ppm)
0	0.0	0.1	20.2	2	4	1.5
15	0.0	0.7	19.4	2	4	1.5
30	0.0	0.8	19.2	2	4	1.5
45	0.0	0.8	19.1	2	4	1.4
60	0.0	0.8	19.0	2	4	1.3
75	0.0	0.9	19.0	2	4	1.2
90	0.0	0.9	19.0	2	4	1.1
105	0.0	0.9	19.0	2	4	0.9
120	0.0	0.9	18.9	2	4	0.8
135	0.0	0.9	18.9	2	4	0.7
150	0.0	0.9	18.9	2	4	0.6
165	0.0	0.9	18.9	3	4	0.5
180	0.0	0.9	18.9	2	4	0.4
195	0.0	0.8	18.9	2	4	0.4

Max CH ₄ (%)	0.0
Max CO ₂ (%)	0.9
Min O ₂ (%)	18.9
Max CO (ppm)	3
Max H ₂ S (ppm)	4
Max PID (ppm)	1.5

Flow rate (l/hr)			Relative pressure (mb)
Initial	Mean	Max	
0.2	0.2	0.2	-0.02

Site & Location	Sonning Golf Club (Housing) Duffield Road, Sonning, Reading, Berkshire, RG4 6GJ	Report No: 11043a/CA
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Results of groundwater/gas monitoring

Date:	01/08/2025	Monitoring equipment	Instrument: GA5000. No. G505055 Calibration check details: See note 2 below Next calibration date: May 2025
Barometric pressure: a) Trend (24hrs): b) At start (mB):	Rising 1011	Notes:	
Recorded by:	OH	1)	Barometric pressure trend and ambient air temperature is recorded from metoffice.gov.uk website on the day of the monitoring visit
Surface ground conditions:	Dry Mild 19	2)	Calibration check is performed at start of monitoring against ambient air and also periodically with a 5% CH ₄ , 5% CO ₂ and 6% O ₂ gas mixture
Weather conditions:		3)	CH ₄ = methane; CO ₂ = carbon dioxide; CO = carbon monoxide; O ₂ = oxygen; H ₂ S = hydrogen sulphide
Ambient air temp (°C):			

BH ID	Time (24hr)	Pipe dia (mm)	GW depth (mbgl)	Depth to pipe base (mbgl)
WS05	13:19:44	50	Dry	2.47

Time (s)	CH ₄ (%)	CO ₂ (%)	O ₂ (%)	CO (ppm)	H ₂ S (ppm)	PID (ppm)
0	0.0	0.1	20.1	2	4	2.5
15	0.0	1.1	19.5	3	4	2.5
30	0.0	1.1	19.4	2	3	3.9
45	0.0	1.1	19.4	2	3	4.1
60	0.0	1.1	19.4	2	3	4.1
75	0.0	1.1	19.4	2	3	4.1
90	0.0	1.1	19.4	2	3	4.1
105	0.0	1.1	19.4	1	3	3.9
120	0.0	1.2	19.4	2	3	3.8
135	0.0	1.2	19.5	2	3	3.7
150	0.0	1.2	19.5	2	3	3.5
165	0.0	1.2	19.5	2	2	3.3
180	0.0	1.2	19.5	2	2	3.1
195	0.0	1.2	19.5	3	1	3.1

Max CH ₄ (%)	0.0
Max CO ₂ (%)	1.2
Min O ₂ (%)	19.4
Max CO (ppm)	3
Max H ₂ S (ppm)	4
Max PID (ppm)	4.1

Flow rate (l/hr)			Relative pressure (mb)
Initial	Mean	Max	
0.5	0.4	0.5	0.05

Site & Location	Sonning Golf Club (Housing) Duffield Road, Sonning, Reading, Berkshire, RG4 6GJ	Report No: 11043a/CA
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Results of groundwater/gas monitoring

Date:	01/08/2025	Monitoring equipment	Instrument: GA5000. No. G505055 Calibration check details: See note 2 below Next calibration date: May 2025
Barometric pressure: a) Trend (24hrs): b) At start (mB):	Rising 1011	Notes:	
Recorded by:	OH	1)	Barometric pressure trend and ambient air temperature is recorded from metoffice.gov.uk website on the day of the monitoring visit
Surface ground conditions:	Dry Mild 19	2)	Calibration check is performed at start of monitoring against ambient air and also periodically with a 5% CH ₄ , 5% CO ₂ and 6% O ₂ gas mixture
Weather conditions:		3)	CH ₄ = methane; CO ₂ = carbon dioxide; CO = carbon monoxide; O ₂ = oxygen; H ₂ S = hydrogen sulphide
Ambient air temp (°C):			

BH ID	Time (24hr)	Pipe dia (mm)	GW depth (mbgl)	Depth to pipe base (mbgl)
WS06	13:36:44	19	Dry	1.72

Time (s)	CH ₄ (%)	CO ₂ (%)	O ₂ (%)	CO (ppm)	H ₂ S (ppm)	PID (ppm)
0	0.0	0.1	20.4	4	0	0.4
15	0.0	0.8	19.1	5	0	0.4
30	0.0	1.1	18.5	4	0	0.4
45	0.0	1.2	18.3	3	0	0.3
60	0.0	1.3	18.2	3	0	0.3
75	0.0	1.3	18.2	4	0	0.2
90	0.0	1.3	18.2	4	0	0.2
105	0.0	1.3	18.1	4	0	0.1
120	0.0	1.3	18.1	4	0	0.1
135	0.0	1.3	18.1	4	0	0.1
150	0.0	1.3	18.0	4	0	0.1
165	0.0	1.3	18.0	3	0	0.1
180	0.0	1.3	18.0	3	0	0.0
195	0.0	1.3	18.0	3	1	0.0

Max CH ₄ (%)	0.0
Max CO ₂ (%)	1.3
Min O ₂ (%)	18.0
Max CO (ppm)	5
Max H ₂ S (ppm)	1
Max PID (ppm)	0.4

Flow rate (l/hr)			Relative pressure (mb)
Initial	Mean	Max	
0.4	0.3	0.4	0.05

Site & Location	Sonning Golf Club (Housing) Duffield Road, Sonning, Reading, Berkshire, RG4 6GJ	Report No: 11043a/CA
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Results of groundwater/gas monitoring

Date:	01/08/2025	Monitoring equipment	Instrument: GA5000. No. G505055 Calibration check details: See note 2 below Next calibration date: May 2025
Barometric pressure: a) Trend (24hrs): b) At start (mB):	Rising 1011	Notes:	
Recorded by:	OH	1)	Barometric pressure trend and ambient air temperature is recorded from metoffice.gov.uk website on the day of the monitoring visit
Surface ground conditions:	Dry Mild 19	2)	Calibration check is performed at start of monitoring against ambient air and also periodically with a 5% CH ₄ , 5% CO ₂ and 6% O ₂ gas mixture
Weather conditions:		3)	CH ₄ = methane; CO ₂ = carbon dioxide; CO = carbon monoxide; O ₂ = oxygen; H ₂ S = hydrogen sulphide
Ambient air temp (°C):			

BH ID	Time (24hr)	Pipe dia (mm)	GW depth (mbgl)	Depth to pipe base (mbgl)
WS07	13:46:52	19	Dry	1.59

Time (s)	CH ₄ (%)	CO ₂ (%)	O ₂ (%)	CO (ppm)	H ₂ S (ppm)	PID (ppm)
0	0.0	0.1	20.4	3	1	0.3
15	0.0	0.7	19.8	2	1	0.3
30	0.0	0.7	19.7	2	1	0.2
45	0.0	0.7	19.7	1	1	0.2
60	0.0	0.7	19.7	1	1	0.2
75	0.0	0.7	19.7	1	1	0.2
90	0.0	0.7	19.7	1	2	0.2
105	0.0	0.7	19.7	1	2	0.2
120	0.0	0.7	19.7	1	2	0.2
135	0.0	0.7	19.7	2	2	0.1
150	0.0	0.7	19.7	1	2	0.1
165	0.0	0.7	19.7	1	2	0.1
180	0.0	0.7	19.8	1	2	0.1
195	0.0	0.7	19.7	1	2	0.1

Max CH ₄ (%)	0.0
Max CO ₂ (%)	0.7
Min O ₂ (%)	19.7
Max CO (ppm)	3
Max H ₂ S (ppm)	2
Max PID (ppm)	0.3

Flow rate (l/hr)			Relative pressure (mb)
Initial	Mean	Max	
0.3	0.3	0.3	-0.03

Site & Location	Sonning Golf Club (Housing) Duffield Road, Sonning, Reading, Berkshire, RG4 6GJ	Report No: 11043a/CA
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Results of groundwater/gas monitoring

Date:	01/08/2025	Monitoring equipment	
Barometric pressure:		Instrument:	GA5000. No. G505055
a) Trend (24hrs):	Rising 1011	Calibration check details:	See note 2 below
b) At start (mB):		Next calibration date:	May 2025
		Notes:	
Recorded by:	OH	1) Barometric pressure trend and ambient air temperature is recorded from metoffice.gov.uk website on the day of the monitoring visit	
Surface ground conditions:	Dry Mild 19	2) Calibration check is performed at start of monitoring against ambient air and also periodically with a 5% CH ₄ , 5% CO ₂ and 6% O ₂ gas mixture	
Weather conditions:		3) CH ₄ = methane; CO ₂ = carbon dioxide; CO = carbon monoxide;	
Ambient air temp (°C):		O ₂ = oxygen; H ₂ S = hydrogen sulphide	

BH ID	Time (24hr)	Pipe dia (mm)	GW depth (mbgl)	Depth to pipe base (mbgl)
WS08	13:56:46	50	Dry	1.60

Time (s)	CH ₄ (%)	CO ₂ (%)	O ₂ (%)	CO (ppm)	H ₂ S (ppm)	PID (ppm)
0	0.0	0.1	20.5	1	3	2.0
15	0.0	0.4	20.2	3	3	2.0
30	0.0	0.4	20.0	1	2	2.6
45	0.0	0.4	20.0	0	3	2.4
60	0.0	0.4	20.0	0	3	2.2
75	0.0	0.4	20.0	0	3	2.0
90	0.0	0.4	20.0	0	3	1.8
105	0.0	0.4	20.0	0	3	1.6
120	0.0	0.4	20.0	0	2	1.3
135	0.0	0.4	20.0	0	2	1.1
150	0.0	0.4	20.0	1	2	0.9
165	0.0	0.4	20.0	1	2	0.7
180	0.0	0.4	20.0	1	2	0.6
195	0.0	0.4	19.9	2	2	0.6

Max CH ₄ (%)	0.0
Max CO ₂ (%)	0.4
Min O ₂ (%)	19.9
Max CO (ppm)	3
Max H ₂ S (ppm)	3
Max PID (ppm)	2.6

Flow rate (l/hr)			Relative pressure (mb)
Initial	Mean	Max	
0.3	0.3	0.3	0.02

Site & Location	Sonning Golf Club (Housing) Duffield Road, Sonning, Reading, Berkshire, RG4 6GJ	Report No: 11043a/CA
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Results of groundwater/gas monitoring

Date:	01/08/2025	Monitoring equipment	
Barometric pressure: a) Trend (24hrs): b) At start (mB):	Rising 1011	Instrument: Calibration check details: Next calibration date:	GA5000. No. G505055 See note 2 below May 2025
Recorded by:		Notes:	
Surface ground conditions:	Dry Mild 19	1) Barometric pressure trend and ambient air temperature is recorded from metoffice.gov.uk website on the day of the monitoring visit	
Weather conditions:		2) Calibration check is performed at start of monitoring against ambient air and also periodically with a 5% CH ₄ , 5% CO ₂ and 6% O ₂ gas mixture	
Ambient air temp (°C):		3) CH ₄ = methane; CO ₂ = carbon dioxide; CO = carbon monoxide; O ₂ = oxygen; H ₂ S = hydrogen sulphide	

BH ID	Time (24hr)	Pipe dia (mm)	GW depth (mbgl)	Depth to pipe base (mbgl)
WS10	14:08:09	50	Dry	1.65

Time (s)	CH ₄ (%)	CO ₂ (%)	O ₂ (%)	CO (ppm)	H ₂ S (ppm)	PID (ppm)
0	0.0	0.0	20.3	1	2	1.4
15	0.0	0.9	19.3	2	2	1.4
30	0.0	0.9	19.1	1	2	1.8
45	0.0	0.9	19.1	1	2	1.8
60	0.0	0.9	19.0	0	2	1.8
75	0.0	0.9	19.0	1	2	1.8
90	0.0	0.9	19.0	0	2	1.7
105	0.0	0.9	19.0	0	2	1.5
120	0.0	0.9	19.0	0	2	1.3
135	0.0	0.9	19.0	0	2	1.1
150	0.0	0.9	19.0	1	2	0.9
165	0.0	0.9	19.0	1	2	0.7
180	0.0	1.0	19.0	0	2	0.6
195	0.0	0.8	19.3	1	3	0.6

Max CH ₄ (%)	0.0
Max CO ₂ (%)	1.0
Min O ₂ (%)	19.0
Max CO (ppm)	2
Max H ₂ S (ppm)	3
Max PID (ppm)	1.8

Flow rate (l/hr)			Relative pressure (mb)
Initial	Mean	Max	
-0.1	-0.1	-0.1	0.07

Site & Location	Sonning Golf Club (Housing) Duffield Road, Sonning, Reading, Berkshire, RG4 6GJ	Report No: 11043a/CA
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Results of groundwater/gas monitoring

Date:	01/08/2025	Monitoring equipment	
Barometric pressure:		Instrument:	GA5000. No. G505055
a) Trend (24hrs):	Rising	Calibration check details:	See note 2 below
b) At start (mB):	1011	Next calibration date:	May 2025
Recorded by:	OH	Notes:	
Surface ground conditions:	Dry	1)	Barometric pressure trend and ambient air temperature is recorded from metoffice.gov.uk website on the day of the monitoring visit
Weather conditions:	Mild	2)	Calibration check is performed at start of monitoring against ambient air and also periodically with a 5% CH ₄ , 5% CO ₂ and 6% O ₂ gas mixture
Ambient air temp (°C):	19	3)	CH ₄ = methane; CO ₂ = carbon dioxide; CO = carbon monoxide; O ₂ = oxygen; H ₂ S = hydrogen sulphide

BH ID	Time (24hr)	Pipe dia (mm)	GW depth (mbgl)	Depth to pipe base (mbgl)
WS12	14:53:52	50	Dry	0.76

Time (s)	CH ₄ (%)	CO ₂ (%)	O ₂ (%)	CO (ppm)	H ₂ S (ppm)	PID (ppm)
0	0.0	0.1	20.8	0	3	0.8
15	0.0	0.7	20.3	0	3	0.8
30	0.0	0.7	20.1	0	3	0.8
45	0.0	0.7	20.1	0	3	0.7
60	0.0	0.7	20.1	0	3	0.7
75	0.0	0.7	20.1	0	3	0.6
90	0.0	0.6	20.1	0	3	0.6
105	0.0	0.6	20.1	0	3	0.6
120	0.0	0.6	20.1	0	3	0.5
135	0.0	0.6	20.1	0	3	0.5
150	0.0	0.6	20.2	0	3	0.5
165	0.0	0.6	20.2	0	3	0.5
180	0.0	0.5	20.2	0	3	0.4
195	0.0	0.5	20.2	1	3	0.4

Max CH ₄ (%)	0.0
Max CO ₂ (%)	0.7
Min O ₂ (%)	20.1
Max CO (ppm)	1
Max H ₂ S (ppm)	3
Max PID (ppm)	0.8

Flow rate (l/hr)			Relative pressure (mb)
Initial	Mean	Max	
0.2	0.2	0.2	-0.09

Site & Location	Sonning Golf Club (Housing) Duffield Road, Sonning, Reading, Berkshire, RG4 6GJ	Report No: 11043a/CA
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Results of groundwater/gas monitoring

Date:	01/08/2025	Monitoring equipment	Instrument: GA5000. No. G505055 Calibration check details: See note 2 below Next calibration date: May 2025
Barometric pressure: a) Trend (24hrs): b) At start (mB):	Rising 1011	Notes:	
Recorded by:	OH	1)	Barometric pressure trend and ambient air temperature is recorded from metoffice.gov.uk website on the day of the monitoring visit
Surface ground conditions:	Dry Mild 19	2)	Calibration check is performed at start of monitoring against ambient air and also periodically with a 5% CH ₄ , 5% CO ₂ and 6% O ₂ gas mixture
Weather conditions:		3)	CH ₄ = methane; CO ₂ = carbon dioxide; CO = carbon monoxide; O ₂ = oxygen; H ₂ S = hydrogen sulphide
Ambient air temp (°C):			

BH ID	Time (24hr)	Pipe dia (mm)	GW depth (mbgl)	Depth to pipe base (mbgl)
WS14	14:38:34	50	Dry	0.90

Time (s)	CH ₄ (%)	CO ₂ (%)	O ₂ (%)	CO (ppm)	H ₂ S (ppm)	PID (ppm)
0	0.0	0.1	20.7	1	3	0.7
15	0.0	1.8	18.3	1	3	0.7
30	0.0	1.9	18.0	0	3	0.8
45	0.0	1.9	17.9	0	3	0.7
60	0.0	2.0	17.8	0	3	0.7
75	0.0	2.0	17.8	0	3	0.6
90	0.0	2.0	17.7	0	3	0.5
105	0.0	2.0	17.8	0	3	0.5
120	0.0	2.0	17.8	0	3	0.4
135	0.0	2.0	17.9	0	3	0.4
150	0.0	1.9	18.0	0	3	0.4
165	0.0	1.9	18.1	0	3	0.3
180	0.0	1.8	18.1	0	3	0.3
195	0.0	1.6	18.5	0	3	0.3

Max CH ₄ (%)	0.0
Max CO ₂ (%)	2.0
Min O ₂ (%)	17.7
Max CO (ppm)	1
Max H ₂ S (ppm)	3
Max PID (ppm)	0.8

Flow rate (l/hr)			Relative pressure (mb)
Initial	Mean	Max	
0.3	0.2	0.3	-0.05

Site & Location	Sonning Golf Club (Housing) Duffield Road, Sonning, Reading, Berkshire, RG4 6GJ	Report No: 11043a/CA
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Results of groundwater/gas monitoring

Date:	01/08/2025	<u>Monitoring equipment</u>	
Barometric pressure: a) Trend (24hrs): b) At start (mB):	Rising 1011	Instrument: Calibration check details: Next calibration date:	GA5000. No. G505055 See note 2 below May 2025
Recorded by:	OH	Notes:	1) Barometric pressure trend and ambient air temperature is recorded from metoffice.gov.uk website on the day of the monitoring visit
Surface ground conditions:	Dry	2)	Calibration check is performed at start of monitoring against ambient air and also periodically with a 5% CH ₄ , 5% CO ₂ and 6% O ₂ gas mixture
Weather conditions:	Mild	3)	CH ₄ = methane; CO ₂ = carbon dioxide; CO = carbon monoxide; O ₂ = oxygen; H ₂ S = hydrogen sulphide
Ambient air temp (°C):	19		

BH ID	Time (24hr)	Pipe dia (mm)	GW depth (mbgl)	Depth to pipe base (mbgl)
WS15	14:28:25	50	Dry	1.44

Time (s)	CH ₄ (%)	CO ₂ (%)	O ₂ (%)	CO (ppm)	H ₂ S (ppm)	PID (ppm)
0	0.0	0.1	20.6	1	3	1.3
15	0.0	1.0	19.6	1	3	1.3
30	0.0	1.0	19.4	0	3	1.6
45	0.0	1.0	19.3	0	3	1.4
60	0.0	1.0	19.3	0	3	1.3
75	0.0	1.0	19.3	0	3	1.0
90	0.0	1.0	19.3	0	3	0.9
105	0.0	1.0	19.3	0	3	0.7
120	0.0	1.1	19.3	0	3	0.6
135	0.0	1.1	19.3	0	3	0.5
150	0.0	1.1	19.3	0	3	0.4
165	0.0	1.1	19.3	0	3	0.3
180	0.0	1.1	19.3	0	3	0.3
195	0.0	1.1	19.3	1	3	0.3

Max CH ₄ (%)	0.0
Max CO ₂ (%)	1.1
Min O ₂ (%)	19.3
Max CO (ppm)	1
Max H ₂ S (ppm)	3
Max PID (ppm)	1.6

Flow rate (l/hr)			Relative pressure (mb)
Initial	Mean	Max	
-0.1	-0.1	-0.1	0.03

Site & Location	Sonning Golf Club (Housing) Duffield Road, Sonning, Reading, Berkshire, RG4 6GJ	Report No: 11043a/CA
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Results of groundwater/gas monitoring

Date:	18/08/2025	Monitoring equipment	
Barometric pressure: a) Trend (24hrs): b) At start (mB):	Falling 1022	Instrument: Calibration check details: Next calibration date:	GA5000. No. G505055 See note 2 below May 2025
Recorded by:		Notes:	
Surface ground conditions:	CA/ OH	1)	Barometric pressure trend and ambient air temperature is recorded from metoffice.gov.uk website on the day of the monitoring visit
Weather conditions:		2)	Calibration check is performed at start of monitoring against ambient air and also periodically with a 5% CH ₄ , 5% CO ₂ and 6% O ₂ gas mixture
Ambient air temp (°C):	Dry Mild 19	3)	CH ₄ = methane; CO ₂ = carbon dioxide; CO = carbon monoxide; O ₂ = oxygen; H ₂ S = hydrogen sulphide

BH ID	Time (24hr)	Pipe dia (mm)	GW depth (mbgl)	Depth to pipe base (mbgl)
WS01	10:09:08	50	Dry	1.65

Time (s)	CH ₄ (%)	CO ₂ (%)	O ₂ (%)	CO (ppm)	H ₂ S (ppm)	PID (ppm)
0	0.0	0.1	21.2	0	0	0.5
15	0.0	0.9	20.9	0	0	0.5
30	0.0	0.9	20.7	0	0	0.6
45	0.0	0.9	20.6	0	0	0.6
60	0.0	0.9	20.6	0	0	0.5
75	0.0	0.9	20.6	0	0	0.4
90	0.0	0.9	20.6	0	0	0.4
105	0.0	0.9	20.5	0	0	0.2
120	0.0	0.9	20.5	0	0	0.1
135	0.0	0.9	20.5	0	0	0.1
150	0.0	0.8	20.5	0	0	0.0
165	0.0	0.8	20.5	0	0	0.0
180	0.0	0.8	20.6	0	0	0.0
195	0.0	0.8	20.5	0	0	0.0

Max CH ₄ (%)	0.0
Max CO ₂ (%)	0.9
Min O ₂ (%)	20.5
Max CO (ppm)	0
Max H ₂ S (ppm)	0
Max PID (ppm)	0.6

Flow rate (l/hr)			Relative pressure (mb)
Initial	Mean	Max	
0.1	0.1	0.1	-10.48

Site & Location	Sonning Golf Club (Housing) Duffield Road, Sonning, Reading, Berkshire, RG4 6GJ	Report No: 11043a/CA
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Results of groundwater/gas monitoring

Date:	18/08/2025	Monitoring equipment	Instrument: GA5000. No. G505055 Calibration check details: See note 2 below Next calibration date: May 2025
Barometric pressure: a) Trend (24hrs): b) At start (mB):	Falling 1022	Notes:	
Recorded by:	CA/ OH	1)	Barometric pressure trend and ambient air temperature is recorded from metoffice.gov.uk website on the day of the monitoring visit
Surface ground conditions:	Dry	2)	Calibration check is performed at start of monitoring against ambient air and also periodically with a 5% CH ₄ , 5% CO ₂ and 6% O ₂ gas mixture
Weather conditions:	Mild	3)	CH ₄ = methane; CO ₂ = carbon dioxide; CO = carbon monoxide; O ₂ = oxygen; H ₂ S = hydrogen sulphide
Ambient air temp (°C):	19		

BH ID	Time (24hr)	Pipe dia (mm)	GW depth (mbgl)	Depth to pipe base (mbgl)
WS05	10:20:57	50	Dry	2.46

Time (s)	CH ₄ (%)	CO ₂ (%)	O ₂ (%)	CO (ppm)	H ₂ S (ppm)	PID (ppm)
0	0.0	0.2	20.9	0	0	3.5
15	0.0	1.1	20.6	0	0	3.5
30	0.0	1.1	20.5	0	0	3.6
45	0.0	1.1	20.5	0	0	3.7
60	0.0	1.1	20.5	0	0	3.6
75	0.0	1.1	20.4	0	0	3.5
90	0.0	1.1	20.4	0	0	3.0
105	0.0	1.1	20.4	0	0	2.8
120	0.0	1.2	20.4	0	0	2.5
135	0.0	1.2	20.4	0	0	2.2
150	0.0	1.2	20.4	0	0	2.2
165	0.0	1.2	20.4	0	0	2.0
180	0.0	1.2	20.4	0	0	1.9
195	0.0	1.2	20.4	0	0	1.9

Max CH ₄ (%)	0.0
Max CO ₂ (%)	1.2
Min O ₂ (%)	20.4
Max CO (ppm)	0
Max H ₂ S (ppm)	0
Max PID (ppm)	3.7

Flow rate (l/hr)			Relative pressure (mb)
Initial	Mean	Max	
0.1	0.1	0.1	-6.38

Site & Location	Sonning Golf Club (Housing) Duffield Road, Sonning, Reading, Berkshire, RG4 6GJ	Report No: 11043a/CA
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Results of groundwater/gas monitoring

Date:	18/08/2025	Monitoring equipment	Instrument: GA5000. No. G505055 Calibration check details: See note 2 below Next calibration date: May 2025
Barometric pressure: a) Trend (24hrs): b) At start (mB):	Falling 1022	Notes:	
Recorded by:	CA/ OH	1)	Barometric pressure trend and ambient air temperature is recorded from metoffice.gov.uk website on the day of the monitoring visit
Surface ground conditions:	Dry	2)	Calibration check is performed at start of monitoring against ambient air and also periodically with a 5% CH ₄ , 5% CO ₂ and 6% O ₂ gas mixture
Weather conditions:	Mild	3)	CH ₄ = methane; CO ₂ = carbon dioxide; CO = carbon monoxide; O ₂ = oxygen; H ₂ S = hydrogen sulphide
Ambient air temp (°C):	19		

BH ID	Time (24hr)	Pipe dia (mm)	GW depth (mbgl)	Depth to pipe base (mbgl)
WS06	10:29:10	19	Dry	1.71

Time (s)	CH ₄ (%)	CO ₂ (%)	O ₂ (%)	CO (ppm)	H ₂ S (ppm)	PID (ppm)
0	0.0	0.1	20.8	1	0	0.2
15	0.0	0.9	20.6	1	0	0.2
30	0.0	1.0	20.4	0	0	0.1
45	0.0	1.0	20.3	1	0	0.0
60	0.0	1.0	20.3	0	0	0.0
75	0.0	1.0	20.3	1	0	0.0
90	0.0	0.9	20.3	0	0	0.0
105	0.0	0.9	20.3	1	0	0.0
120	0.0	0.9	20.4	1	0	0.0
135	0.0	0.8	20.4	1	0	0.0
150	0.0	0.8	20.4	1	0	0.0
165	0.0	0.8	20.4	0	0	0.0
180	0.0	0.7	20.4	1	0	0.0
195	0.0	0.7	20.4	1	0	0.0

Max CH ₄ (%)	0.0
Max CO ₂ (%)	1.0
Min O ₂ (%)	20.3
Max CO (ppm)	1
Max H ₂ S (ppm)	0
Max PID (ppm)	0.2

Flow rate (l/hr)			Relative pressure (mb)
Initial	Mean	Max	
0.0	0.0	0.0	-10.70

Site & Location	Sonning Golf Club (Housing) Duffield Road, Sonning, Reading, Berkshire, RG4 6GJ	Report No: 11043a/CA
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Results of groundwater/gas monitoring

Date:	18/08/2025	<u>Monitoring equipment</u>	Instrument: GA5000. No. G505055 Calibration check details: See note 2 below Next calibration date: May 2025
Barometric pressure: a) Trend (24hrs): b) At start (mB):	Falling 1022	Notes:	
Recorded by:	CA/ OH	1) Barometric pressure trend and ambient air temperature is recorded from metoffice.gov.uk website on the day of the monitoring visit	
Surface ground conditions: Weather conditions:	Dry Mild	2) Calibration check is performed at start of monitoring against ambient air and also periodically with a 5% CH ₄ , 5% CO ₂ and 6% O ₂ gas mixture	
Ambient air temp (°C):	19	3) CH ₄ = methane; CO ₂ = carbon dioxide; CO = carbon monoxide; O ₂ = oxygen; H ₂ S = hydrogen sulphide	

BH ID	Time (24hr)	Pipe dia (mm)	GW depth (mbgl)	Depth to pipe base (mbgl)
WS07	10:49:20	19	Dry	1.59

Time (s)	CH ₄ (%)	CO ₂ (%)	O ₂ (%)	CO (ppm)	H ₂ S (ppm)	PID (ppm)
0	0.0	0.1	20.8	0	0	0.2
15	0.0	0.4	20.8	0	0	0.2
30	0.0	0.4	20.6	0	0	0.0
45	0.0	0.4	20.6	0	0	0.0
60	0.0	0.4	20.6	0	0	0.0
75	0.0	0.4	20.6	0	0	0.0
90	0.0	0.4	20.6	0	0	0.0
105	0.0	0.4	20.6	0	0	0.0
120	0.0	0.4	20.6	0	0	0.0
135	0.0	0.4	20.6	0	0	0.0
150	0.0	0.4	20.6	0	0	0.0
165	0.0	0.4	20.6	0	0	0.0
180	0.0	0.4	20.6	0	0	0.0
195	0.0	0.4	20.6	0	0	0.0

Max CH ₄ (%)	0.0
Max CO ₂ (%)	0.4
Min O ₂ (%)	20.6
Max CO (ppm)	0
Max H ₂ S (ppm)	0
Max PID (ppm)	0.2

Flow rate (l/hr)			Relative pressure (mb)
Initial	Mean	Max	
0.0	0.0	0.0	1.30

Site & Location	Sonning Golf Club (Housing) Duffield Road, Sonning, Reading, Berkshire, RG4 6GJ	Report No: 11043a/CA
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Results of groundwater/gas monitoring

Date:	18/08/2025	Monitoring equipment	Instrument: GA5000. No. G505055 Calibration check details: See note 2 below Next calibration date: May 2025
Barometric pressure: a) Trend (24hrs): b) At start (mB):	Falling 1022	Notes:	
Recorded by:	CA/ OH	1)	Barometric pressure trend and ambient air temperature is recorded from metoffice.gov.uk website on the day of the monitoring visit
Surface ground conditions:	Dry	2)	Calibration check is performed at start of monitoring against ambient air and also periodically with a 5% CH ₄ , 5% CO ₂ and 6% O ₂ gas mixture
Weather conditions:	Mild	3)	CH ₄ = methane; CO ₂ = carbon dioxide; CO = carbon monoxide; O ₂ = oxygen; H ₂ S = hydrogen sulphide
Ambient air temp (°C):	19		

BH ID	Time (24hr)	Pipe dia (mm)	GW depth (mbgl)	Depth to pipe base (mbgl)
WS08	10:37:52	50	Dry	1.60

Time (s)	CH ₄ (%)	CO ₂ (%)	O ₂ (%)	CO (ppm)	H ₂ S (ppm)	PID (ppm)
0	0.0	0.1	20.8	0	0	2.0
15	0.0	0.4	20.7	1	0	2.0
30	0.0	0.4	20.6	1	0	2.3
45	0.0	0.4	20.5	0	0	2.2
60	0.0	0.4	20.5	0	0	2.0
75	0.0	0.4	20.5	0	0	1.6
90	0.0	0.4	20.5	0	0	1.4
105	0.0	0.4	20.5	0	0	1.1
120	0.0	0.4	20.5	0	0	0.8
135	0.0	0.4	20.5	0	0	0.5
150	0.0	0.4	20.5	0	0	0.3
165	0.0	0.4	20.5	0	0	0.2
180	0.0	0.4	20.5	0	0	0.1
195	0.0	0.4	20.5	0	0	0.1

Max CH ₄ (%)	0.0
Max CO ₂ (%)	0.4
Min O ₂ (%)	20.5
Max CO (ppm)	1
Max H ₂ S (ppm)	0
Max PID (ppm)	2.3

Flow rate (l/hr)			Relative pressure (mb)
Initial	Mean	Max	
0.0	0.0	0.0	-10.68

Site & Location	Sonning Golf Club (Housing) Duffield Road, Sonning, Reading, Berkshire, RG4 6GJ	Report No: 11043a/CA
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Results of groundwater/gas monitoring

Date:	18/08/2025	Monitoring equipment	
Barometric pressure:		Instrument:	GA5000. No. G505055
a) Trend (24hrs):		Calibration check details:	See note 2 below
b) At start (mB):	Falling 1022	Next calibration date:	May 2025
Recorded by:	CA/ OH	Notes:	
Surface ground conditions:	Dry	1)	Barometric pressure trend and ambient air temperature is recorded from metoffice.gov.uk website on the day of the monitoring visit
Weather conditions:	Mild	2)	Calibration check is performed at start of monitoring against ambient air and also periodically with a 5% CH ₄ , 5% CO ₂ and 6% O ₂ gas mixture
Ambient air temp (°C):	19	3)	CH ₄ = methane; CO ₂ = carbon dioxide; CO = carbon monoxide; O ₂ = oxygen; H ₂ S = hydrogen sulphide

BH ID	Time (24hr)	Pipe dia (mm)	GW depth (mbgl)	Depth to pipe base (mbgl)
WS10	10:57:44	50	Dry	1.65

Time (s)	CH ₄ (%)	CO ₂ (%)	O ₂ (%)	CO (ppm)	H ₂ S (ppm)	PID (ppm)
0	0.0	0.1	20.9	0	0	1.6
15	0.0	0.5	20.7	0	0	1.6
30	0.0	0.5	20.6	0	0	2.3
45	0.0	0.5	20.5	0	0	2.2
60	0.0	0.5	20.5	0	0	2.1
75	0.0	0.5	20.5	0	0	1.9
90	0.0	0.5	20.5	0	0	1.6
105	0.0	0.5	20.5	0	0	1.3
120	0.0	0.5	20.5	0	0	1.0
135	0.0	0.5	20.6	0	0	0.7
150	0.0	0.5	20.6	0	0	0.5
165	0.0	0.5	20.6	0	0	0.4
180	0.0	0.5	20.6	0	0	0.3
195	0.0	0.5	20.6	0	0	0.2

Max CH ₄ (%)	0.0
Max CO ₂ (%)	0.5
Min O ₂ (%)	20.5
Max CO (ppm)	0
Max H ₂ S (ppm)	0
Max PID (ppm)	2.3

Flow rate (l/hr)			Relative pressure (mb)
Initial	Mean	Max	
-0.1	-0.1	0.0	-10.77

Site & Location	Sonning Golf Club (Housing) Duffield Road, Sonning, Reading, Berkshire, RG4 6GJ	Report No: 11043a/CA
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Results of groundwater/gas monitoring

Date:	18/08/2025	Monitoring equipment	Instrument: GA5000. No. G505055 Calibration check details: See note 2 below Next calibration date: May 2025
Barometric pressure: a) Trend (24hrs): b) At start (mB):	Falling 1022	Notes:	
Recorded by:		1)	Barometric pressure trend and ambient air temperature is recorded from metoffice.gov.uk website on the day of the monitoring visit
Surface ground conditions:	CA/ OH	2)	Calibration check is performed at start of monitoring against ambient air and also periodically with a 5% CH ₄ , 5% CO ₂ and 6% O ₂ gas mixture
Weather conditions:		3)	CH ₄ = methane; CO ₂ = carbon dioxide; CO = carbon monoxide; O ₂ = oxygen; H ₂ S = hydrogen sulphide
Ambient air temp (°C):	Dry Mild 19		

BH ID	Time (24hr)	Pipe dia (mm)	GW depth (mbgl)	Depth to pipe base (mbgl)
WS12	11:06:05	50	Dry	0.77

Time (s)	CH ₄ (%)	CO ₂ (%)	O ₂ (%)	CO (ppm)	H ₂ S (ppm)	PID (ppm)
0	0.0	0.1	21.0	0	0	0.4
15	0.0	0.2	21.0	0	0	0.4
30	0.0	0.2	20.8	0	0	0.3
45	0.0	0.3	20.8	0	0	0.3
60	0.0	0.3	20.8	0	0	0.2
75	0.0	0.2	20.8	0	0	0.2
90	0.0	0.2	20.8	0	0	0.2
105	0.0	0.2	20.8	0	0	0.2
120	0.0	0.2	20.8	0	0	0.1
135	0.0	0.2	20.8	0	0	0.1
150	0.0	0.2	20.8	0	0	0.1
165	0.0	0.2	20.8	0	0	0.1
180	0.0	0.2	20.8	0	0	0.1
195	0.0	0.2	20.8	0	0	0.1

Max CH ₄ (%)	0.0
Max CO ₂ (%)	0.3
Min O ₂ (%)	20.8
Max CO (ppm)	0
Max H ₂ S (ppm)	0
Max PID (ppm)	0.4

Flow rate (l/hr)			Relative pressure (mb)
Initial	Mean	Max	
0.0	0.0	0.0	-0.10

Site & Location	Sonning Golf Club (Housing) Duffield Road, Sonning, Reading, Berkshire, RG4 6GJ	Report No: 11043a/CA
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Results of groundwater/gas monitoring

Date:	18/08/2025	<u>Monitoring equipment</u>	GA5000. No. G505055
Barometric pressure:	Falling 1022	Instrument:	See note 2 below
a) Trend (24hrs): b) At start (mB):		Calibration check details:	May 2025
Recorded by:	CA/ OH	Next calibration date:	
Surface ground conditions:	Dry	Notes:	1) Barometric pressure trend and ambient air temperature is recorded from metoffice.gov.uk website on the day of the monitoring visit
Weather conditions:	Mild	2)	Calibration check is performed at start of monitoring against ambient air and also periodically with a 5% CH ₄ , 5% CO ₂ and 6% O ₂ gas mixture
Ambient air temp (°C):	19	3)	CH ₄ = methane; CO ₂ = carbon dioxide; CO = carbon monoxide; O ₂ = oxygen; H ₂ S = hydrogen sulphide

BH ID	Time (24hr)	Pipe dia (mm)	GW depth (mbgl)	Depth to pipe base (mbgl)
WS14	11:22:56	50	Dry	0.90

Time (s)	CH ₄ (%)	CO ₂ (%)	O ₂ (%)	CO (ppm)	H ₂ S (ppm)	PID (ppm)
0	0.0	0.0	21.1	0	0	0.5
15	0.0	0.3	21.0	0	0	0.5
30	0.0	0.3	20.8	0	0	0.4
45	0.0	0.3	20.8	0	0	0.4
60	0.0	0.3	20.8	0	0	0.3
75	0.0	0.3	20.8	0	0	0.2
90	0.0	0.3	20.8	0	0	0.2
105	0.0	0.3	20.8	0	0	0.2
120	0.0	0.3	20.8	0	0	0.2
135	0.0	0.3	20.8	0	0	0.1
150	0.0	0.3	20.8	0	0	0.1
165	0.0	0.3	20.8	0	0	0.1
180	0.0	0.3	20.8	0	0	0.1
195	0.0	0.3	20.8	0	0	0.1

Max CH ₄ (%)	0.0
Max CO ₂ (%)	0.3
Min O ₂ (%)	20.8
Max CO (ppm)	0
Max H ₂ S (ppm)	0
Max PID (ppm)	0.5

Flow rate (l/hr)			Relative pressure (mb)
Initial	Mean	Max	
-0.1	-0.1	0.0	10.08