



MOORHILL, MOORHILL ROAD, WEST END

FLOOD RISK ASSESSMENT &
DRAINAGE STRATEGY

October 2022

Highwood Homes Limited

RESIDENTIAL
MOORHILL CARE HOME
MOORHILL ROAD, WEST END

FLOOD RISK ASSESSMENT & DRAINAGE STRATEGY

CONTROLLED DOCUMENT

<i>Document No:</i>	024.5050/FRADS/2	
<i>Status:</i>	Original	
	<i>Name</i>	<i>Date</i>
<i>Prepared by:</i>	Oliver Terry	October 2022
<i>Checked by:</i>	Nadine Hassan	October 2022
<i>Approved by:</i>	Adam Shephard	October 2022

Revision Record

<i>Rev.</i>	<i>Date</i>	<i>By</i>	<i>Summary of Changes</i>	<i>Aprvd</i>
2	13.10.2022	EA	Access road and parking areas drainage updated	NH

Disclaimer

This document has been prepared in accordance with the scope of Paul Basham Associates Ltd's appointment with its client and is subject to the terms of that appointment. It is addressed to and for the sole use and reliance of Paul Basham Associates clients. Paul Basham Associates accepts no liability for any use of this document other than by its client and only for the purposes, stated in the document, for which it was prepared and provided. No person other than the client may copy (in whole or in part), use or rely on the contents of this document, without the prior written permission of a Director of Paul Basham Associates. Any advice, opinions, or recommendations within this document should be read and relied upon only in the context of the document as a whole. The contents of this document are not to be construed as providing legal, business or tax advice or opinion.

© Paul Basham Associates Limited 2022



Highwood Homes
The Hay Barn,
Upper Ashfield Farm,
Hoe Lane,
Romsey,
Hampshire,
SO51 9NJ

Paul Basham Associates Ltd
The Bothy,
Cams Hall Estate,
Fareham,
Hampshire,
PO16 8UT

**RESIDENTIAL
MOORHILL CARE HOME
MOORHILL ROAD, WEST END**

FLOOD RISK ASSESSMENT & DRAINAGE STRATEGY

Contents

1.	INTRODUCTION	2
2.	SITE DETAILS	2
3.	SITE GEOLOGY	3
4.	TOPOGRAPHY	4
5.	EXISTING DRAINAGE	4
6.	FLOOD RISK	5
7.	DRAINAGE STRATEGY	9
8.	SUMMARY AND CONCLUSION	11

Figures

Figure 1: Site Location Plan	2
Figure 2: BGS bedrock mapping	3
Figure 3: Flood Zone mapping	5
Figure 4: Long term flood risk from rivers and seas	6
Figure 5: Long term flood risk from reservoirs	6
Figure 6: Long term flood risk from surface water	7

Tables

Table 1: Soakage test results	4
Table 2: Flood risk vulnerability and flood zone compatibility	8

Appendices

Appendix A: BGS Borehole log	
Appendix B: Omnia Consulting Site Investigation Report	
Appendix C: Topographical Survey	
Appendix D: Southern Water sewer mapping	
Appendix E: Omnia Phase I – II Geo-environmental Site Assessment	
Appendix F: Drainage strategy drawing	
Appendix G: MicroDrainage Calculations Output	



1. INTRODUCTION

- 1.1 Paul Basham Associates have been appointed by Highwood Homes Limited to carry out a flood risk assessment and produce a drainage strategy in support of a full planning application for a new care home being made to Eastleigh Borough Council (EBC) at 'Moorhill', Moorhill Road, West End (hereafter referred to as 'the site').
- 1.2 The proposed development seeks to provide specialist care accommodation in the form of a new 70-bed care home in attractive, landscaped surroundings.
- 1.3 The site is located contiguous with the existing settlement policy boundaries of West end and the city of Southampton, close to existing shops, services and facilities, with a large catchment population. The site is ideally located for the provision of a new care home to meet local needs.

2. SITE DETAILS

- 2.1 The plot size is approximately 0.72ha and the land is currently a mixture of greenfield and brownfield as a portion of the site was previously used as a material storage yard. The development proposals are for a 70-bed care home, with two areas of open space; one serving as a car park, and the other being a landscaped area. See **Figure 1** for site location.



Figure 1: Site Location Plan

3. SITE GEOLOGY

- 3.1 A review of the British Geological Survey (BGS) mapping indicates that the bedrock geology beneath the site is *“Wittering Formation – Sand, silt, and clay. Sedimentary bedrock formed between 56 and 41.2 million years ago during the Palaeogene period.”* There are also superficial deposits of *“River Terrace Deposits, 9 – Sand and gravel. Sedimentary superficial deposit formed between 2.588 million years ago and the present during the Quaternary period.”* See Figure 2 for the BGS map extract.

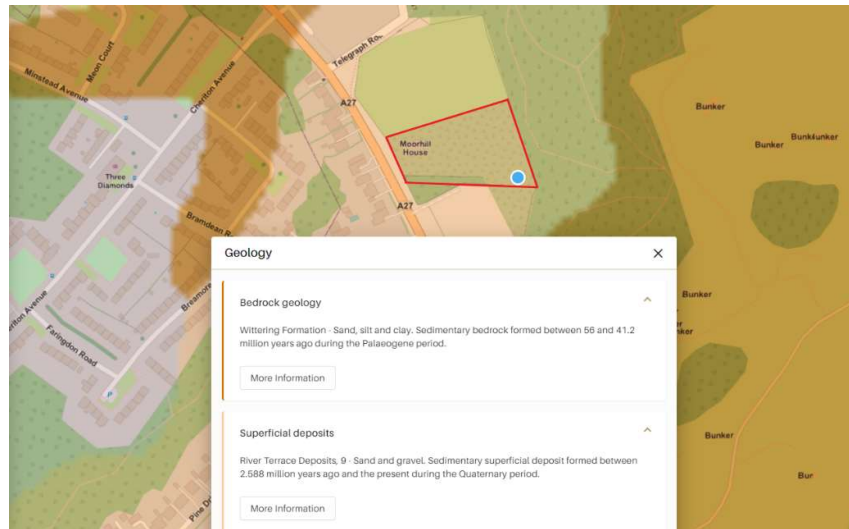


Figure 2: BGS bedrock mapping

- 3.2 There were no public local boreholes in vicinity of the site, the closest available one being 0.57km away. This was borehole SU14SE/40, which was tested on a nearby bedrock of Wittering Formation has a confirmed presence of Gravel, brown and grey sandy clay at and stiff brown and light grey silty clay with some brown sand. The base of the borehole was measured at 4.57m and the base layer was a stiff dark grey sandy clay (0.61m). The BGS borehole log can be found in **Appendix A**.
- 3.3 Site investigations consisting of trial pitting and soakage testing, were undertaken in July 2022 at 4 different locations across the site by Omnia Consulting these show that the bedrock makeup varies across the site. The topsoil is made up of Sand, this was found in Trial Pit 'SA201'. The made ground varied across Trial Pits 'SA202, SA203 & SA204', these varied between Sand, Concrete Crush and Gravel. The river terrace also varied across Trial Pits 'SA201, SA202, SA203 & SA204', consisting of Gravel, Silt and Sand. The Omnia Consulting soakage tests results can be found in **Appendix B**, however the results were unable to be completed due to access issues and therefore additional tests were commissioned.

- 3.4 Omnia Consulting undertook the additional tests, where the second round of tests were undertaken in locations representative of the final positions of the proposed SuDS features. The trial pit locations were 'SA201, SA202, SA203 & SA204'. Three tests were taken at each trial pit location in accordance with BRE365, a summary of the results are shown in the Table 1: Soakage test results **Table 1** below and the full test results are included in **Appendix B**.

Trial Pit No.	Test Infiltration rates (m/s)		
	1	2	3
SA201	7.24E-06	4.34E-06	3.82E-06
SA202	1.71E-05	1.17E-05	1.34E-05
SA203	6.31E-05	7.94E-05	5.99E-05
SA204	8.74E-06	3.59E-06	2.52E-06

Table 1: Soakage test results

4. TOPOGRAPHY

- 4.1 The Topographical survey is included in **Appendix C**. It shows that the site generally slopes from West to East.

5. EXISTING DRAINAGE

Existing Surface Water Drainage

- 5.1 According to the Southern Water sewer mapping, shown in **Appendix D**, the closest surface water drainage connection is Southern Water manhole ref. 0450 located in Haselfoot Gardens, which eventually connects into a main run located along Cheriton Avenue.
- 5.2 The nearest watercourse is 1.3km away from the Eastern boundary of the site. This is not within an accessible distance, and therefore it is assumed that there is no nearby watercourse.

Existing Foul Water Drainage

- 5.3 According to Southern Water sewer mapping, found in **Appendix D**, there is a foul sewer running in a northerly direction just outside of the Western boundary of the site along Moorhill Road. The nearest manhole to the site is Southern Water manhole ref. 0501, which has a Cover Level of 81.19, but does not have an Invert Level shown on record. An Invert Level of 77.93m has been calculated for this manhole, by extrapolating the gradient between the existing Southern Water manholes ref. 0404 (Invert level: 78.72m) and 9602 (Invert level: 76.58m).



6. FLOOD RISK

Fluvial/tidal flooding

- 6.1 Flood mapping obtained from the government's 'flood map for planning' website has identified that the site falls within Flood Zone 1. Meaning there is a less than 0.1% chance of flooding in any year. This can be seen in **Figure 3**.

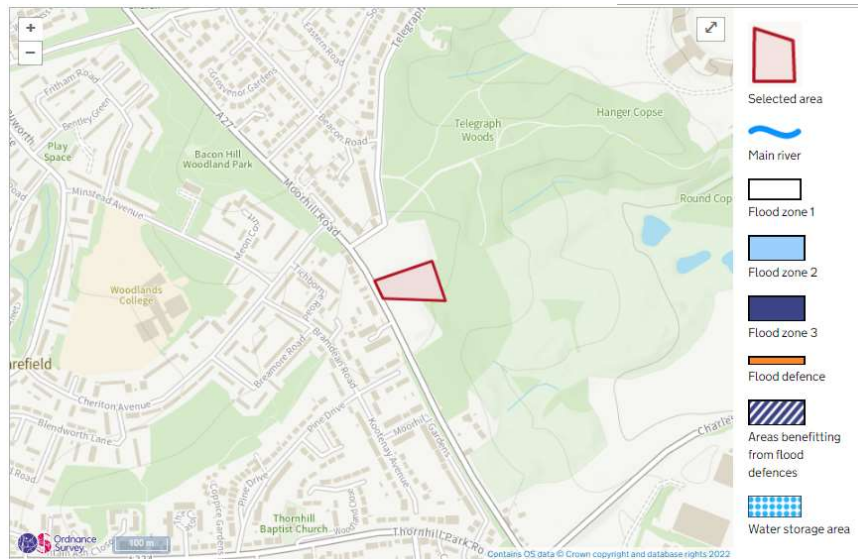


Figure 3: Flood Zone map

Long term flood risk from rivers and seas

- 6.2 The long-term flood risk and from rivers and seas mapping is shown in **Figure 4** and indicates that the site is considered to be at low risk of flooding from rivers or the sea.

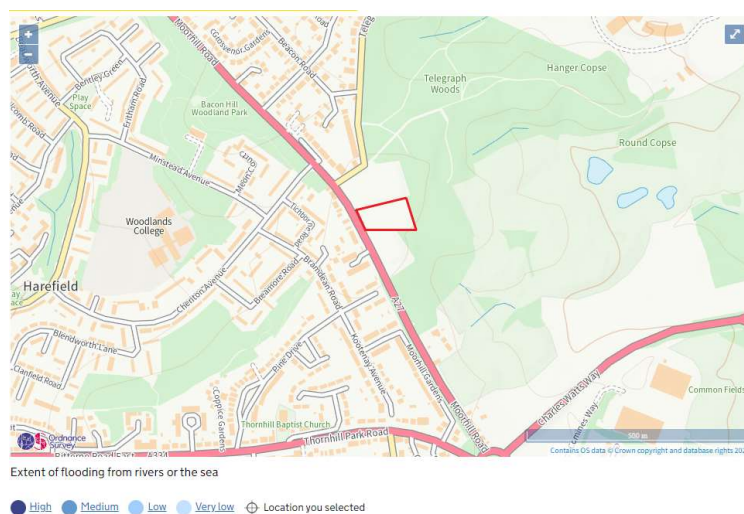


Figure 4: Long-term flood risk from rivers and seas map

Long-term flood risk from reservoirs

- 6.3 The long-term flood risk from reservoirs is shown in **Figure 5** this indicates that the site is considered to be at low risk of flooding from reservoirs..

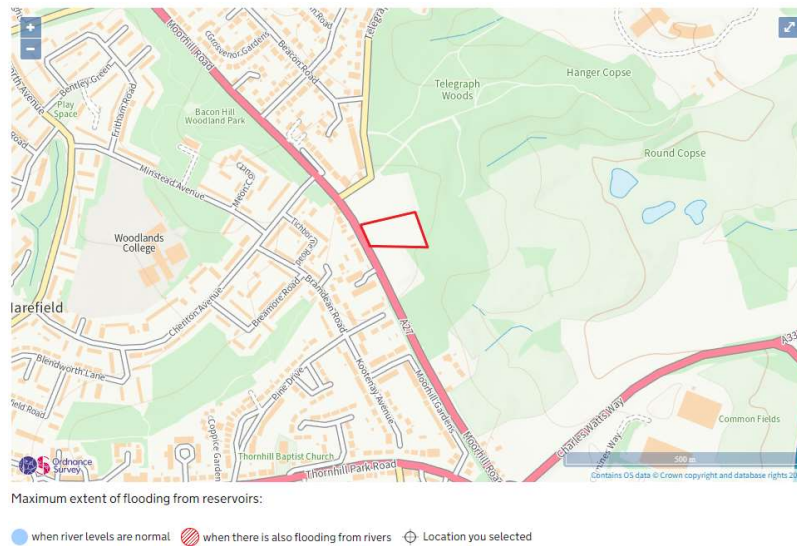


Figure 5: Long term flood risk from reservoirs map

Long-term surface water flood risk

- 6.4 Surface water or 'pluvial' flooding results from rainfall running over ground before eventually entering a watercourse or sewer. It is usually associated with high intensity rainfall events but can also occur with lower intensity rainfall or melting snow where the ground is already saturated, frozen, developed (for example in an urban setting), or otherwise has low permeability.
- 6.5 The surface water flood risk map is shown in **Figure 6** and indicates that the site has a small portion of land located towards the south east corner of the site, considered to be at high risk of flooding from surface water. This means that the chance of flooding is greater than 3.3% each year.

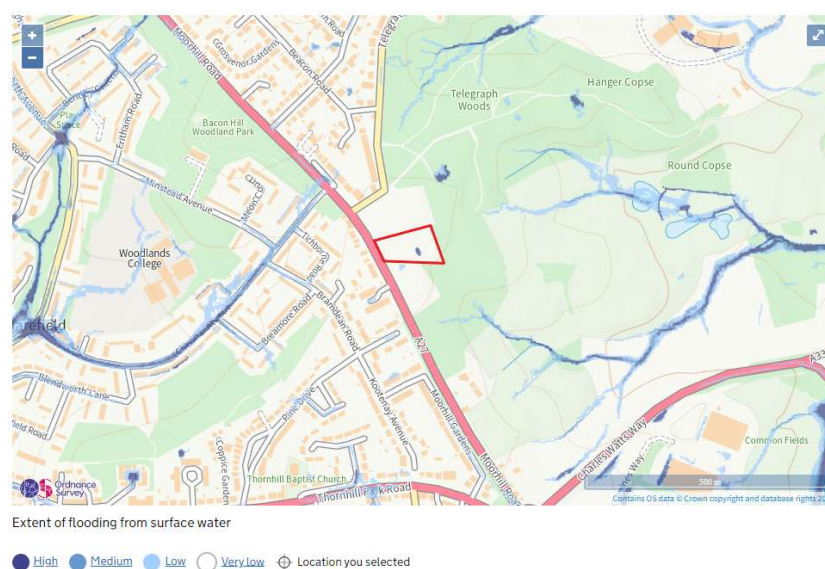


Figure 6: Long term flood risk from surface water

National Planning Policy Framework (NPPF)

6.6 This report has been prepared considering the National Planning Policy Framework (NPPF) Technical Guidance and the Environment Agency's (EA) flood risk standing advice.

6.7 Table 3 from the NPPF Technical Guidance has been included within **Figure 7** below. This provides the classes of development (based on flood risk vulnerability) that are permitted within each of the flood zones. The Flood Risk Vulnerability Classification for the site is 'More Vulnerable' as it is a housing development, which is defined in Table 2 of the Planning Practice Guidance. Based on this, the development is appropriate as it passes the Sequential Test and no Exception Test is required.

Flood Zones	Essential infrastructure	Highly vulnerable	More vulnerable	Less vulnerable	Water compatible
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	Exception Test required	✓	✓	✓
Zone 3a †	Exception Test required †	X	Exception Test required	✓	✓
Zone 3b *	Exception Test required *	X	X	X	✓*

Table 2 - Flood risk vulnerability and flood zone 'compatibility'

Key: ✓ Development is appropriate X Development should not be permitted.

Notes to table 3:

- This table does not show the application of the [Sequential Test](#) which should be applied first to guide development to Flood Zone 1, then Zone 2, and then Zone 3; nor does it reflect the need to avoid flood risk from sources other than rivers and the sea;
- The Sequential and [Exception Tests](#) do not need to be applied to [minor developments](#) and changes of use, except for a change of use to a caravan, camping or chalet site, or to a mobile home or park home site;
- Some developments may contain different elements of vulnerability and the highest vulnerability category should be used, unless the development is considered in its component parts.

† In Flood Zone 3a essential infrastructure should be designed and constructed to remain operational and safe in times of flood.

* "In Flood Zone 3b (functional floodplain) essential infrastructure that has to be there and has passed the Exception Test, and water-compatible uses, should be designed and constructed to:

- remain operational and safe for users in times of flood;
- result in no net loss of floodplain storage;
- not impede water flows and not increase flood risk elsewhere

Minor development means:

- minor non-residential extensions: industrial/commercial/leisure etc extensions with a footprint less than 250 square metres.
- alterations: development that does not increase the size of buildings e.g. alterations to external appearance.
- householder development: For example; sheds, garages, games rooms etc within the curtilage of the existing dwelling, in addition to physical extensions to the existing dwelling itself. This definition excludes any proposed development that would create a separate dwelling within the curtilage of the existing dwelling e.g. subdivision of houses into flats.

Figure 7: NPPF Planning Practice Guidance Table – Flood Risk Vulnerability and Flood Zone Compatibility

Groundwater Flooding

- 6.8 Groundwater flooding occurs when groundwater levels increase sufficiently for the water table to intersect the ground surface. Groundwater flooding can occur in a variety of geological settings including valleys and in areas underlain by chalk, and in river valleys with thick deposits of alluvium and river gravels.
- 6.9 The ground water flooding risk for the site is expected to be low based on the results found in the Phase I – II Geo-Environmental Site Assessment that was carried out by Omnia Consulting. Groundwater monitoring wells were installed as part of the assessment and found the presence of groundwater about 2.6mbgl to the west of the site. The full report can be found in **Appendix E**.

7. DRAINAGE STRATEGY

Potential Surface Water Drainage Strategy

- 7.1 In line with the Building Regulations Part H3, surface water shall discharge to one of the following, listed in order of priority:
- An adequate infiltration system: or, where not reasonably practicable,
 - A watercourse; or, where not reasonably practicable,
 - A sewer.
- 7.2 The surface water drainage strategy proposes the runoff from the building roof shall drain via infiltration through basins 1 and 2 located in the north east, and south east corners of the site. The roof run-off that is being taken into the Southern Basin will flow via lined rain gardens located in the landscaped areas around the South east corner of the building. Meanwhile, runoff from the carparks and a portion of the building will drain via infiltration crates installed below the carparks.
- 7.3 The car parking areas are proposed to be permeable block paving while the access road shall be finished with permeable asphalt, both will be self-draining. The area of permeable finishing located above the crates in the car park, will drain through the surface and into the infiltration crates.
- 7.4 It is proposed that the building roof shall be split into 3 catchments as shown on the drainage catchment plan in **Appendix F**, and will drain as follows:
- Catchment 1: area of 0.045ha going into the infiltration crates have an area of 126m² x 1.2 depth
 - Catchment 2: area of 0.078ha going into infiltration basin 2. Basin 2 is 1m in depth, with 1:3 side slopes



- Catchment 3: area of 0.027ha going into infiltration basin 1. Basin 1 is 500mm in depth, with 1:3 side slopes.

7.5 A catchpit has been specified upstream of the crates to reduce the build-up of silt in the crates and enable infiltration to also take place at the base of the crates.

7.6 There is a small portion of the site that is at risk of long-term flooding from surface water, located near to the southern boundary, this can be seen in **Figure 6**. To mitigate this, a series of shallow filtration trenches (filter drains) have been specified to drain any surface run off which may pond in this area.

7.7 The bottom of the infiltration crates are at 80.12mAOD, since the groundwater identified at this part of the site was struck at 2.6mbgl (78.4mAOD), there is at least 1m buffer between the top of groundwater level and the bottom of the proposed crates. This will adequately protect the crates from any floatation forces as a result of rising groundwater levels.

MicroDrainage Calculations

7.8 The proposed drainage system has been modelled in MicroDrainage Source Control to simulate the flows for 1 in 1, 1 in 30 and 1 in 100 year storm situations, and ensures that the system does not flood in any of these events, including a 40% allowance for climate change on the 1 in 30 and 1 in 100 storms.

7.9 MicroDrainage calculations show that the half drain time for the infiltration crates in the 1 in 100 year event is more than 1440 minutes. Therefore, 47.88m³ of extra attenuation volume has been provided to account for this. The full output for the calculations can be found in **Appendix G**.

Potential Foul Water Drainage Strategy

7.10 Southern Water sewer mapping (**Appendix D**) shows an existing foul sewer running from south to north along the border of the entrance to the site.

7.11 The proposed drainage run is directed through a Root Protection Area (RPA), therefore a thrust-bore utility trench has been proposed for the sewer to run through. Please refer to the drainage strategy layout in **Appendix F**.



8. SUMMARY AND CONCLUSION

- 8.1 Paul Basham Associates have prepared this FRA and Drainage strategy on behalf of Highwood Homes to support a planning application for the development of a 70-bed care home.
- 8.2 The proposed site falls entirely within flood zone 1 and is considered to have a very low risk of flooding from rivers, seas, and reservoirs. Most of the site is considered to be at very low risk of flooding from surface water, though there is a small, localised area at high risk of flooding near to the southern border. Building FFL and site levels have been raised above this level; however, this area is located within dense vegetation and the topography of the site falls away from the flooding, therefore it is not likely to cause risk to the site.
- 8.3 Ground investigations carried out by Omnia Consulting (**Appendix B**) confirmed that the site's underlying geology consists of Gravel, Silt and Sand. No ground water was encountered up to 1.8m. However, a phase I – II Geo-Environmental Site Assessment was carried out by Omnia consulting and found there to be groundwater present to the west of the site at 2.6mbgl.
- 8.4 BRE365 soakage tests were undertaken at four locations SA201, SA202, SA203 and SA204 (**Appendix B**). Three tests were undertaken at each of these four locations, and an average was calculated for each location, and the most relevant test was used for the drainage designs.
- 8.5 The proposed surface water drainage strategy entirely utilises infiltration components. The building is split into 3 catchments, with 2 of them being taken via on-site infiltration basins, and the final one being taken via the crates located underneath the permeable car park.
- 8.6 The proposed drainage network has been modelled in MicroDrainage Source control to simulate the flows of 1 in 1, 1 in 30 and 1 in 100 year storms and the proposed design ensures that the system does not flood in a 1 in 100 year critical storm event, including a 40% allowance for climate change.
- 8.7 The Foul water from the proposed site shall be drained through a gravity system and discharged into the existing foul network via a proposed manhole connection point at the western boundary of the site.
- 8.8 In light of the above report, It can be concluded that the proposed drainage strategy does not increase the overall flood risk of the site.



Appendix A

107

GEOLOGICAL SURVEY OF GREAT BRITAIN

RECORD OF SHAFT OR BORE FOR MINERALS

(For Survey use only)

6-inch Map Registered No.

Name of Shaft or Bore given by Geological Survey:

S U 41 SE / 40

Name and Number given by owner: No. 84

Nat. Grid Reference

SU 4741 1304

For whom made Min. of Transpt. S.E. R.C.U. Hampshire SubUnit

Town or Village West End County Hampshire

Exact site Attach a tracing from a map, or a sketch-map, if possible.

1" N.S. Map No.	1" O.S. Map No.	Confidential or not
315		

Purpose for which made Road construction

Ground Level at shaft bore relative to O.D. 202.5' If not ground level give O.D. of beginning of shaft bore -

Made by Date of sinking July 1968

Information from Ministry of Transport Report Date received

Examined by

SPECIMEN NUMBERS AND ADDITIONAL NOTES

(For Survey use only)

GEOLOGICAL CLASSIFICATION

DESCRIPTION OF STRATA

THICKNESS

DEPTH

FT.

IN.

FT.

IN.

Topsoil

1

6

1

6

Gravel in a matrix of brown and grey sandy clay

1

6

3

-

Stiff brown and light grey silty clay with some pockets of brown sand

10

-

13

-

Stiff dark grey sandy clay

2

-

15

-

END OF BOREHOLE AT 15'0"

Appendix B

Site Name:	Moorhill, Southampton
Site Reference:	A11641
Test Date:	27/07/2022



Trial Pit Identification:	SA201
Trial Pit Length (m):	2.70
Trial Pit Width (m):	0.70
Trial Pit Depth (m):	1.70
Groundwater Level (m bgl):	N/A

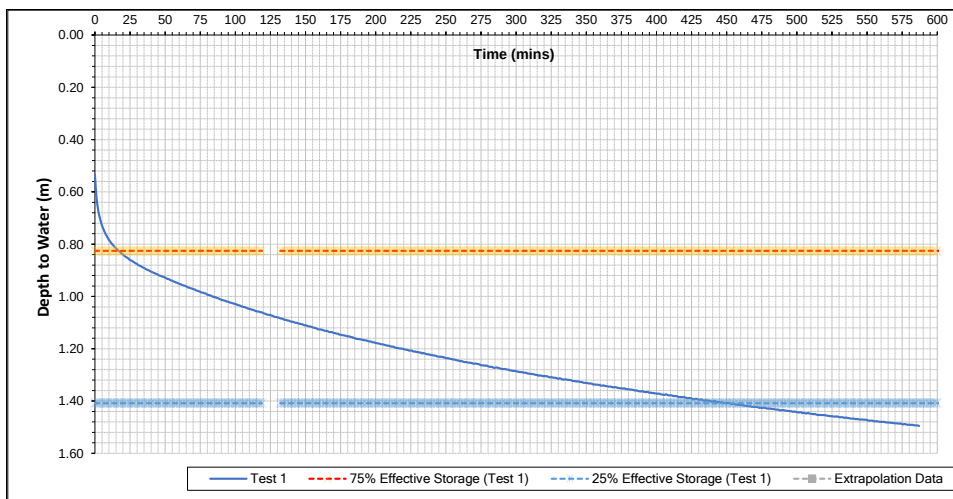
SOIL INFILTRATION RATE TEST
See BRE DG365, Soakaway Design (2016).

Geology Description:
0.00-0.50: Dark brown slightly silty slightly gravelly fine to coarse SAND. Gravel is sub-angular to sub-rounded fine to coarse flint. [TOPSOIL]
0.50-1.10: Orangish brown silty slightly gravelly fine to coarse SAND. Gravel is sub-angular to sub-rounded fine to coarse flint. [RIVER TERRACE]
1.10-1.20: Orange sandy angular to sub-rounded GRAVEL of flint. Sand is coarse. [RIVER TERRACE]
1.20-1.70: Orange clayey sandy sub-angular to sub-rounded fine to coarse GRAVEL of flint. Sand is coarse. [RIVER TERRACE]

Test Parameters	TEST 1	
Effective Storage Depth (m):	Time (min)	Depth (m)
1.17	0.00	0.53
	1.00	0.62
75% Effective Storage Depth (m):	2.00	0.66
0.87	3.00	0.69
	902.00	
(i.e. Depth Below Ground Level) (m):	903.00	
0.83	904.00	
	905.00	
25% Effective Storage Depth (m):	906.00	
0.29	907.00	
	908.00	
(i.e. Depth Below Ground Level) (m):	909.00	
1.41	910.00	
	911.00	
Effective Storage Depth Across 75% - 25% (m):	912.00	
0.58	913.00	
	914.00	
Time to Fall to 75% Effective Depth (min):	915.00	
17	916.00	
	917.00	
Time to Fall to 25% Effective Depth (min):	918.00	
450	919.00	
	920.00	
Vp75%-25% (m3):	921.00	
1.10	922.00	
	923.00	
As50% (m2):	924.00	
5.85	925.00	
	926.00	
Tp75%-25% (mins):	927.00	
433	928.00	

DESIGN SOIL INFILTRATION RATE, f (m/s):	7.24E-06
---	----------

Comments:



Site Engineer:	Date:
TH	27/07/2022

Checked and Approved By:	Date:
OM	03/08/2022

Location
SA201

Site Name:	Moorhill, Southampton
Site Reference:	A11641
Test Date:	27/07/2022

Trial Pit Identification:	SA201
Trial Pit Length (m):	2.70
Trial Pit Width (m):	0.70
Trial Pit Depth (m):	1.70
Groundwater Level (m bgl):	N/A



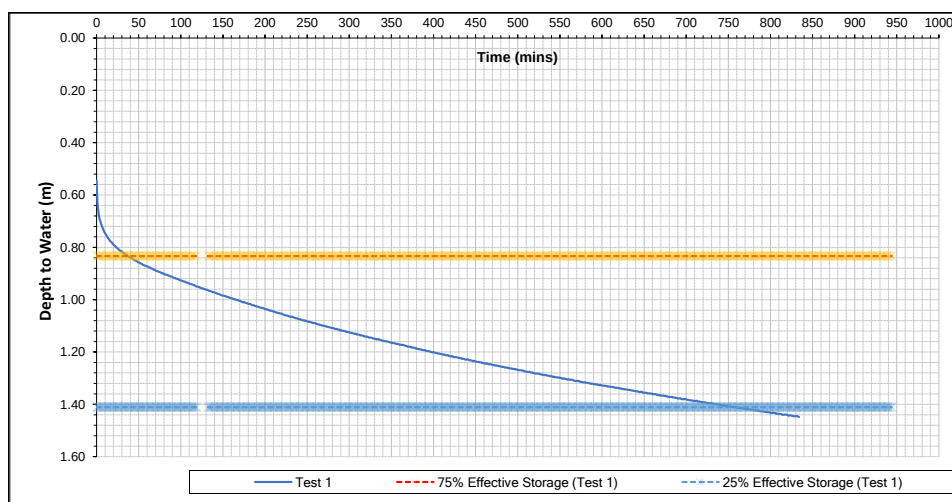
SOIL INFILTRATION RATE TEST
See BRE DG365, Soakaway Design (2016).

Geology Description:
0.00-0.50: Dark brown slightly silty slightly gravelly fine to coarse SAND. Gravel is sub-angular to sub-rounded fine to coarse flint. [TOPSOIL]
0.50-1.10: Orangish brown silty slightly gravelly fine to coarse SAND. Gravel is sub-angular to sub-rounded fine to coarse flint. [RIVER TERRACE]
1.10-1.20: Orange sandy angular to sub-rounded GRAVEL of flint. Sand is coarse. [RIVER TERRACE]
1.20-1.70: Orange clayey sandy sub-angular to sub-rounded fine to coarse GRAVEL of flint. Sand is coarse. [RIVER TERRACE]

Test Parameters	TEST 2	
Effective Storage Depth (m):	Time (min)	Depth (m)
1.16	0.00	0.54
	1.00	0.63
75% Effective Storage Depth (m):	807.00	1.44
0.87	808.00	1.44
	809.00	1.44
(i.e. Depth Below Ground Level) (m):	810.00	1.44
0.83	811.00	1.44
	812.00	1.44
25% Effective Storage Depth (m):	813.00	1.44
0.29	814.00	1.44
	815.00	1.44
(i.e. Depth Below Ground Level) (m):	816.00	1.44
1.41	817.00	1.44
	818.00	1.44
Effective Storage Depth Across 75% - 25% (m):	819.00	1.44
0.58	820.00	1.44
	821.00	1.44
Time to Fall to 75% Effective Depth (min):	822.00	1.44
40.00	823.00	1.44
	824.00	1.44
Time to Fall to 25% Effective Depth (min):	825.00	1.44
760.00	826.00	1.44
	827.00	1.44
Vp75%-25% (m3):	828.00	1.45
1.09	829.00	1.45
	830.00	1.45
As50% (m2):	831.00	1.45
5.82	832.00	1.45
	833.00	1.45
Tp75%-25% (mins):	834.00	1.45
720.00	835.00	1.45
	836.00	1.45

DESIGN SOIL INFILTRATION RATE, f (m/s):	4.34E-06
---	----------

Comments:



Site Engineer:	Date:
TH	26.05.2022

Checked and Approved By:	Date:
OM	03/08/2022

Location
SA201

Site Name:	Moorhill, Southampton
Site Reference:	A11641
Test Date:	27/07/2022

Trial Pit Identification:	SA201
Trial Pit Length (m):	2.70
Trial Pit Width (m):	0.70
Trial Pit Depth (m):	1.70
Groundwater Level (m bgl):	N/A



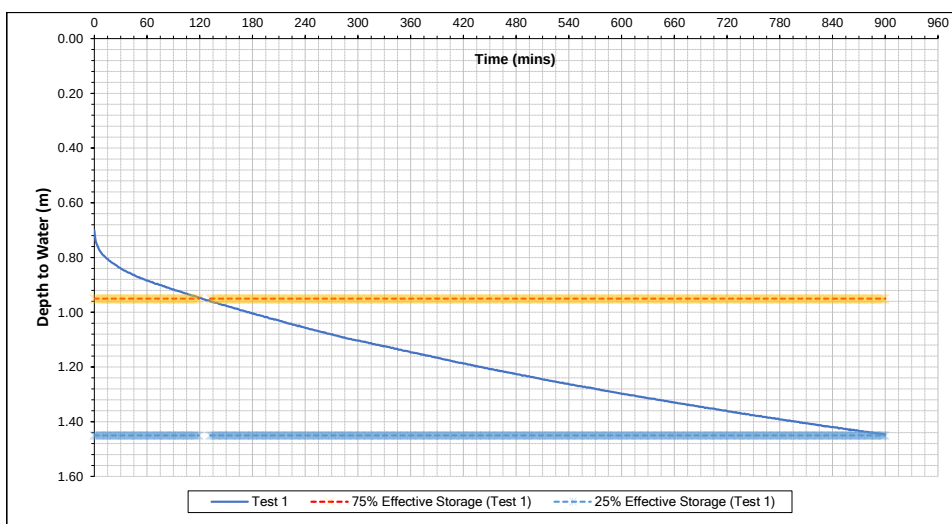
SOIL INFILTRATION RATE TEST
See BRE DG365, Soakaway Design (2016).

Geology Description:
0.00-0.50: Dark brown slightly silty slightly gravelly fine to coarse SAND. Gravel is sub-angular to sub-rounded fine to coarse flint. [TOPSOIL]
0.50-1.10: Orangish brown silty slightly gravelly fine to coarse SAND. Gravel is sub-angular to sub-rounded fine to coarse flint. [RIVER TERRACE]
1.10-1.20: Orange sandy angular to sub-rounded GRAVEL of flint. Sand is coarse. [RIVER TERRACE]
1.20-1.70: Orange clayey sandy sub-angular to sub-rounded fine to coarse GRAVEL of flint. Sand is coarse. [RIVER TERRACE]

Test Parameters	TEST 3	
Effective Storage Depth (m):	Time (min)	Depth (m)
1.00	0.00	0.70
	1.00	0.73
75% Effective Storage Depth (m):	2.00	0.75
0.75		
(i.e. Depth Below Ground Level) (m):		
0.95		
25% Effective Storage Depth (m):		
0.25		
(i.e. Depth Below Ground Level) (m):		
1.45		
Effective Storage Depth Across 75% - 25% (m):		
0.49975		
Time to Fall to 75% Effective Depth (min):		
120		
Time to Fall to 25% Effective Depth (min):		
900		
Vp75%-25% (m3):		
0.94		
As50% (m2):		
5.2883		
Tp75%-25% (mins):		
780		

DESIGN SOIL INFILTRATION RATE, f (m/s):	3.82E-06
---	----------

Comments:



Site Engineer:	Date:
TH	27/07/2022

Checked and Approved By:	Date:
OM	03/08/2022

Location
SA201

Site Name:	Moorhill, Southampton
Site Reference:	A11641
Test Date:	27/07/2022



Trial Pit Identification:	SA202
Trial Pit Length (m):	2.30
Trial Pit Width (m):	0.60
Trial Pit Depth (m):	1.52
Groundwater Level (m bgl):	N/A

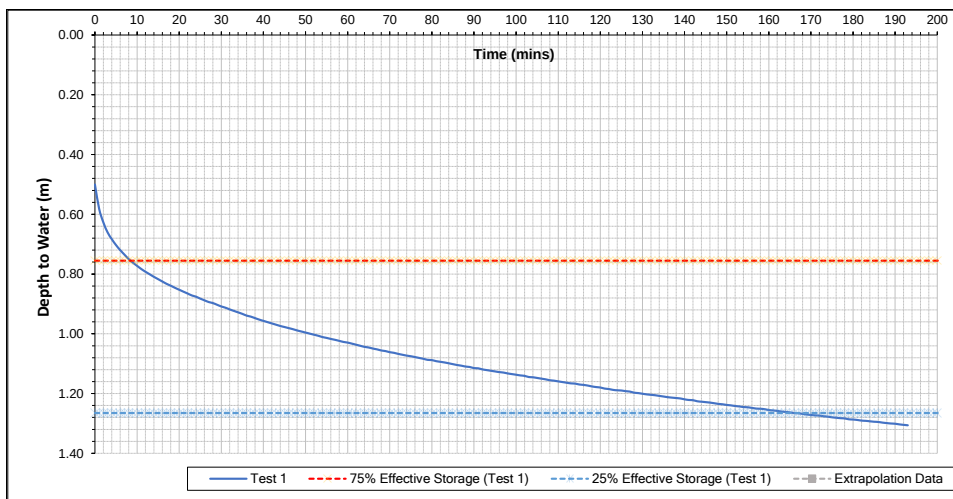
SOIL INFILTRATION RATE TEST
See BRE DG365, Soakaway Design (2016).

Geology Description:
0.00-0.50: Dark brown slightly silty slightly gravelly fine to coarse SAND. Gravel is sub-angular to sub-rounded fine to coarse flint with rare angular coarse brick. [MADE GROUND]
0.50-1.30: Orangish brown and reddish brown silty slightly gravelly fine to coarse SAND. Gravel is sub-angular to sub-rounded fine to coarse flint. [RIVER TERRACE]
1.30-1.60: Mottled red blueish grey and orange sandy SILT. Sand is fine to coarse. [RIVER TERRACE]
1.60-1.70: Orange slightly gravelly fine to coarse SAND. Gravel is sub-angular to sub-rounded fine to medium flint. [RIVER TERRACE]

Test Parameters	TEST 1	
Effective Storage Depth (m):	Time (min)	Depth (m)
1.02	0.00	0.50
	1.00	0.58
75% Effective Storage Depth (m):	2.00	0.63
0.76	3.00	0.66
	4.00	0.68
(i.e. Depth Below Ground Level) (m):	5.00	0.70
0.76	6.00	0.72
	7.00	0.73
25% Effective Storage Depth (m):	8.00	0.75
0.25	9.00	0.76
	10.00	0.77
(i.e. Depth Below Ground Level) (m):	11.00	0.78
1.27	12.00	0.79
	13.00	0.80
Effective Storage Depth Across 75% - 25% (m):	14.00	0.81
0.51	15.00	0.82
	16.00	0.82
Time to Fall to 75% Effective Depth (min):	17.00	0.83
8	18.00	0.84
	19.00	0.85
Time to Fall to 25% Effective Depth (min):	20.00	0.85
166	21.00	0.86
	22.00	0.87
Vp75%-25% (m3):	23.00	0.87
0.70	24.00	0.88
	25.00	0.88
As50% (m2):	26.00	0.89
4.34	27.00	0.89
	28.00	0.90
Tp75%-25% (mins):	29.00	0.90
158	30.00	0.91
	31.00	0.91

DESIGN SOIL INFILTRATION RATE, f (m/s):	1.71E-05
---	----------

Comments:



Site Engineer:	Date:
TH	27/07/2022

Checked and Approved By:	Date:
OM	03/08/2022

Location
SA202

Site Name:	Moorhill, Southampton
Site Reference:	A11641
Test Date:	27/07/2022



Trial Pit Identification:	SA202
Trial Pit Length (m):	2.30
Trial Pit Width (m):	0.60
Trial Pit Depth (m):	1.52
Groundwater Level (m bgl):	N/A

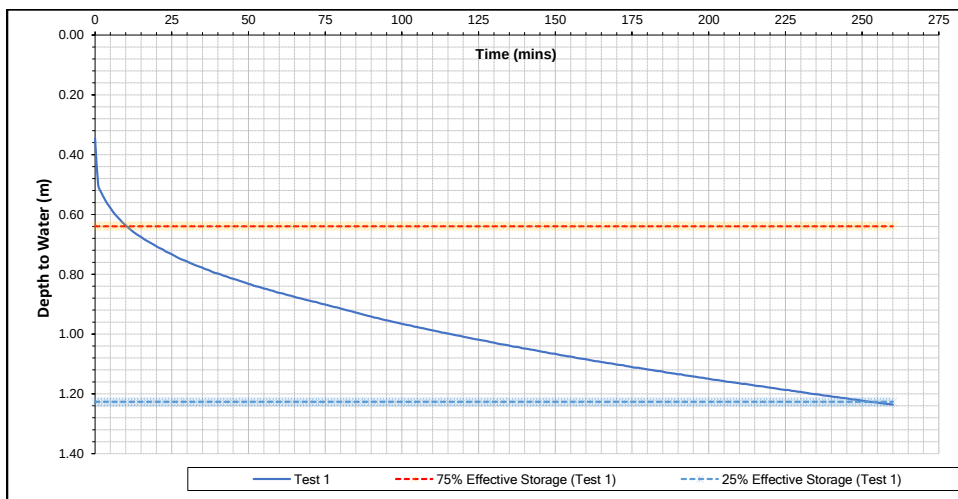
SOIL INFILTRATION RATE TEST
See BRE DG365, Soakaway Design (2016).

Geology Description:
0.00-0.50: Dark brown slightly silty slightly gravelly fine to coarse SAND. Gravel is sub-angular to sub-rounded fine to coarse flint with rare angular coarse brick. [MADE GROUND]
0.50-1.30: Orangish brown and reddish brown silty slightly gravelly fine to coarse SAND. Gravel is sub-angular to sub-rounded fine to coarse flint. [RIVER TERRACE]
1.30-1.60: Mottled red blueish grey and orange sandy SILT. Sand is fine to coarse. [RIVER TERRACE]
1.60-1.70: Orange slightly gravelly fine to coarse SAND. Gravel is sub-angular to sub-rounded fine to medium flint. [RIVER TERRACE]

Test Parameters	TEST 2	
Effective Storage Depth (m):	Time (min)	Depth (m)
1.17	0.00	0.35
	1.00	0.50
75% Effective Storage Depth (m):	2.00	0.53
0.88	3.00	0.55
	4.00	0.56
(i.e. Depth Below Ground Level) (m):	5.00	0.58
0.64	6.00	0.59
	7.00	0.61
25% Effective Storage Depth (m):	8.00	0.62
0.29	9.00	0.63
	10.00	0.64
(i.e. Depth Below Ground Level) (m):	11.00	0.65
1.23	12.00	0.65
	13.00	0.66
Effective Storage Depth Across 75% - 25% (m):	14.00	0.67
0.59	15.00	0.68
	16.00	0.68
Time to Fall to 75% Effective Depth (min):	17.00	0.69
10.00	18.00	0.69
	19.00	0.70
Time to Fall to 25% Effective Depth (min):	20.00	0.71
252.00	21.00	0.71
	22.00	0.72
Vp75%-25% (m3):	23.00	0.72
0.81	24.00	0.73
	25.00	0.73
As50% (m2):	26.00	0.74
4.78	27.00	0.74
	28.00	0.75
Tp75%-25% (mins):	29.00	0.75
242.00	30.00	0.76
	31.00	0.76

DESIGN SOIL INFILTRATION RATE, f (m/s):	1.17E-05
---	----------

Comments:



Site Engineer:	Date:
TH	26.05.2022

Checked and Approved By:	Date:
OM	03/08/2022

Location
SA202

Site Name:	Moorhill, Southampton
Site Reference:	A11641
Test Date:	27/07/2022

Trial Pit Identification:	SA202
Trial Pit Length (m):	2.30
Trial Pit Width (m):	0.60
Trial Pit Depth (m):	1.52
Groundwater Level (m bgl):	N/A



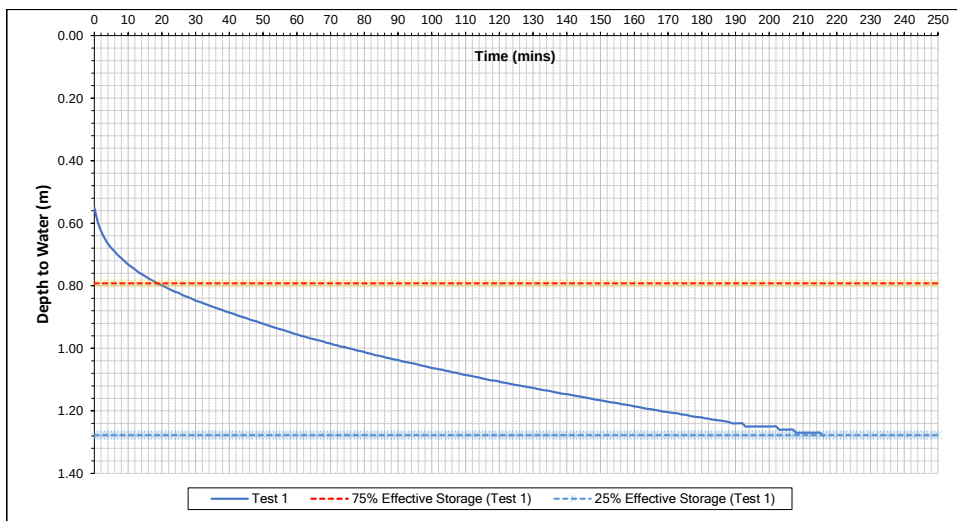
SOIL INFILTRATION RATE TEST
See BRE DG365, Soakaway Design (2016).

Geology Description:
0.00-0.50: Dark brown slightly silty slightly gravelly fine to coarse SAND. Gravel is sub-angular to sub-rounded fine to coarse flint with rare angular coarse brick. [MADE GROUND]
0.50-1.30: Orangish brown and reddish brown silty slightly gravelly fine to coarse SAND. Gravel is sub-angular to sub-rounded fine to coarse flint. [RIVER TERRACE]
1.30-1.60: Mottled red blueish grey and orange sandy SILT. Sand is fine to coarse. [RIVER TERRACE]
1.60-1.70: Orange slightly gravelly fine to coarse SAND. Gravel is sub-angular to sub-rounded fine to medium flint. [RIVER TERRACE]

Test Parameters	TEST 3	
Effective Storage Depth (m):	Time (min)	Depth (m)
0.97	0.00	0.55
	1.00	0.60
75% Effective Storage Depth (m):	2.00	0.62
0.73	3.00	0.65
	4.00	0.67
(i.e. Depth Below Ground Level) (m):	5.00	0.68
0.79	6.00	0.69
	7.00	0.70
25% Effective Storage Depth (m):	8.00	0.71
0.24	9.00	0.72
	10.00	0.73
(i.e. Depth Below Ground Level) (m):	11.00	0.74
1.28	12.00	0.75
	13.00	0.76
Effective Storage Depth Across 75% - 25% (m):	14.00	0.76
0.48515	15.00	0.77
	16.00	0.78
Time to Fall to 75% Effective Depth (min):	17.00	0.78
18	18.00	0.79
	19.00	0.79
Time to Fall to 25% Effective Depth (min):	20.00	0.80
216	21.00	0.80
	22.00	0.81
Vp75%-25% (m3):	23.00	0.81
0.67	24.00	0.82
	25.00	0.82
As50% (m2):	26.00	0.83
4.19387	27.00	0.83
	28.00	0.84
Tp75%-25% (mins):	29.00	0.84
198	30.00	0.85
	31.00	0.85

DESIGN SOIL INFILTRATION RATE, f (m/s):	1.34E-05
---	----------

Comments:



Site Engineer:	Date:
TH	27/07/2022

Checked and Approved By:	Date:
OM	03/08/2022

Location
SA202

Site Name:	Moorhill, Southampton
Site Reference:	A11641
Test Date:	27/07/2022



Trial Pit Identification:	SA203
Trial Pit Length (m):	2.30
Trial Pit Width (m):	0.70
Trial Pit Depth (m):	1.83
Groundwater Level (m bgl):	N/A

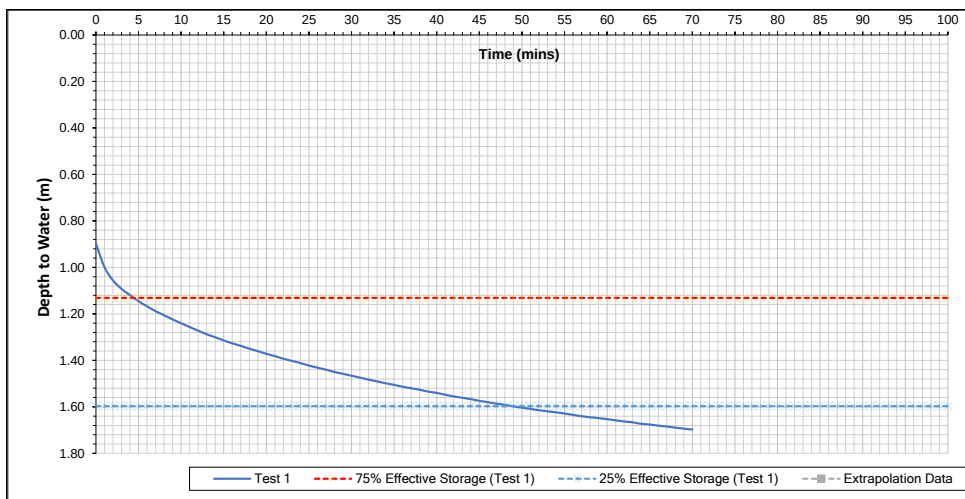
SOIL INFILTRATION RATE TEST
See BRE DG365, Soakaway Design (2016).

Geology Description:
0.00-0.20: Light reddish brown grey type 1 concrete crush. [MADE GROUND]
0.20-0.40: Light reddish brown sandy angular to sub-angular fine to coarse GRAVEL of concrete. Sand is fine to coarse. [MADE GROUND]
0.40-1.80: Orange and dark brown slightly gravelly slightly silty coarse SAND. Gravel is sub-angular to sub-rounded fine to coarse flint. [RIVER TERRACE]

Test Parameters	TEST 1	
Effective Storage Depth (m):	Time (min)	Depth (m)
0.93	0.00	0.90
	1.00	1.00
75% Effective Storage Depth (m):	2.00	1.06
0.70	3.00	1.09
	4.00	1.12
(i.e. Depth Below Ground Level) (m):	5.00	1.15
	6.00	1.17
1.13	7.00	1.19
25% Effective Storage Depth (m):	8.00	1.21
0.23	9.00	1.22
	10.00	1.24
(i.e. Depth Below Ground Level) (m):	11.00	1.26
1.60	12.00	1.27
	13.00	1.29
Effective Storage Depth Across 75% - 25% (m):	14.00	1.30
0.47	15.00	1.31
	16.00	1.33
Time to Fall to 75% Effective Depth (min):	17.00	1.34
4	18.00	1.35
	19.00	1.36
Time to Fall to 25% Effective Depth (min):	20.00	1.37
49	21.00	1.38
	22.00	1.39
Vp75%-25% (m3):	23.00	1.40
0.75	24.00	1.41
	25.00	1.42
As50% (m2):	26.00	1.43
4.41	27.00	1.44
	28.00	1.45
Tp75%-25% (mins):	29.00	1.46
45	30.00	1.47
	31.00	1.47

DESIGN SOIL INFILTRATION RATE, f (m/s):	6.31E-05
---	----------

Comments:



Site Engineer:	Date:
TH	27/07/2022

Checked and Approved By:	Date:
OM	03/08/2022

Location
SA203

Site Name:	Moorhill, Southampton
Site Reference:	A11641
Test Date:	27/07/2022

Trial Pit Identification:	SA203
Trial Pit Length (m):	2.30
Trial Pit Width (m):	0.70
Trial Pit Depth (m):	1.83
Groundwater Level (m bgl):	N/A



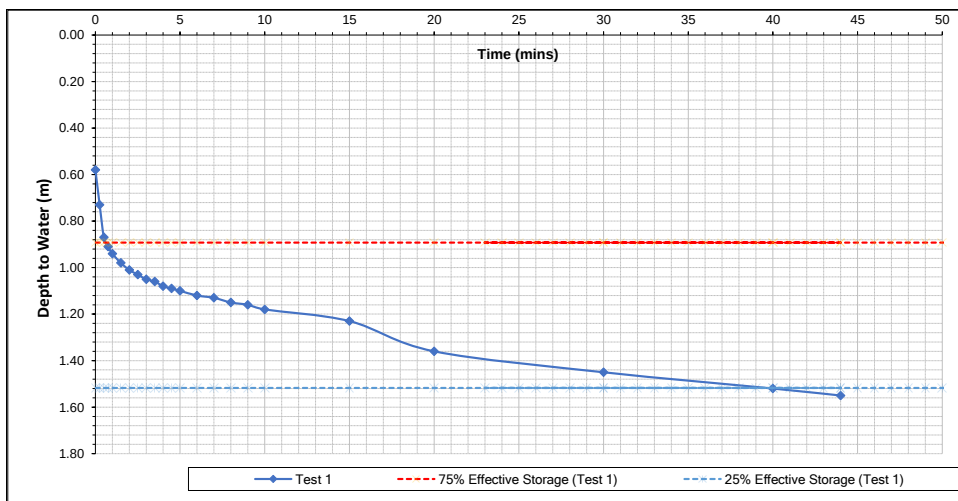
SOIL INFILTRATION RATE TEST
See BRE DG365, Soakaway Design (2016).

Geology Description:
0.00-0.20: Light reddish brown grey type 1 concrete crush. [MADE GROUND]
0.20-0.40: Light reddish brown sandy angular to sub-angular fine to coarse GRAVEL of concrete. Sand is fine to coarse. [MADE GROUND]
0.40-1.80: Orange and dark brown slightly gravelly slightly silty coarse SAND. Gravel is sub-angular to sub-rounded fine to coarse flint. [RIVER TERRACE]

Test Parameters	TEST 2	
Effective Storage Depth (m):	Time (min)	Depth (m)
1.25	0.00	0.58
	0.25	0.73
75% Effective Storage Depth (m):	0.50	0.87
0.94	0.75	0.91
	1.00	0.94
(i.e. Depth Below Ground Level) (m):	1.50	0.98
0.89	2.00	1.01
	2.50	1.03
25% Effective Storage Depth (m):	3.00	1.05
0.31	3.50	1.06
	4.00	1.08
(i.e. Depth Below Ground Level) (m):	4.50	1.09
1.52	5.00	1.10
	6.00	1.12
Effective Storage Depth Across 75% - 25% (m):	7.00	1.13
0.63	8.00	1.15
	9.00	1.16
Time to Fall to 75% Effective Depth (min):	10.00	1.18
0.60	15.00	1.23
	20.00	1.36
Time to Fall to 25% Effective Depth (min):	30.00	1.45
40.00	40.00	1.52
	44.00	1.55
Vp75%-25% (m3):	23.00	
1.01	24.00	
	25.00	
As50% (m2):	26.00	
5.36	27.00	
	28.00	
Tp75%-25% (mins):	29.00	
39.40	30.00	
	31.00	

DESIGN SOIL INFILTRATION RATE, f (m/s):	7.94E-05
---	----------

Comments:



Site Engineer:	Date:
TH	26.05.2022

Checked and Approved By:	Date:
OM	03/08/2022

Location
SA203

Site Name:	Moorhill, Southampton
Site Reference:	A11641
Test Date:	27/07/2022



Trial Pit Identification:	SA203
Trial Pit Length (m):	2.30
Trial Pit Width (m):	0.70
Trial Pit Depth (m):	1.83
Groundwater Level (m bgl):	N/A

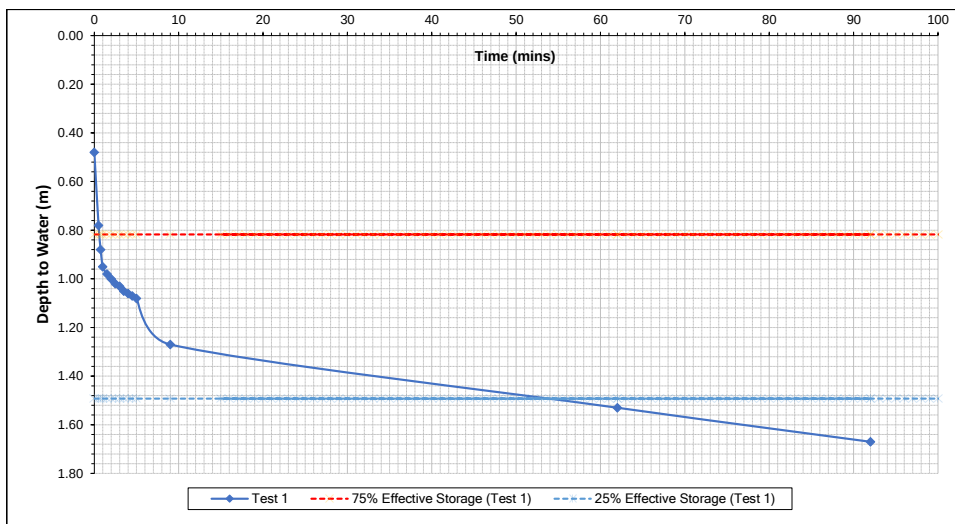
SOIL INFILTRATION RATE TEST
See BRE DG365, Soakaway Design (2016).

Geology Description:
0.00-0.20: Light reddish brown grey type 1 concrete crush. [MADE GROUND]
0.20-0.40: Light reddish brown sandy angular to sub-angular fine to coarse GRAVEL of concrete. Sand is fine to coarse. [MADE GROUND]
0.40-1.80: Orange and dark brown slightly gravelly slightly silty coarse SAND. Gravel is sub-angular to sub-rounded fine to coarse flint. [RIVER TERRACE]

Test Parameters	TEST 3	
Effective Storage Depth (m):	Time (min)	Depth (m)
1.35	0.00	0.48
	0.50	0.78
75% Effective Storage Depth (m):	0.75	0.88
1.01	1.00	0.95
	1.50	0.98
(i.e. Depth Below Ground Level) (m):	2.00	1.00
0.82	2.50	1.02
	3.00	1.03
25% Effective Storage Depth (m):	3.50	1.05
0.34	4.00	1.06
	4.50	1.07
(i.e. Depth Below Ground Level) (m):	5.00	1.08
1.49	9.00	1.27
	62.00	1.53
Effective Storage Depth Across 75% - 25% (m):	92.00	1.67
0.675	15.00	
	16.00	
Time to Fall to 75% Effective Depth (min):	17.00	
0.55	18.00	
	19.00	
Time to Fall to 25% Effective Depth (min):	20.00	
54	21.00	
	22.00	
Vp75%-25% (m3):	23.00	
1.09	24.00	
	25.00	
As50% (m2):	26.00	
5.66	27.00	
	28.00	
Tp75%-25% (mins):	29.00	
53.45	30.00	
	31.00	

DESIGN SOIL INFILTRATION RATE, f (m/s):	5.99E-05
---	----------

Comments:



Site Engineer:	Date:
TH	27/07/2022

Checked and Approved By:	Date:
OM	03/08/2022

Location
SA203

Site Name:	Moorhill, Southampton
Site Reference:	A11641
Test Date:	27/07/2022



Trial Pit Identification:	SA204
Trial Pit Length (m):	2.60
Trial Pit Width (m):	0.80
Trial Pit Depth (m):	1.94
Groundwater Level (m bgl):	N/A

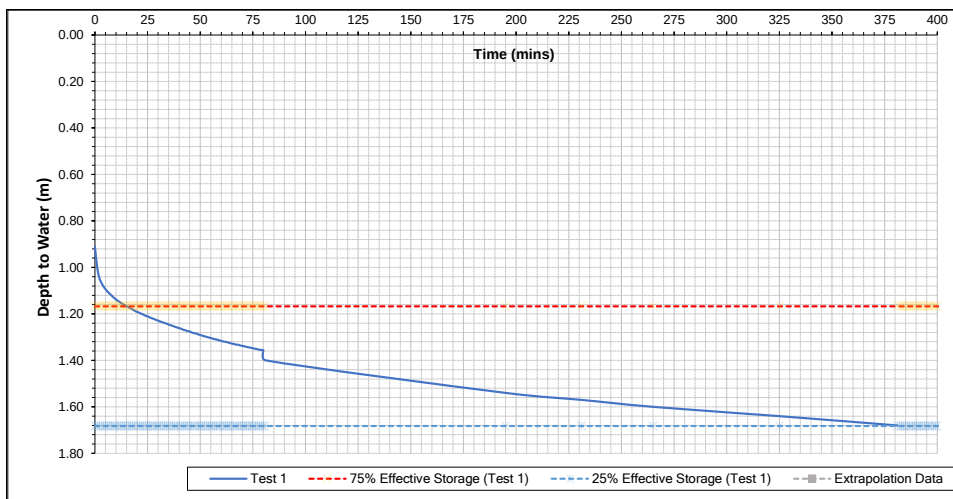
SOIL INFILTRATION RATE TEST
See BRE DG365, Soakaway Design (2016).

Geology Description:
0.00-0.15: Light reddish brown sandy angular to sub-angular fine to coarse GRAVEL of concrete. Sand is fine to coarse. [MADE GROUND]
0.15-0.60: Dark brown sandy angular to sub-angular fine to coarse GRAVEL of flint, slate and rare brick. [MADE GROUND]
0.60-1.30: Orangish brown slightly silty slightly gravelly fine to coarse SAND. Gravel is sub-angular to sub-rounded fine to coarse flint. [RIVER TERRACE]
1.20-1.70: Orangish brown clayey sandy sub-angular to sub-rounded fine to coarse GRAVEL of flint. Sand is coarse. [RIVER TERRACE]

Test Parameters	TEST 1	
Effective Storage Depth (m):	Time (min)	Depth (m)
1.03	0.00	0.91
	1.00	0.99
75% Effective Storage Depth (m):	2.00	1.04
0.77	3.00	1.06
	4.00	1.08
(i.e. Depth Below Ground Level) (m):	5.00	1.09
1.17	6.00	1.10
	7.00	1.11
25% Effective Storage Depth (m):	8.00	1.12
0.26	9.00	1.13
	10.00	1.14
(i.e. Depth Below Ground Level) (m):	11.00	1.14
1.68	12.00	1.15
	13.00	1.16
Effective Storage Depth Across 75% - 25% (m):	14.00	1.16
0.52	15.00	1.17
	16.00	1.17
Time to Fall to 75% Effective Depth (min):	17.00	1.18
15	18.00	1.18
	19.00	1.19
Time to Fall to 25% Effective Depth (min):	20.00	1.19
381	21.00	1.19
	22.00	1.20
Vp75%-25% (m3):	23.00	1.20
1.07	24.00	1.21
	25.00	1.21
As50% (m2):	26.00	1.21
5.58	27.00	1.22
	28.00	1.22
Tp75%-25% (mins):	29.00	1.23
366	30.00	1.23
	31.00	1.23

DESIGN SOIL INFILTRATION RATE, f (m/s):	8.74E-06
---	----------

Comments:



Site Engineer:	Date:
TH	27/07/2022

Checked and Approved By:	Date:
OM	03/08/2022

Location
SA204

Site Name:	Moorhill, Southampton
Site Reference:	A11641
Test Date:	27/07/2022

Trial Pit Identification:	SA204
Trial Pit Length (m):	2.60
Trial Pit Width (m):	0.80
Trial Pit Depth (m):	1.94
Groundwater Level (m bgl):	N/A



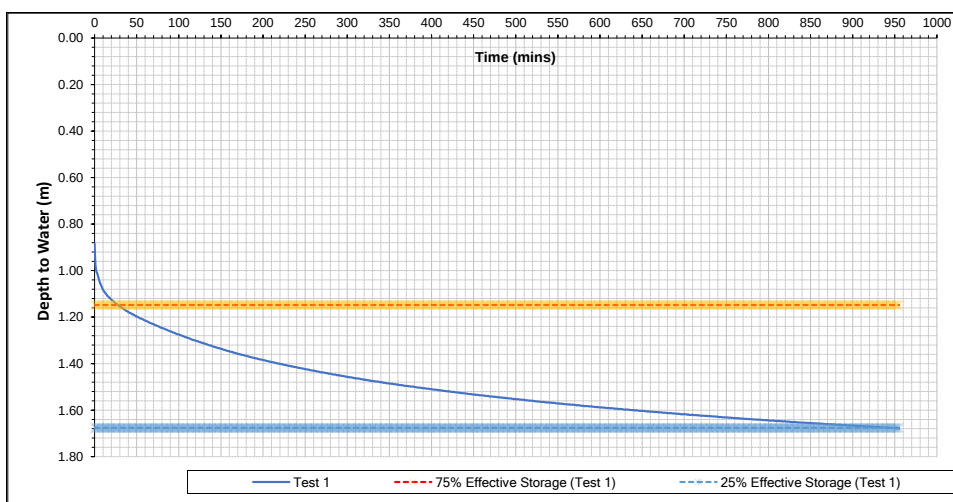
SOIL INFILTRATION RATE TEST
See BRE DG365, Soakaway Design (2016).

Geology Description:
0.00-0.15: Light reddish brown sandy angular to sub-angular fine to coarse GRAVEL of concrete. Sand is fine to coarse. [MADE GROUND]
0.15-0.60: Dark brown sandy angular to sub-angular fine to coarse GRAVEL of flint, slate and rare brick. [MADE GROUND]
0.60-1.30: Orangish brown slightly silty slightly gravelly fine to coarse SAND. Gravel is sub-angular to sub-rounded fine to coarse flint. [RIVER TERRACE]
1.20-1.70: Orangish brown clayey sandy sub-angular to sub-rounded fine to coarse GRAVEL of flint. Sand is coarse. [RIVER TERRACE]

Test Parameters	TEST 2	
Effective Storage Depth (m):	Time (min)	Depth (m)
1.06	0.00	0.88
	1.00	0.97
75% Effective Storage Depth (m):	2.00	1.00
0.79	3.00	1.01
	4.00	1.02
(i.e. Depth Below Ground Level) (m):	5.00	1.04
1.15	6.00	1.05
	7.00	1.06
25% Effective Storage Depth (m):	8.00	1.07
0.26	9.00	1.07
	10.00	1.08
(i.e. Depth Below Ground Level) (m):	11.00	1.09
1.68	12.00	1.09
	13.00	1.10
Effective Storage Depth Across 75% - 25% (m):	14.00	1.10
0.53	15.00	1.11
	16.00	1.11
Time to Fall to 75% Effective Depth (min):	17.00	1.11
30.00	18.00	1.12
	19.00	1.12
Time to Fall to 25% Effective Depth (min):	20.00	1.13
930.00	21.00	1.13
	22.00	1.13
Vp75%-25% (m3):	23.00	1.13
1.10	24.00	1.14
	25.00	1.14
As50% (m2):	26.00	1.14
5.67	27.00	1.15
	28.00	1.15
Tp75%-25% (mins):	29.00	1.15
900.00	30.00	1.15
	31.00	1.16

DESIGN SOIL INFILTRATION RATE, f (m/s):	3.59E-06
---	----------

Comments:



Site Engineer:	Date:
TH	26.05.2022

Checked and Approved By:	Date:
OM	03/08/2022

Location
SA204

Site Name:	Moorhill, Southampton
Site Reference:	A11641
Test Date:	27/07/2022

Trial Pit Identification:	SA204
Trial Pit Length (m):	2.60
Trial Pit Width (m):	0.80
Trial Pit Depth (m):	1.94
Groundwater Level (m bgl):	N/A



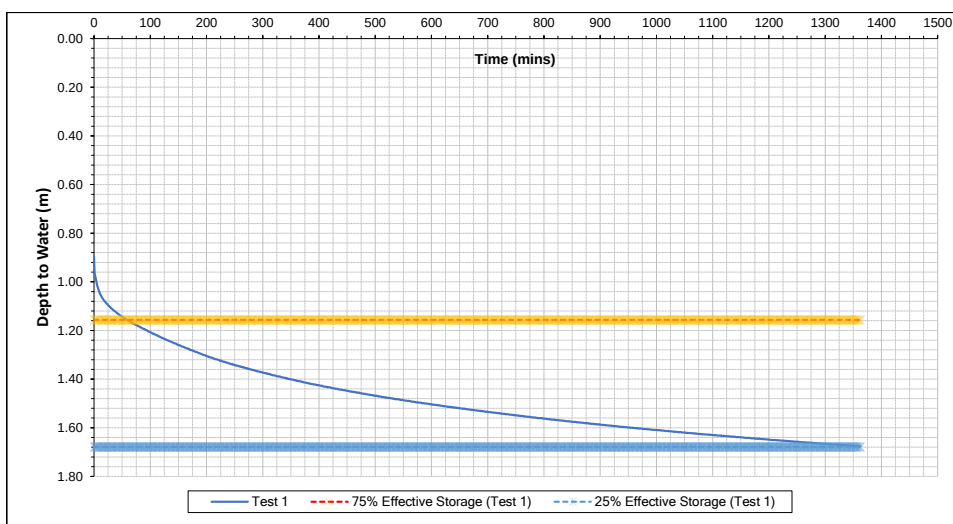
SOIL INFILTRATION RATE TEST
See BRE DG365, Soakaway Design (2016).

Geology Description:
0.00-0.15: Light reddish brown sandy angular to sub-angular fine to coarse GRAVEL of concrete. Sand is fine to coarse. [MADE GROUND]
0.15-0.60: Dark brown sandy angular to sub-angular fine to coarse GRAVEL of flint, slate and rare brick. [MADE GROUND]
0.60-1.30: Orangish brown slightly silty slightly gravelly fine to coarse SAND. Gravel is sub-angular to sub-rounded fine to coarse flint. [RIVER TERRACE]
1.20-1.70: Orangish brown clayey sandy sub-angular to sub-rounded fine to coarse GRAVEL of flint. Sand is coarse. [RIVER TERRACE]

Test Parameters	TEST 3	
Effective Storage Depth (m):	Time (min)	Depth (m)
1.04	0.00	0.90
	1.00	0.96
75% Effective Storage Depth (m):	2.00	0.97
0.78	3.00	0.99
	4.00	1.00
(i.e. Depth Below Ground Level) (m):	5.00	1.01
1.16	6.00	1.02
	7.00	1.02
25% Effective Storage Depth (m):	8.00	1.03
0.26	9.00	1.04
	10.00	1.04
(i.e. Depth Below Ground Level) (m):	11.00	1.05
1.68	12.00	1.05
	13.00	1.06
Effective Storage Depth Across 75% - 25% (m):	14.00	1.06
0.52235	15.00	1.07
	16.00	1.07
Time to Fall to 75% Effective Depth (min):	17.00	1.07
50	18.00	1.08
	19.00	1.08
Time to Fall to 25% Effective Depth (min):	20.00	1.08
1325	21.00	1.09
	22.00	1.09
Vp75%-25% (m3):	23.00	1.09
1.09	24.00	1.09
	25.00	1.10
As50% (m2):	26.00	1.10
5.63198	27.00	1.10
	28.00	1.10
Tp75%-25% (mins):	29.00	1.10
1275	30.00	1.11
	31.00	1.11

DESIGN SOIL INFILTRATION RATE, f (m/s):	2.52E-06
---	----------

Comments:



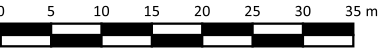
Site Engineer:	Date:
TH	27/07/2022

Checked and Approved By:	Date:
OM	03/08/2022

Location
SA204

Key

- Site Boundary
- Window Sample Locations
- Soakaway Locations
- Hand Pit Location
- DCP Locations



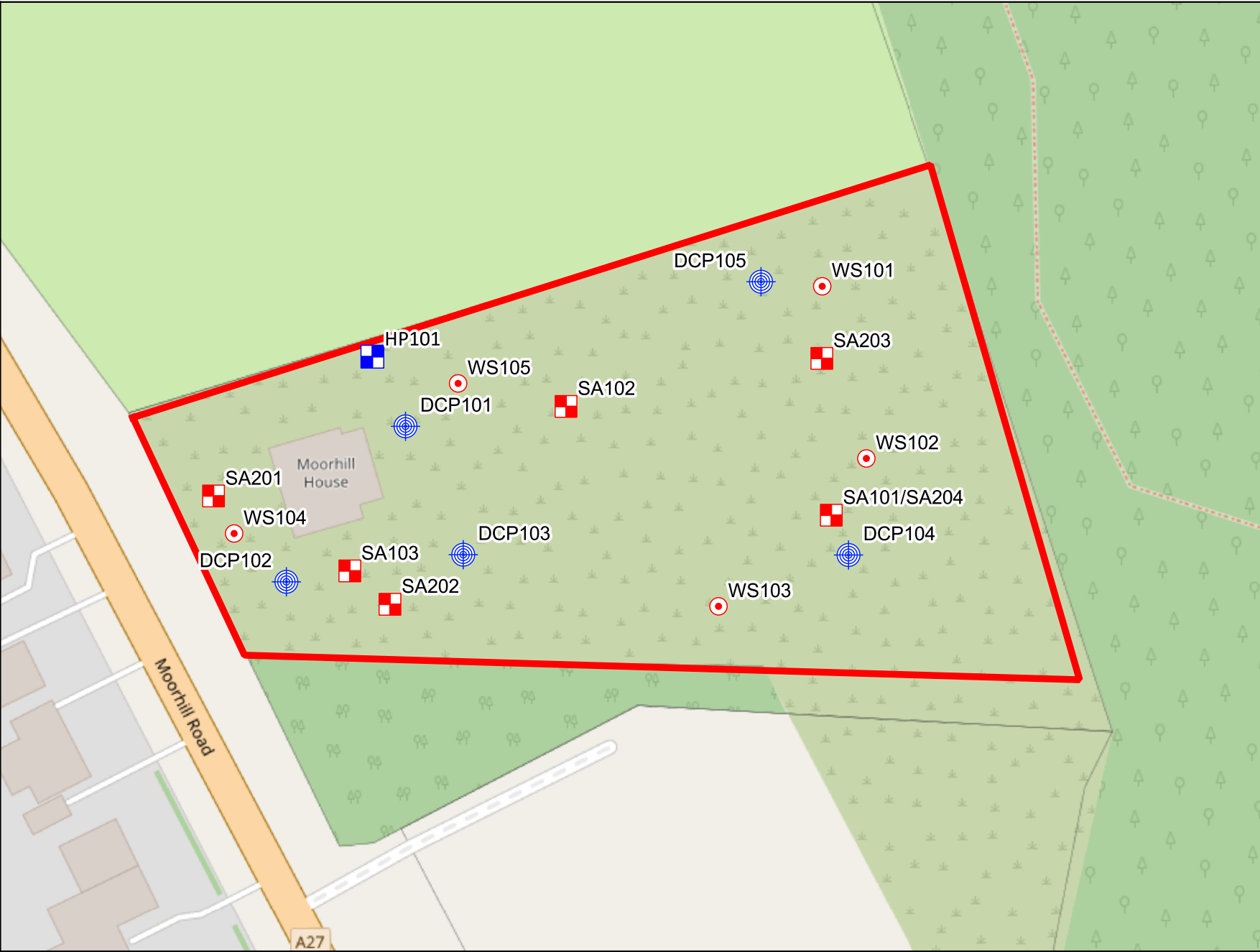
Scale 1:750
Paper Size A4

© OpenStreetMap contributors

The client must not amend any drawing, design or other intellectual property produced by Omnia without permission in writing from Omnia in advance of any amendments being made.

In the event that such written permission is not obtained in advance of the amendments being made Omnia shall not be liable for any damage and/or losses incurred as a result of the amended drawing, design or intellectual property.

Omnia Consulting, 3-6 The Quarterdeck, Port Solent, Portsmouth, Hampshire, PO6 4TP
T: (01489) 808 088
E: info@omnia-consulting.co.uk
W: www.omnia-consulting.co.uk



Job Title:
Moorhill, Southampton

Client:
Highwood

Project Number:
A11641

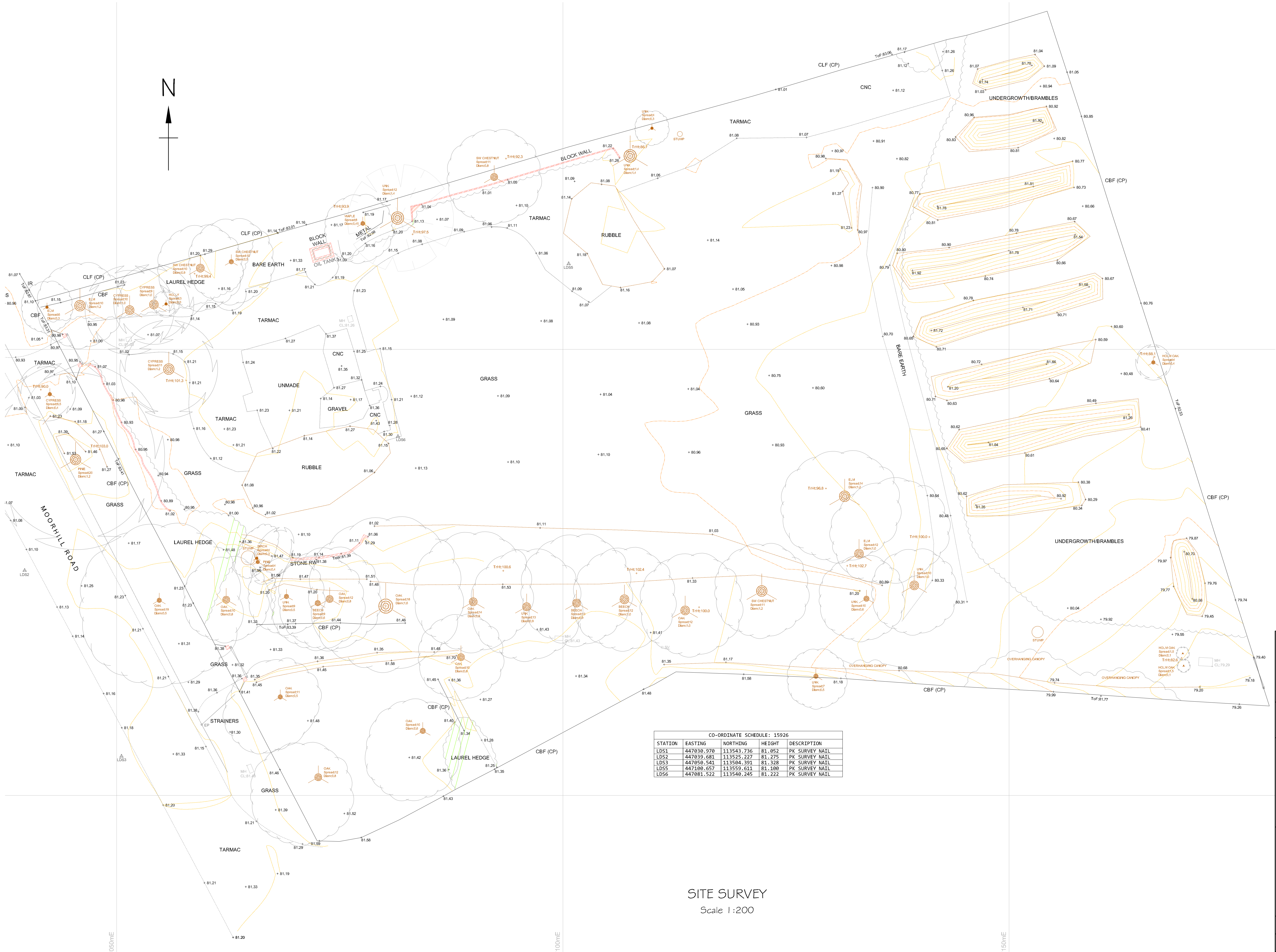
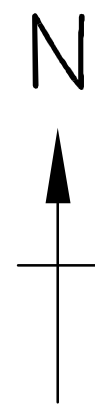
Drawn By:
L. Burnett

Date:
03/08/2022

Authorised By:
O. Maxwell

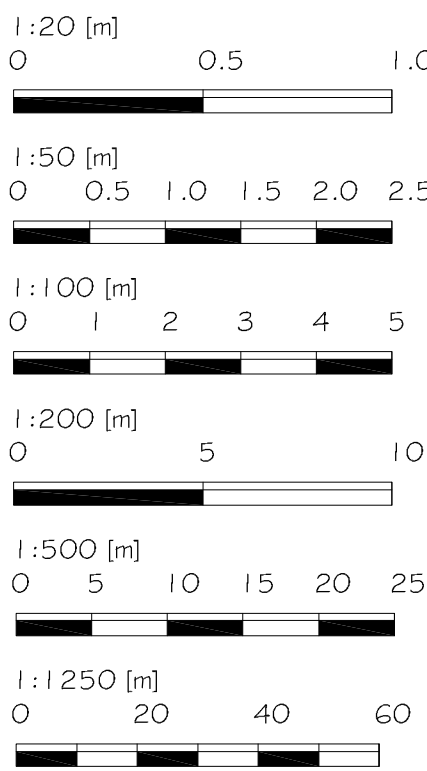
Drawing Title:
Figure 4.0
Intrusive Location Plan

Appendix C



CO-ORDINATE SCHEDULE: 15926				
STATION	EASTING	NORTHING	HEIGHT	DESCRIPTION
LDS1	447030.978	113543.736	81.052	PK SURVEY NAIL
LDS2	447039.681	113525.227	81.275	PK SURVEY NAIL
LDS3	447050.541	113504.391	81.328	PK SURVEY NAIL
LDS5	447100.657	113559.611	81.200	PK SURVEY NAIL
LDS6	447081.522	113540.245	81.222	PK SURVEY NAIL

SITE SURVEY
Scale 1:200



Alex Dawson
www.addraughting.co.uk
alex@addraughting.co.uk
01672 511412
07791 341698



AD DRAUGHTING
ARCHITECTURAL SERVICES

59 Barrow Close
Marlborough
Wiltshire
SN8 2BE

Client

WOOLLEY
& WALLIS

Job Title

REPLACEMENT HOUSE AT:
FIR COTTAGE,
MOORHILL ROAD,
WEST END,
SOUTHAMPTON,
HAMPSHIRE,
SO30 3AY.

Drawing Title

EXISTING TOPOLOGICAL SURVEY

Scale

AS SHOWN

Date

25/03/2020

Drawing No.

933-02-05

Rev

-

Appendix D

Order received: 6 October 2020
Order completed: 13 October 2020

Drainage and water enquiry

Commercial

Order reference: LS/U1541493

Your reference: SF29317036000 EA/M-913252

Search address:

Moorhill Moorhill Road
Southampton
Hampshire
SO30 3AZ

Ordered by:

Searchflow
42 Kings Hill Avenue
West Malling
Kent
ME19 4AJ

For enquiries regarding the information provided in this report, please contact the LandSearch team:

Tel: 0845 270 0212
0330 303 0276 (individual consumers)

Email: searches@southernwater.co.uk

Web: www.southernwater.co.uk

LandSearch
Southern Water Services
Southern House
Capstone Road
Chatham
Kent
ME5 7QA

What you need to know about...

Private sewer transfer

On 1 October 2011, ownership of private sewers and lateral drains changed in accordance with The Water Industry (Schemes for Adoption of Private Sewers) Regulations 2011. The contents of this search may not reflect these changes.

For further information please visit our website: www.southernwater.co.uk/sewer-ownership-changes.

Records searched

The following records were searched in compiling this report: the Map of Public Sewers, the Map of Waterworks, water and sewerage records, the Register of Properties subject to Internal Foul Flooding, the Register of Properties subject to Poor Water Pressure and the Drinking Water Register. Should the property not fall entirely within Southern Water's region, a copy of the records held by the relevant water company was searched.

Competition in the non-household retail market

From April 2017 non-household customers in England can choose their retailer. 'Retail' refers to the way in which customers are billed for their water and sewerage as well as customer services including meter reading.

The 'wholesale' part of the water industry was not opened for competition in April 2017. This means Southern Water continues to look after the pipes and infrastructure for all its customers across Kent, Sussex, Hampshire and the Isle of Wight.

Moving

There can be a lot to do and remember when you're moving. Whether you are moving within our area, moving into our area or moving out of the area please let your retailer know.

Your order summary

Maps

1.1	Where relevant, please include a copy of an extract from the public sewer map.	Map provided
1.2	Where relevant, please include a copy of an extract from the map of waterworks.	Map provided

Drainage

2.1	Does foul water from the property drain to a public sewer?	No
2.2	Does surface water from the property drain to a public sewer?	No
2.3	Is a surface water drainage charge payable?	See answer
2.4	Does the public sewer map indicate any public sewer, disposal main or lateral drain within the boundaries of the property?	No
2.4.1	Does the public sewer map indicate any public pumping station or any other ancillary apparatus within the boundaries of the property?	No
2.5	Does the public sewer map indicate any public sewer within 30.48 metres (100 feet) of any buildings within the property?	No
2.5.1	Does the public sewer map indicate any public pumping station or any other ancillary apparatus within 50 metres of any buildings within the property?	No
2.6	Are any sewers or lateral drains serving, or which are proposed to serve the property, the subject of an existing adoption agreement or an application for such an agreement?	No
2.7	Has any sewerage undertaker approved or been consulted about any plans to erect a building or extension on the property over or in the vicinity of a public sewer, disposal main or drain?	No
2.8	Is the building which is or forms part of the property at risk of internal flooding due to overloaded public sewers?	No
2.9	Please state the distance from the property to the nearest boundary of the nearest sewage treatment works.	See answer

Water

3.1	Is the property connected to mains water supply?	No
3.2	Are there any water mains, resource mains or discharge pipes within the boundaries of the property?	Yes
3.3	Is any water main or service pipe serving, or which is proposed to serve the property, the subject of an existing adoption agreement or an application for such an agreement?	No
3.4	Is the property at risk of receiving low water pressure or flow?	No
3.5	What is the classification of the water supply for the property?	See answer
3.6	Is there a meter installed at this property?	See answer

Charging

4.1.1	Who is responsible for providing the sewerage services for the property?	Southern Water
4.1.2	Who is responsible for providing the water services for the property?	Southern Water
4.2	Who bills the property for sewerage services?	See answer
4.3	Who bills the property for water services?	See answer

Trade effluent information

4.4	Is there a consent on this property to discharge trade effluent under Section 118 of the Water Industry Act (1991) into the public sewerage system?	No
-----	---	----

Maps

Public sewer map

Q. 1.1: Where relevant, please include a copy of an extract from the public sewer map.

A.: A copy of an extract from the public sewer map is provided.

Guidance Notes:

The Water Industry Act 1991 defines public sewers as those which the Company has responsibility for. Other assets and rivers, watercourses, ponds, culverts or highway drains may be shown for information purpose only.

Any private sewers or lateral drains which are indicated on the extract of the public sewer map as being subject to an agreement under Section 104 of the Water Industry Act 1991 are not an "as constructed" record. It is recommended these details be checked with the developer.

Map of waterworks

Q. 1.2: Where relevant, please include a copy of an extract from the map of waterworks.

A.: A copy of an extract of the map of waterworks is provided.

Guidance Notes:

Assets other than vested water mains may be shown on the plan for information only.

The Company is not responsible for private supply pipes connecting the property to the public water main and does not hold details of these. These may pass through land outside of the control of the seller, or may be shared with adjacent properties. The buyer may wish to investigate whether separate rights or easements are needed for their inspection, repair or renewal.

If an extract of the public water main record is enclosed, this will show known public water mains in the vicinity of the property. It should be possible to estimate the likely length and route of any private water supply pipe connecting the property to the public water network.

Drainage

Foul water

Q. 2.1: Does foul water from the property drain to a public sewer?

A.: The Company's records indicate that foul water from the property does not drain to the public sewerage system.

Guidance Notes:

The Company is not responsible for private drains and sewers that connect the property to the public sewerage system and does not hold details of these.

The property owner will normally have sole responsibility for private drains serving the property and may have shared responsibility, with other users, if the property is served by a private sewer which also serves other properties. These may pass through land outside of the control of the seller and the buyer may wish to investigate whether separate rights or easements are needed for their inspection, repair or renewal.

The copy extract will show known public sewers in the vicinity of the property. It should be possible to estimate the likely length and route of any private drains and/or sewers connecting the property to the public sewerage system.

If foul water does not drain to the public sewerage system the property may have private facilities in the form of a cesspit, septic tank or other type of treatment plant.

Surface water

Q. 2.2: Does surface water from the property drain to a public sewer?

A.: The Company's records indicate that surface water from the property does not drain to the public sewerage system. If the property was constructed after 6 April 2015 the surface water drainage may be served by a Sustainable Drainage System. Further information may be available from the developer.

Guidance Notes:

The Company is not responsible for private drains and sewers that connect the property to the public sewerage system and does not hold details of these.

The property owner will normally have sole responsibility for private drains serving the property and may have shared responsibility, with other users, if the property is served by a private sewer which also serves other properties. These may pass through land outside of the control of the seller and the buyer may wish to investigate whether separate rights or easements are needed for their inspection, repair or renewal.

The copy extract will show known public sewers in the vicinity of the property. It should be possible to estimate the likely length and route of any private drains and/or sewers connecting the property to the public sewerage system.

In some cases company records do not distinguish between foul and surface water connections to the public sewerage system. If on inspection the buyer finds that the property is not connected for surface water drainage, the property may be eligible for a rebate of the surface water drainage charge. Details can be obtained from the Company.

If surface water does not drain to the public sewerage system the property may have private facilities in the form of a soakaway or private connection to a watercourse.

Surface water drainage charge

Q. 2.3: Is a surface water drainage charge payable?

A.: Records confirm that a surface water drainage charge is not applicable at this property. If the property was constructed after 6 April 2015 the surface water drainage may be served by a Sustainable Drainage System. Further information may be available from the developer.

Guidance Notes:

Where surface water from a property does not drain to the public sewerage system no surface water drainage charges are applicable.

If on inspection the buyer finds that the property is not connected for surface water drainage, the buyer should contact their retailer.

Public sewers within the boundary of the property

Q. 2.4: Does the public sewer map indicate any public sewer, disposal main or lateral drain within the boundaries of the property?

A.: The public sewer map indicates that there are no public sewers, disposal mains or lateral drains within the boundaries of the property. However, from 1 October 2011 there may be additional public sewers, disposal mains or lateral drains which are not recorded on the public sewer map but which may further prevent or restrict development of the property. It is therefore recommended that investigations are made into the drainage arrangements of the property as the owner may be liable for repairs to the drainage system.

Guidance Notes:

The approximate boundary of the property has been determined by reference to the Ordnance Survey record or the map supplied.

The presence of a public sewer within the boundary of the property may restrict further development within it.

Southern Water Services has a statutory right of access to carry out work on their assets, subject to notice. This may result in employees of Southern Water Services or its contractors needing to enter the property to carry out work.

Please note if the property was constructed after 1 July 2011 any sewers and/or lateral drain within the boundary of the property are the responsibility of the householder.

Public pumping station within the boundary of the property

Q. 2.4.1: Does the public sewer map indicate any public pumping station or any other ancillary apparatus within the boundaries of the property?

A.: The public sewer map included indicates that there is no public pumping station within the boundaries of the property. Any other ancillary apparatus is shown on the public sewer map and referenced on the legend.

Guidance Notes:

The approximate boundary of the property has been determined by reference to the Ordnance Survey record or the map supplied.

The presence of a pumping station within the boundary of the property may restrict further development within it.

Southern Water Services has a statutory right of access to carry out work on their assets, subject to notice. This may result in employees of Southern Water Services or its contractors needing to enter the property to carry out work.

It should be noted that only private pumping stations installed before 1 July 2011 will be transferred into the ownership of Southern Water Services.

Public sewers near to the property

Q. 2.5: Does the public sewer map indicate any public sewer within 30.48 metres (100 feet) of any buildings within the property?

A.: The public sewer map indicates that there are no public sewers within 30.48 metres (100 feet) of a building within the property.

Guidance Notes:

From 1 October 2011 there may be additional lateral drains and/or public sewers which are not recorded on the public sewer map but are also within 30.48 metres (100 feet) of a building within the property.

The presence of a public sewer within 30.48 metres (100 feet) of a building within the property can result in the local authority requiring a property to be connected to the public sewer.

The measure is estimated from the Ordnance Survey record, between a building within the boundary of the property and the nearest public sewer.

Public pumping station near to the property

Q. 2.5.1: Does the public sewer map indicate any public pumping station or any other ancillary apparatus within 50 metres of any buildings within the property?

A.: The public sewer map included indicates that there is no public pumping station within 50 metres of any buildings within the property. Any other ancillary apparatus is shown on the public sewer map and referenced on the legend.

Guidance Notes:

The measure is estimated from the Ordnance Survey record, between a building within the boundary of the property and the nearest pumping station.

It should be noted that only private pumping stations installed before 1 July 2011 will be transferred into the ownership of Southern Water Services.

Public adoption of sewers and lateral drains

Q. 2.6: Are any sewers or lateral drains serving, or which are proposed to serve the property, the subject of an existing adoption agreement or an application for such an agreement?

A.: Records indicate that the sewers serving the development, of which this property forms part, are not the subject of an application for adoption under Section 104 of the Water Industry Act 1991. Where the property is part of an established development it would not normally be subject to an adoption agreement under Section 104 of the Water Industry Act 1991.

Guidance Notes:

This enquiry is of interest to purchasers of new homes who will want to know whether or not the property will be linked to a public sewer.

Where the property is part of a very recent or ongoing development and the sewers are not the subject of an adoption application, buyers should consult with the developer to ascertain the extent of private drains and sewers for which they will hold maintenance and renewal liabilities.

Final adoption is subject to the developer complying with the terms of the adoption agreement under Section 104 of the Water Industry Act 1991.

Any sewers and/or lateral drains within the boundary of the property are not the subject of an adoption agreement and remain the responsibility of the householder. Adoptable sewers are normally those situated in the public highway.

Building over a public sewer, disposal main or drain

Q. 2.7: Has the sewerage undertaker approved or been consulted about any plans to erect a building or extension on the property over or in the vicinity of a public sewer, disposal main or drain?

A.: There are no records in relation to any approval or consultation about any plans to erect a building or extension on the property over or in the vicinity of a public sewer, disposal main or drain. However, the sewerage undertaker might not be aware of a building or extension on the property over or in the vicinity of a public sewer, disposal main or drain.

Guidance Notes:

Buildings or extensions erected over a sewer in contravention of Building Control may have to be removed or altered.

From 1 October 2011 private sewers, disposal mains and lateral drains were transferred into public ownership and the sewerage undertaker may not have approved or been consulted about any plans to erect a building or extension on the property or in the vicinity of these.

Risk of flooding due to overloading public sewers

Q. 2.8: Is the building which is or forms part of the property at risk of internal flooding due to overloaded public sewers?

A.: The building is not recorded as being at risk of internal flooding due to overloaded public sewers. From 1 October 2011 private sewers, disposal mains and lateral drains were transferred into public ownership. It is therefore possible that a building may be at risk of internal flooding due to an overloaded public sewer which the sewerage undertaker is not aware of. For further information it is recommended that enquiries are made of the vendor.

Guidance Notes:

A sewer is "overloaded" when the flow from a storm is unable to pass through it due to a permanent problem (e.g. flat gradient, small diameter). Flooding as a result of temporary problems such as blockages, siltation, collapses and equipment or operational failures are excluded.

"Internal flooding" from the public sewers is defined as flooding, which enters a building or passes below a suspended floor.

For reporting purposes, buildings are restricted to those normally occupied and used for residential, public, commercial, business or industrial purposes.

"At Risk" properties are defined as properties that have suffered or are likely to suffer internal flooding from the public foul, combined or surface water sewers due to overloading of the sewerage system more frequently than the relevant reference period (either once or twice in ten years) as determined by the sewerage undertaker's reporting procedure.

Flooding as a result of storm events proven to be exceptional and beyond the reference period of one in ten years are not included.

Buildings may be at risk of flooding but not identified where flooding incidents have not been reported to the sewerage undertaker.

Public sewers are defined as those for which the sewerage undertaker holds statutory responsibility under the Water Industry Act 1991.

It should be noted that flooding can occur from private sewers and drains which are not the responsibility of the sewerage undertaker. This report excludes flooding from the private sewers and drains and the sewerage undertaker makes no comment upon this matter.

Sewage treatment works

Q. 2.9: Please state the distance from the property to the nearest boundary of the nearest sewage treatment works.

A.: The nearest sewage treatment works is 3.59 kilometres West North West of the property. The name of the sewage treatment works is PORTSWOOD WTW, which is the responsibility of Southern Water Services, Southern House, Yeoman Road, Worthing, West Sussex, BN13 3NX.

Guidance Notes:

The nearest sewage treatment works will not always be the sewage treatment works serving the catchment within which the property is situated.

The sewerage undertaker's records were inspected to determine the nearest sewage treatment works.

It should be noted that there may be a private sewage treatment works closer than the one detailed above that have not been identified.

Water

Connection to mains water supply

Q. 3.1: Is the property connected to mains water supply?

A.: Records indicate that the property is not connected to mains water supply and water is therefore likely to be provided by virtue of a private supply.

Guidance Notes:

The situation should be checked with the current owner of the property.

Details of private supplies are not kept by the water undertaker.

Water mains, resource mains or discharge pipes

Q. 3.2: Are there any water mains, resource mains or discharge pipes within the boundaries of the property?

A.: The map of waterworks indicates that there are water mains, resource mains or discharge pipes within the boundaries of the property.

Guidance Notes:

The boundary of the property has been determined by reference to the Ordnance Survey record or the map supplied.

The presence of a public water main within the boundary of the property may restrict further development within it.

Water undertakers have a statutory right of access to carry out work on their assets, subject to notice. This may result in employees of the water undertaker or its contractors needing to enter the property to carry out work.

Adoption of water mains and services pipes

Q. 3.3: Is any water main or service pipe serving, or which is proposed to serve the property, the subject of an existing adoption agreement or an application for such an agreement?

A.: Records confirm that water mains or service pipes serving the property are not the subject of an existing adoption agreement or an application for such an agreement.

Guidance Notes:

This enquiry is of interest to purchasers of new homes who will want to know whether or not the property will be linked to the mains water supply.

Risk of low water pressure or flow

Q. 3.4: Is the property at risk of receiving low water pressure or flow?

A.: Records confirm that the property is not recorded by the water undertaker as being at risk of receiving low water pressure or flow.

Guidance Notes:

"Low water pressure" means water pressure below the regulatory reference level which is the minimum pressure when demand on the system is not abnormal.

The reference level of service is a flow of 9 litres/minute at a pressure of 10 metres head on the customer's side of the main stop tap (mst). The reference level of service must be applied on the customer's side of a meter or any other company fittings that are on the customer's side of the main stop tap.

The reference level applies to a single property. Where more than one property is served by a common service pipe, the flow assumed in the reference level must be appropriately increased to take account of the total number of properties served.

For two properties, a flow of 18 litres/minute at a pressure of 10 metres head on the customer's side of the mst is appropriate. For three or more properties the appropriate flow should be calculated from the standard loadings provided in BS6700 or Institute of Plumbing handbook.

Water companies include properties receiving pressure below the reference level, provided that allowable exclusions do not apply (i.e. events which can cause pressure to temporarily fall below the reference level). Refer to list below:

Abnormal demand: This exclusion is intended to cover abnormal peaks in demand and not the daily, weekly or monthly peaks in demand which are normally expected. Companies exclude properties which are affected by low pressure only on those days with the highest peak demands. During the year companies may exclude, for each property, up to five days of low pressure caused by peak demand.

Planned maintenance: Companies exclude low pressures caused by planned maintenance. It is not intended that companies identify the number of properties affected in each instance. However, companies must maintain sufficiently accurate records to verify that low pressure incidents that are excluded because of planned maintenance are actually caused by maintenance.

One-off incidents: This exclusion covers a number of causes of low pressure; mains bursts; failures of company equipment (such as PRVs or booster pumps); firefighting; and action by a third party. However, if problems of this type affect a property frequently, they cannot be classed as one-off events and further investigation will be required before they can be excluded.

Low pressure incidents of short duration: Properties affected by low pressures which only occur for a short period, and for which there is evidence that incidents of a longer duration would not occur during the course of the year, may be excluded.

Water hardness

Q. 3.5: What is the classification of the water supply for the property?

A.: The water supplied to the property has an average water hardness of 292 mg/l calcium carbonate which is defined as "Hard" by Southern Water.

Guidance Notes:

The hardness of water depends on the amount of calcium in it – the more it contains, the harder the water is.

There is no UK or European standard set for the hardness of drinking water. More information on water hardness can be found on the Drinking Water Inspectorates' website: <http://www.dwi.gov.uk/>

Water hardness can be expressed in various indices for example the hardness settings for dishwashers are commonly expressed in Clark's degrees, but check with the manufacturer as there are also other units. The following table explains how to convert mg/l calcium and mg/l calcium carbonate classifications.

To Convert from:	To Clark degrees	To French degrees	To German degrees
mg/l calcium	multiply by 0.18	multiply by 0.25	multiply by 0.14
mg/l calcium carbonate	multiply by 0.07	multiply by 0.10	multiply by 0.056

Water meters

Q. 3.6: Is there a meter installed at this property?

A.: Records indicate that the property is not served by a water meter.

Guidance Notes:

Where the property is not served by a water meter and the customer wishes to consider this method of charging they should contact their water retailer.

If a property is measured (metered) upon change of occupation this property will retain the meter.

Charging

Sewerage undertaker

Q. 4.1.1: Who is responsible for providing the sewerage services for the property?

A.: Southern Water is responsible for providing the sewerage services for the property.

Guidance Notes:

The 'wholesale' part of the water industry did not open for competition in April 2017. This means that Southern Water continues to operate the network of pipes, mains and treatment works.

As a wholesaler, Southern Water sells sewerage services to the companies who enter the retail market. In some instances, wholesalers will still need to interact directly with customers. For example, customers will still contact Southern Water to report internal sewer flooding.

Water undertakers

Q. 4.1.2: Who is responsible for providing the water services for the property?

A.: Southern Water is responsible for providing the water services for the property.

Guidance Notes:

The 'wholesale' part of the water industry did not open for competition in April 2017. This means that water undertakers continue to operate the network of pipes, mains and treatment works.

As a wholesaler, water undertakers sell water services to the companies who enter the retail market. In some instances, wholesalers will still need to interact directly with customers. For example, customers will still contact water undertakers to report leaks.

Sewerage bills

Q. 4.2: Who bills the property for sewerage services?

A.: If you wish to know who bills the sewerage services for this property then you will need to contact the current owner. For a list of all potential retailers of sewerage services for the property please visit www.open-water.org.uk.

Guidance Notes:

From April 2017 non-household customers in England can choose their retailer.

'Retail' refers to the way in which customers are billed for their water and sewerage as well as customer services including meter reading.

Water bills

Q. 4.3: Who bills the property for water services?

A.: If you wish to know who bills the water services for this property then you will need to contact the current owner. For a list of all potential retailers of water services for the property please visit www.open-water.org.uk.

Guidance Notes:

From April 2017 non-household customers in England can choose their retailer.

'Retail' refers to the way in which customers are billed for their water and sewerage as well as customer services including meter reading.

Trade effluent information

Q. 4.4: Is there a consent on this property to discharge trade effluent under Section 118 of the Water Industry Act (1991) into the public sewerage system?

A.: The trader operating at this commercial property does not hold either a Trade Effluent Consent, or an acknowledgement of a trade effluent discharge, as issued by Southern Water.

Guidance Notes:

Please note, any existing consent is dependent on the business being carried out at the property and will not transfer automatically upon change of ownership.

Any change of ownership from the current incumbent of a property will require the negotiation of a new trade effluent consent or a new acknowledgement between the new incumbent and Southern Water.

Where consent or acknowledgement details have been provided, this does not represent a direct copy of the original.

Other Information

Additional meter information

No further information.

DISCLAIMER: These replies and information, including that shown on the enclosed plan(s), are given on the distinct understanding that neither the Company nor any of its representatives is legally liable for its accuracy or for any action or omission to act whatsoever by anyone on the strength of that information, save as to obvious error. In particular, any person proposing to construct or excavate on land on the basis of information hereby provided should carry out all necessary on-site investigations.

Appendix one: Terms and expressions

- "the 1991 Act" means the Water Industry Act 1991(i);
- "the 2000 Regulations" means the Water Supply (Water Quality) Regulations 2000(ii);
- "the 2001 Regulations" means the Water Supply (Water Quality) Regulations 2001(iii);
- "adoption agreement" means an agreement made or to be made under Section 51A(1) or 104(1) of the 1991 Act(iv);
- "bond" means a surety granted by a developer who is a party to an adoption agreement;
- "bond waiver" means an agreement with a developer for the provision of a form of financial security as a substitute for a bond;
- "calendar year" means the twelve months ending with 31 December;
- "discharge pipe" means a pipe from which discharges are made or are to be made under Section 165(1) of the 1991 Act;
- "disposal main" means (subject to Section 219(2) of the 1991 Act) any outfall pipe or other pipe which:
- (a) is a pipe for the conveyance of effluent to or from any sewage disposal works, whether of a sewerage undertaker or of any other person; and
 - (b) is not a public sewer;
- "drain" means (subject to Section 219(2) of the 1991 Act) a drain used for the drainage of one building or any buildings or yards appurtenant to buildings within the same curtilage;
- "effluent" means any liquid, including particles of matter and other substances in suspension in the liquid;
- "financial year" means the twelve months ending with 31 March;
- "lateral drain" means:
- (a) that part of a drain which runs from the curtilage of a building (or buildings or yards within the same curtilage) to the sewer with which the drain communicates or is to communicate; or
 - (b) (if different and the context so requires) the part of a drain identified in a declaration of vesting made under Section 102 of the 1991 Act or in an agreement made under Section 104 of that Act(v);
- "licensed water supplier" means a company which is the holder for the time being of a water supply licence under Section 17A(1) of the 1991 Act(vi);
- "maintenance period" means the period so specified in an adoption agreement as a period of time:
- (a) from the date of issue of a certificate by a sewerage undertaker to the effect that a developer has built (or substantially built) a private sewer or lateral drain to that undertaker's satisfaction; and
 - (b) until the date that private sewer or lateral drain is vested in the sewerage undertaker;
- "map of waterworks" means the map made available under section 198(3) of the 1991 Act(vii) in relation to the information specified in subsection (1A);
- "private sewer" means a pipe or pipes which drain foul or surface water, or both, from premises, and are not vested in a sewerage undertaker;
- "public sewer" means, subject to Section 106(1A) of the 1991 Act(viii), a sewer for the time being vested in a sewerage undertaker in its capacity as such, whether vested in that undertaker:
- (a) by virtue of a scheme under Schedule 2 to the Water Act 1989(ix);
 - (b) by virtue of a scheme under Schedule 2 to the 1991 Act(x);
 - (c) under Section 179 of the 1991 Act(xi); or
 - (d) otherwise;
- "public sewer map" means the map made available under Section 199(5) of the 1991 Act(xii);
- "resource main" means (subject to Section 219(2) of the 1991 Act) any pipe, not being a trunk main, which is or is to be used for the purpose of:
- (a) conveying water from one source of supply to another, from a source of supply to a regulating reservoir or from a regulating reservoir to a source of supply; or
 - (b) giving or taking a supply of water in bulk;
- "sewerage services" includes the collection and disposal of foul and surface water and any other services which are required to be provided by a sewerage undertaker for the purpose of carrying out its functions;
- "sewerage undertaker" means the company appointed to be the sewerage undertaker under Section 6(1) of the 1991 Act for the area in which the property is or will be situated;
- "surface water" includes water from roofs and other impermeable surfaces within the curtilage of the property;
- "water main" means (subject to Section 219(2) of the 1991 Act) any pipe, not being a pipe for the time being vested in a person other than the water undertaker, which is used or to be used by a water undertaker or licensed water supplier for the purpose of making a general supply of water available to customers or potential customers of the undertaker or supplier, as distinct from for the purpose of providing a supply to particular customers;
- "water meter" means any apparatus for measuring or showing the volume of water supplied to, or of effluent discharged from any premises;
- "water supplier" means the company supplying water in the water supply zone, whether a water undertaker or licensed water supplier;
- "water supply zone" means the names and areas designated by a water undertaker within its area of supply that are to be its water supply zones for that year; and
- "water undertaker" means the company appointed to be the water undertaker under Section 6(1) of the 1991 Act for the area in which the property is or will be situated.

In this report, references to a pipe, including references to a main, a drain or a sewer, shall include references to a tunnel or conduit which serves or is to serve as the pipe in question and to any accessories for the pipe.

- (i) 1991 c.56.
- (ii) S.I. 2000/3184. These Regulations apply in relation to England.
- (iii) S.I. 2001/3911. These Regulations apply in relation to Wales.
- (iv) Section 51A was inserted by Section 92(2) of the Water Act 2003 (c. 37). Section 104(1) was amended by Section 96(4) of that Act.
- (v) Various amendments have been made to Sections 102 and 104 by section 96 of the Water Act 2003.
- (vi) Inserted by Section 56 of and Schedule 4 to the Water Act 2003.
- (vii) Subsection (1A) was inserted by Section 92(5) of the Water Act 2003.
- (viii) Section 106(1A) was inserted by Section 99 of the Water Act 2003.
- (ix) 1989 c.15.
- (x) To which there are various amendments made by Section 101(1) of and Schedule 8 to the Water Act 2003.
- (xi) To which there are various amendments made by Section 101(1) of and Schedule 8 to the Water Act 2003.
- (xii) Section 199 was amended by Section 97(1) and (8) of the Water Act 2003.

Appendix two: A guide to new development

The information contained below is for general guidance only. It is recommended that Southern Water's Developer Services department be contacted for further details concerning new infrastructure development.

Wastewater information

Sewer requisitions

It may be necessary for a developer to request that Southern Water provides a public sewer to connect a development site to the existing public system. The developer is responsible for the cost of the work, although a discount will be applied based on the future predicted income from the development served by the new sewer.

Sewer diversions

If a public sewer crosses private land, it may be possible for the landowner/developer to request the sewer be diverted. In the majority of cases Southern Water will allow the developer to undertake this work under close supervision. Whether Southern Water or the developer undertakes the diversionary works the costs are the responsibility of the developer.

Building-over sewers

Public sewers are afforded statutory protection and consequently there is no right to build over or in close proximity to a public sewer. If an existing public sewer either crosses a development site or is located in close proximity to a development site it is essential that a developer contact Southern Water.

Sewer connections

A developer can serve notice on Southern Water that it wishes to make a connection to the public sewerage system. The developer must provide 21 days' notice and the work will be supervised by Southern Water.

Water information

Water requisitions

It may be necessary for a developer to request that Southern Water provides both:

- (a) a public water main to connect a development site to the existing public system and,
- (b) on-site public water mains to serve the individual properties.

In both cases the developer is responsible for the cost of the work, although a discount will be applied based on the future predicted income from the development.

It is possible for the developer to lay the on-site mains themselves under a Self-Lay Agreement. Further details are available from Southern Water.

Water main diversions

The building over or in close proximity to public water mains is not permitted. A developer must request that Southern Water undertakes a diversion of a water main that is affected by a development.

Water connections

A developer can request a new connection to a public water main. This work will be undertaken by Southern Water.

Contact us

For specific information on Southern Water's Developer Services service, including details on how to contact the right person, please visit our website: www.southernwater.co.uk/developers-and-builders-overview.

Appendix three: Terms and conditions

The Customer the Client and the Purchaser are asked to note these terms, which govern the basis on which this drainage and water report is supplied.

Definitions

"The Company" means the water service company operating within the Southern Water drainage area that provides information to Southern Water for this commercial search Report.

"Order" means any request completed by the Customer requesting the Report.

"Report" means the drainage and/or water report prepared by The Company in respect of the Property.

"Property" means the address or location supplied by the Customer in the Order.

"Customer" means the person, company, firm or other legal body placing the Order, either on their own behalf as Client, or, as an agent for a Client.

"Client" means the person, company or body who is the intended recipient of the Report with an actual or potential interest in the Property.

"Purchaser" means the actual or potential purchaser of the Property including their mortgage lender.

1.0 Agreement

- 1.1 Southern Water agrees to supply the Report subject to these terms. The scope and limitations of the Report are described in paragraph 2 of these terms. Where the Customer is acting as an agent for the Client then the Customer shall be responsible for bringing these terms to the attention of the Client.
- 1.2 The Customer and Client agree that the placing of an Order for a Report indicates their acceptance of these terms.

2.0 The Report

Whilst Southern Water will use reasonable care and skill in producing the Report, it is provided to the Client on the basis that they acknowledge and agree to the following:

- 2.1 The information contained in the Report can change on a regular basis so Southern Water cannot be responsible to the Client for any change in the information contained in the Report after the date on which the Report was produced and sent to the Client.
- 2.2 The Report does not give details about the actual state or condition of the Property nor should it be used or taken to indicate or exclude actual suitability or unsuitability of the Property for any particular purpose, or relied upon for determining saleability or value, or used as a substitute for any physical investigation or inspection. Further advice and information from appropriate experts and professionals should always be obtained.
- 2.3 The information contained in the Report is based upon the accuracy of the address supplied by the Customer or Client.
- 2.4 The Report provides information as to the location and connection of existing services, and details of trade effluent consents. It should not be relied upon for any other purpose. The Report may contain opinions or general advice to the Customer and the Client and Southern Water cannot ensure that any such opinion or general advice is accurate, complete or valid and accepts no liability therefore.
- 2.5 The position and depth of apparatus shown on any maps attached to the Report are approximate, and are furnished as a general guide only, and no warranty as to its correctness is given or implied. The exact positions and depths should be obtained by excavation trial holes.

3.0 Liability

- 3.1 Southern Water shall not be liable to the Client for any failure defect or non-performance of its obligations arising from any failure of or defect in any machine, processing system or transmission link or anything beyond Southern Water's reasonable control or the acts or omissions or any party for whom Southern Water is not responsible.
- 3.2 Where a Report is requested for an address falling within a geographical area where Southern Water and another Company separately provide water and sewerage services, then it shall be deemed that liability for the information given by Southern Water or the Company as the case may be will remain with Southern Water or the Company as the case may be in respect of the accuracy of the information supplied. Where Southern Water is supplying information which has been provided to it by another Company for the purposes outlined in this agreement, Southern Water will therefore not be liable in any way for the accuracy of that information.
- 3.3 Where the Customer sells this Report to a Client (other than in the case of a bona fide legal adviser recharging the cost of the Report as a disbursement) Southern Water or the Company as the case may be shall not in any circumstances (whether for breach of contract, negligence or any other tort, under statute or statutory duty or otherwise at all) be liable for any loss or damage whatsoever (save to the extent provided by clause 3.4) and the Customer shall indemnify Southern Water in respect of any claim (other than a claim covered by clause 3.4) by the Client.
- 3.4 Southern Water shall accept liability for death or personal injury arising from its negligence.
- 3.5 The entire liability of Southern Water or the Company as the case may be in respect of all causes of action arising under or in connection with the Report (whether for breach of contract, negligence or any other tort, under statute or statutory duty or otherwise at all) shall not exceed £2,000,000 (two million pounds); and Southern Water or the Company as the case may be shall not in any circumstances (whether for breach of contract, negligence or any other tort, under statute or statutory duty or otherwise at all) be liable for any loss of profit, loss of goodwill, loss of reputation, loss of business or any indirect, special or consequential loss, damage or other claims, costs or expenses.

4.0 Copyright and confidentiality

- 4.1 The Customer and the Client acknowledge that the Report is confidential and is intended for the personal use of the Client. The copyright and any other intellectual property rights in the Report shall remain the property of Southern Water. No intellectual or other property rights are transferred or licensed to the Customer or the Client except to the extent expressly provided.
- 4.2 The Customer or Client is entitled to make copies of the Report (other than any maps contained in the, or attached to the Report, where no copying is permitted).
- 4.3 The Customer and Client agree (in respect of both the original and any copies made) to respect and not to alter any trademark, copyright notice or other property marking which appears on the Report.
- 4.4 The maps contained in the Report are protected by Crown Copyright and must not be used for any purpose outside the context of the Report.
- 4.5 The Customer and the Client agree to indemnify Southern Water or the Company as the case may be against any losses, costs, claims and damage suffered by Southern Water or the Company as the case may be, as a result of any breach by either of them of the terms of paragraphs 4.1 to 4.4 inclusive.

5.0 Payment

- 5.1 Unless otherwise stated all prices are inclusive of VAT. The Customer shall pay for the price of the Report specified by Southern Water, without any set off, deduction or counterclaim. Unless the Customer or Client has an account with Southern Water for payment for Reports, payments for Reports must be received in full by Southern Water before the Report is produced. For Customers or Clients with accounts, payment terms will be as agreed with Southern Water.

6.0 General

- 6.1 If any provision of these terms is or becomes invalid or unenforceable, it will be taken to be removed from the rest of these terms to the extent that it is invalid or unenforceable. No other provision of these terms shall be affected.
- 6.2 These terms shall be governed by English law and all parties submit to the exclusive jurisdiction of the English courts.
- 6.3 Nothing in this notice shall in any way restrict your statutory or any other rights of access to the information contained in the Report.

These Terms and conditions are available in larger print for those with impaired vision.

Appendix four: Complaints procedure

When we get it wrong

You deserve the highest standard of service from us, but sometimes we make mistakes. If we do, please let us know and we will investigate and review your concerns.

Whilst we always try to resolve all complaints straight away, if this is not possible and you are not happy with the course of action taken by us, you can ask us to escalate the issue internally or take your complaint to an independent third party.

How you contact us

Firstly please call us and we will try to sort out your problem straight away.

You can call us between 8am and 5pm, Monday to Friday on 0845 270 0212 or 0330 303 0276 (individual consumers);

Email us at searches@southernwater.co.uk; or

Write to us at LandSearch, Southern Water Services, Southern House, Capstone Road, Chatham, Kent, ME5 7QA.

What you can expect

You will receive a full, fair and courteous response from someone who can effectively deal with your problem.

If we can remedy the problem straight away we will do it but if we cannot immediately resolve your problem we will keep you informed of actions being taken.

The process

We will try to resolve any telephone contact or complaint at the time of the call, however, if that isn't possible, we will take the details of your complaint and we will investigate and get back to you within 10 working days.

We will respond to written complaints within 10 working days of the date received, but we will always aim to respond more quickly. Depending on the scale of investigation required, we will keep you informed of the progress and update you with new timescales if necessary.

If you are still not satisfied with our response or action we will refer the matter to a Senior Manager for resolution. At your request we will liaise with a third party representative acting on your behalf.

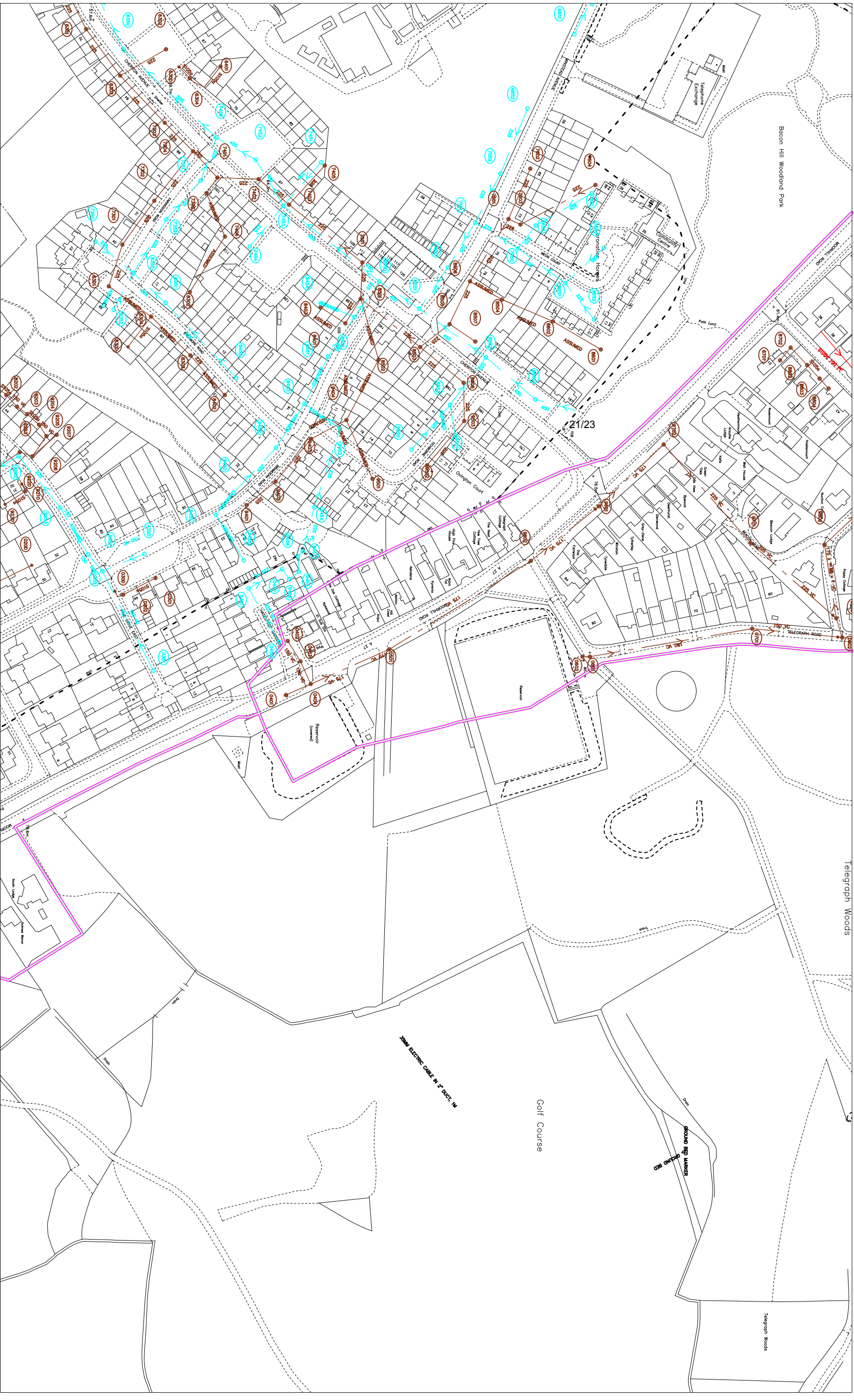
Our commitment to you

If we do not respond to your complaint within 10 working days of receipt of your contact, we will compensate you in line with Southern Water's Customer services — Guaranteed standards of service for business customers.

If we find your complaint to be justified, or we have made any errors that substantially change the outcome in your search result, we will refund the search fee. We will also provide you with a revised search and undertake the necessary action to put things right as soon as practically possible. You will be kept informed of the progress of any action required.

If you remain dissatisfied

While we aim to resolve your complaint first time, in the event that we are unable to resolve the issue to your satisfaction, ultimately you can contact a third party. Please make sure that you have followed the process above first, if not, your complaint will be passed back to us.



Drawn by: SamalAr

Scale: 1:2500

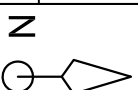
Date: 13/10/2020

The positions of pipes shown on this plan are believed to be correct, but Southern Water Services Ltd accept no responsibility in the event of inaccuracy.

The actual positions should be determined on site.

WARNING: BAC pipes are constructed of Bonded Asbestos Cement
WARNING: Unknown (UNK) materials may include Bonded Asbestos Cement

Based upon Ordnance Survey Digital Data with the permission of the controller of H.M.S.O. Crown Copyright Reserved
Licence No. WU 298530.



SEWER RECORDS PAGE 2 OF 2

Node	Cover	Invert	Size	Material	Shape	Node	Cover	Invert	Size	Material	Shape	Node	Cover	Invert	Size	Material	Shape	Node	Cover	Invert	Size	Material	Shape
020DX			UNK	UNK	CIRC	8352X			UNK	UNK	CIRC												
0301X			UNK	UNK	CIRC	8401X	68.519	66.419	225	UNK	CIRC												
0302X			UNK	UNK	CIRC	8402X	76.756	75.256	225	UNK	CIRC												
0350X	80.504	78.764	150	UNK	CIRC	8403X			UNK	UNK	CIRC												
0351X	80.58	79.31	150	VC	CIRC	8450X	75.669	74.579	225	UNK	CIRC												
0401X	81.08	78.91	175	VC	CIRC	8451X	70.515	68.755	225	UNK	CIRC												
0402X	81.36	80.05	150	VC	CIRC	8452X			UNK	UNK	CIRC												
0403X	81.45	79.27	150	VC	CIRC	8453X	68.149		UNK	UNK	CIRC												
0404X	81.36	78.75	175	VC	CIRC	8454X			UNK	UNK	CIRC												
0450X	81.38	79.63	225	VC	CIRC	8501X	67.351		UNK	UNK	CIRC												
0451X	81.17	79.31	225	VC	CIRC	8502X			UNK	UNK	CIRC												
0452X	80.93	79.12	225	VC	CIRC	8503X	69.074		UNK	UNK	CIRC												
0453X	80.8	79.01	225	VC	CIRC	8504X			UNK	UNK	CIRC												
0454X	80.73	78.94	225	VC	CIRC	8505X	69.185		UNK	UNK	CIRC												
0501X	81.19		175	VC	CIRC	8506X	70.559		UNK	UNK	CIRC												
0601X	80.79	78.69	150	VC	CIRC	8507X	70.146	69.346	225	UNK	CIRC												
0602X			150	VC	CIRC	8508X	70.687	69.217	225	UNK	CIRC												
0701X	78.72	76.81	150	VC	CIRC	8550X	67.327		UNK	UNK	CIRC												
6301X	58.691	56.771	225	UNK	CIRC	8551X	68.025		UNK	UNK	CIRC												
6302X	60.504	58.674	225	UNK	CIRC	8552X	71.073	68.143	450	UNK	CIRC												
6303X	60.303	57.723	225	UNK	CIRC	8553X	72.165	69.285	225	UNK	CIRC												
6304X			UNK	UNK	CIRC	8601X			UNK	UNK	CIRC												
6350X	58.526	56.546	525	UNK	CIRC	8602X	77	75.7	UNK	UNK	CIRC												
6401X			UNK	UNK	CIRC	8650X	72.902	69.642	450	UNK	CIRC												
6651X	73.869	72.759	130	UNK	CIRC	8651X	76.889	75.239	225	UNK	CIRC												
6652X	76.141	74.431	225	UNK	CIRC	8652X	77.631	75.991	225	UNK	CIRC												
7301X	67.535	66.515	225	UNK	CIRC	8701X			UNK	UNK	CIRC												
7302X	64.171	62.681	225	UNK	CIRC	8702X			UNK	UNK	CIRC												
7303X	61.501	59.401	225	UNK	CIRC	8802X			UNK	UNK	CIRC												
7304X	62.009	59.669	225	UNK	CIRC	8803X			UNK	UNK	CIRC												
7305X	64.248	62.468	225	UNK	CIRC	9203X	78.552	76.862	150	UNK	CIRC												
7350X	69.834	68.234	225	UNK	CIRC	9204X			UNK	UNK	CIRC												
7351X	62.751	60.951	225	UNK	CIRC	9205X			UNK	UNK	CIRC												
7352X	64.442	63.422	225	UNK	CIRC	9206X			UNK	UNK	CIRC												
7401X	63.365	62.06	225	UNK	CIRC	9207X			UNK	UNK	CIRC												
7402X	63.98	62.96	225	UNK	CIRC	9210X			UNK	UNK	CIRC												
7403X	62.793	62.06	225	UNK	CIRC	9220X			UNK	UNK	CIRC												
7404X			UNK	UNK	CIRC	9253X	79.623	77.943	225	UNK	CIRC												
7405X	64.532	63.042	225	UNK	CIRC	9350X	80.617	79.447	150	UNK	CIRC												
7450X	61.878	59.648	525	UNK	CIRC	9351X			UNK	UNK	CIRC												
7451X	64.443	63.773	225	UNK	CIRC	9401X	79.732	77.512	225	UNK	CIRC												
7452X	63.444	61.934	450	UNK	CIRC	9402X	78.062	76.202	225	UNK	CIRC												
7453X	65.37	63.31	450	UNK	CIRC	9403X	75.255	73.755	UNK	UNK	CIRC												
7454X	68.527	67.227	225	UNK	CIRC	9404X			UNK	UNK	CIRC												
7455X	66.881	64.031	225	UNK	CIRC	9450X	79.667	77.957	225	UNK	CIRC												
7501X	69.641	67.371	225	UNK	CIRC	9451X			UNK	UNK	CIRC												
7550X			UNK	UNK	CIRC	9452X			UNK	UNK	CIRC												
7551X	73.03	73.594	225	UNK	CIRC	9453X	76.541	74.791	UNK	UNK	CIRC												
7552X	75.414	72.285	225	UNK	CIRC	9454X	75.25	73.97	UNK	UNK	CIRC												
7601X	74.985	72.85	225	UNK	CIRC	9455X	79.093	77.663	225	UNK	CIRC												
7602X	76.553	74.813	225	UNK	CIRC	9456X			UNK	UNK	CIRC												
7603X	75.431	73.331	225	UNK	CIRC	9457X	80.57	78.82	225	VC	CIRC												
7604X	79.122	77.852	225	UNK	CIRC	9501X	80.36	77.98	UNK	VC	CIRC												
7650X	74.664	72.934	225	UNK	CIRC	9502X	76.926	75.196	225	UNK	CIRC												
7651X	78.934	77.484	225	UNK	CIRC	9503X	73.632	71.282	225	UNK	CIRC												
7652X	78.834	77.134	225	UNK	CIRC	9550X	76.377	74.667	225	UNK	CIRC												
7653X	76.157	74.457	225	UNK	CIRC	9551X			UNK	UNK	CIRC												
8202X			150	VC	CIRC	9601X	77.28	75.25	UNK	VC	CIRC												
8203X			150	VC	CIRC	9602X	79.68	76.58	175	VC	CIRC												
8301X	69.835	67.775	225	UNK	CIRC	9701X	79.44	77.09	225	VC	CIRC												
8302X	71.492		UNK	UNK	CIRC	9702X			225	VC	CIRC												
8303X			UNK	UNK	CIRC	9802X	80.32	78.07	175	VC	CIRC												
8304X			UNK	UNK	CIRC																		
830DX			UNK	UNK	CIRC																		
8350X	68.604	66.694	225	UNK	CIRC																		
8351X	71.631	70.341	225	UNK	CIRC																		

LINE TYPES / COLOURS

- Foul (Brown)
- Foul Slop/Sewer (Dark Blue)
- Foul Vacuum Main (Red)
- Foul Flap Main (Red)
- Combined (Red)
- Combined Flap Main (Red)
- Landed Drain (Orange)
- Building Over Agreement Area (Orange)
- Trained Effluent (Dark Blue)
- Slop (Purple)
- Sewer Cleanout (Purple)
- Section 104 Area (Light Blue)
- Surface Water (Light Blue)
- Surface Water Flap Main (Light Blue)
- Potable (Yellow)
- Access Shaft (Green)
- Demarcated (ZZZ Uniform)

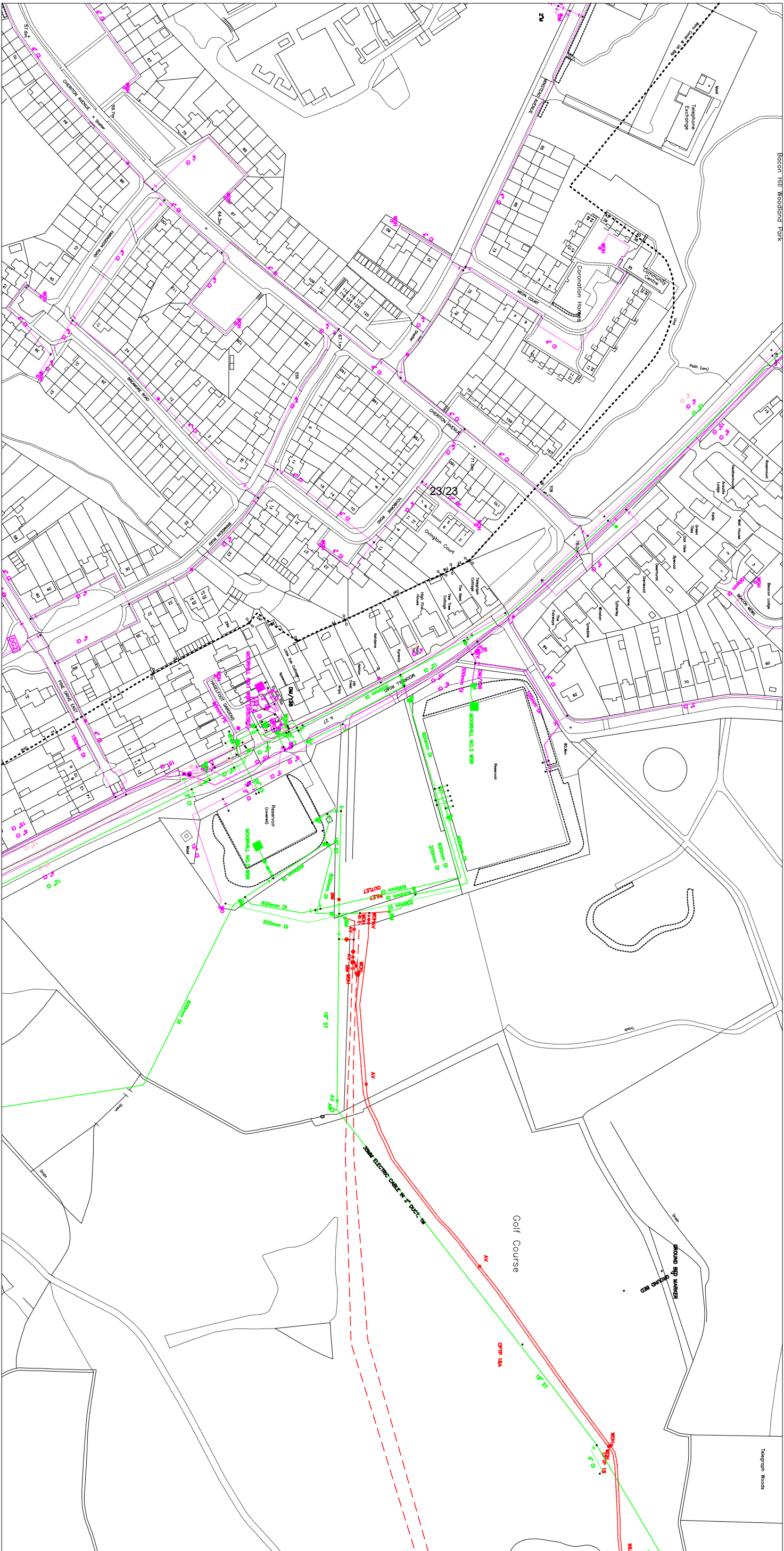
MATERIALS

- AK Asphaltene
- BRG Brick (Common)
- BRE Brick (Engineering)
- CC Concrete Box (Channel)
- CC Concrete Box (Culvert)
- CP Concrete (pre-cast)
- CSB Concrete Segments (boxed)
- CSB Concrete Segments (unboxed)
- Landed Drain
- GRC Glass Reinforced Concrete
- GRC Glass Reinforced Concrete
- MCC Masonry in regular Concrete
- PE Polyethylene
- PF Pitch Fibre
- PP Polypropylene
- PPM Reinforced Plastic Water
- SI Ston Iron
- ST Steel
- VC Vitrified Clay
- XXX Uniform
- ZZZ Uniform

LEGEND - SEWERS

- Manhole (SW)
- Manhole (F&C)
- Lamp hole (SW)
- Lamp hole (F&C)
- Purging Station (SW)
- Purging Station (F&C)
- Side entry Manhole (SW)
- Side entry Manhole (F&C)
- Blind shaft (SW)
- Blind shaft (F&C)
- Ejector station (SW)
- Ejector station (F&C)
- Waterlogged door (SW)
- Waterlogged door (F&C)
- Flushing at Man (SW)
- Flushing at Man (F&C)
- Flushing at Non (SW)
- Flushing at Non (F&C)
- Demarcation manhole
- Waistout (SW)
- Waistout (F&C)
- Waistout
- Roofing Eye (SW)
- Roofing Eye (F&C)
- Gauging point (SW)
- Gauging point (F&C)
- Intercity chamber (SW)
- Intercity chamber (F&C)
- Storm tank (SW)
- Storm tank (F&C)
- Storm tank
- Vortex chamber (SW)
- Vortex chamber (F&C)
- Vortex chamber
- Label slope
- Dummy/324 manhole
- Pericote chamber
- Diamonds
- Storm overflow
- Backflow manhole
- Other (s)
- Other
- Change to sewer (s)
- Change in sewer
- Rail valve
- Rail valve
- Intercity chamber
- Culvert
- Valve
- Closed Valve
- At Valve
- Vortex chamber (SW)
- Vortex chamber (F&C)
- Label slope
- Dummy/324 manhole
- Pericote chamber
- Diamonds
- Storm overflow
- Backflow manhole
- Other (s)
- Other
- Change to sewer (s)
- Change in sewer
- Rail valve
- Rail valve
- Intercity chamber
- Culvert
- Valve
- Closed Valve
- At Valve
- Vortex chamber (SW)
- Vortex chamber (F&C)
- Label slope
- Dummy/324 manhole
- Pericote chamber
- Diamonds
- Storm overflow
- Backflow manhole
- Other (s)
- Other
- Change to sewer (s)
- Change in sewer
- Rail valve
- Rail valve
- Intercity chamber
- Culvert
- Valve
- Closed Valve
- At Valve
- Vortex chamber (SW)
- Vortex chamber (F&C)
- Label slope
- Dummy/324 manhole
- Pericote chamber
- Diamonds
- Storm overflow
- Backflow manhole
- Other (s)
- Other
- Change to sewer (s)
- Change in sewer
- Rail valve
- Rail valve
- Intercity chamber
- Culvert
- Valve
- Closed Valve
- At Valve
- Vortex chamber (SW)
- Vortex chamber (F&C)
- Label slope
- Dummy/324 manhole
- Pericote chamber
- Diamonds
- Storm overflow
- Backflow manhole
- Other (s)
- Other
- Change to sewer (s)
- Change in sewer
- Rail valve
- Rail valve
- Intercity chamber
- Culvert
- Valve
- Closed Valve
- At Valve
- Vortex chamber (SW)
- Vortex chamber (F&C)
- Label slope
- Dummy/324 manhole
- Pericote chamber
- Diamonds
- Storm overflow
- Backflow manhole
- Other (s)
- Other
- Change to sewer (s)
- Change in sewer
- Rail valve
- Rail valve
- Intercity chamber
- Culvert
- Valve
- Closed Valve
- At Valve
- Vortex chamber (SW)
- Vortex chamber (F&C)
- Label slope
- Dummy/324 manhole
- Pericote chamber
- Diamonds
- Storm overflow
- Backflow manhole
- Other (s)
- Other
- Change to sewer (s)
- Change in sewer
- Rail valve
- Rail valve
- Intercity chamber
- Culvert
- Valve
- Closed Valve
- At Valve
- Vortex chamber (SW)
- Vortex chamber (F&C)
- Label slope
- Dummy/324 manhole
- Pericote chamber
- Diamonds
- Storm overflow
- Backflow manhole
- Other (s)
- Other
- Change to sewer (s)
- Change in sewer
- Rail valve
- Rail valve
- Intercity chamber
- Culvert
- Valve
- Closed Valve
- At Valve
- Vortex chamber (SW)
- Vortex chamber (F&C)
- Label slope
- Dummy/324 manhole
- Pericote chamber
- Diamonds
- Storm overflow
- Backflow manhole
- Other (s)
- Other
- Change to sewer (s)
- Change in sewer
- Rail valve
- Rail valve
- Intercity chamber
- Culvert
- Valve
- Closed Valve
- At Valve
- Vortex chamber (SW)
- Vortex chamber (F&C)
- Label slope
- Dummy/324 manhole
- Pericote chamber
- Diamonds
- Storm overflow
- Backflow manhole
- Other (s)
- Other
- Change to sewer (s)
- Change in sewer
- Rail valve
- Rail valve
- Intercity chamber
- Culvert
- Valve
- Closed Valve
- At Valve
- Vortex chamber (SW)
- Vortex chamber (F&C)
- Label slope
- Dummy/324 manhole
- Pericote chamber
- Diamonds
- Storm overflow
- Backflow manhole
- Other (s)
- Other
- Change to sewer (s)
- Change in sewer
- Rail valve
- Rail valve
- Intercity chamber
- Culvert
- Valve
- Closed Valve
- At Valve
- Vortex chamber (SW)
- Vortex chamber (F&C)
- Label slope
- Dummy/324 manhole
- Pericote chamber
- Diamonds
- Storm overflow
- Backflow manhole
- Other (s)
- Other
- Change to sewer (s)
- Change in sewer
- Rail valve
- Rail valve
- Intercity chamber
- Culvert
- Valve
- Closed Valve
- At Valve
- Vortex chamber (SW)
- Vortex chamber (F&C)
- Label slope
- Dummy/324 manhole
- Pericote chamber
- Diamonds
- Storm overflow
- Backflow manhole
- Other (s)
- Other
- Change to sewer (s)
- Change in sewer
- Rail valve
- Rail valve
- Intercity chamber
- Culvert
- Valve
- Closed Valve
- At Valve
- Vortex chamber (SW)
- Vortex chamber (F&C)
- Label slope
- Dummy/324 manhole
- Pericote chamber
- Diamonds
- Storm overflow
- Backflow manhole
- Other (s)
- Other
- Change to sewer (s)
- Change in sewer
- Rail valve
- Rail valve
- Intercity chamber
- Culvert
- Valve
- Closed Valve
- At Valve
- Vortex chamber (SW)
- Vortex chamber (F&C)
- Label slope
- Dummy/324 manhole
- Pericote chamber
- Diamonds
- Storm overflow
- Backflow manhole
- Other (s)
- Other
- Change to sewer (s)
- Change in sewer
- Rail valve
- Rail valve
- Intercity chamber
- Culvert
- Valve
- Closed Valve
- At Valve
- Vortex chamber (SW)
- Vortex chamber (F&C)
- Label slope
- Dummy/324 manhole
- Pericote chamber
- Diamonds
- Storm overflow
- Backflow manhole
- Other (s)
- Other
- Change to sewer (s)
- Change in sewer
- Rail valve
- Rail valve
- Intercity chamber
- Culvert
- Valve
- Closed Valve
- At Valve
- Vortex chamber (SW)
- Vortex chamber (F&C)
- Label slope
- Dummy/324 manhole
- Pericote chamber
- Diamonds
- Storm overflow
- Backflow manhole
- Other (s)
- Other
- Change to sewer (s)
- Change in sewer
- Rail valve
- Rail valve
- Intercity chamber
- Culvert
- Valve
- Closed Valve
- At Valve
- Vortex chamber (SW)
- Vortex chamber (F&C)
- Label slope
- Dummy/324 manhole
- Pericote chamber
- Diamonds
- Storm overflow
- Backflow manhole
- Other (s)
- Other
- Change to sewer (s)
- Change in sewer
- Rail valve
- Rail valve
- Intercity chamber
- Culvert
- Valve
- Closed Valve
- At Valve

Drawn by:	SamalAr
Title:	Moorhill Moorhill Road
Date:	13/10/2020
	



LEGEND - MAINS

	Distribution Main / Communication pipe
	Trunk Main
	Raw water main
	Non potable
	Abandoned main
	Proposed Main
	Fire main
	Non SWS
	Sluice valve
	Closed valve
	Air valve
	Butterfly valve
	Pressure reducing valve
	Reflux valve
	Motorised valve
	Clockwise closing valve
	Fire Hydrant
	Washout
	Washout hydrant
	Meter
	Capped end
	Emptying plug
	Stopcock
	Leak Noise Correlator Survey Point
	Anode
	Telemetry cable
	Access point / hatchbox

MATERIALS

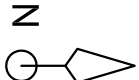
	Dialysis machine
	Break pressure tank
	Change node
	Pumping station
	Booster station
	Insertion Flow Meter Point
	Water tower
	Service reservoir
	Water Supply Works
	Bore hole / Well
	Intake
	Customer site
	Swab insertion point
	Alkaliene
	Cast iron
	Spun (grey) iron
	Concrete
	Ductile iron
	Bonded Asbestos Cement
	Glass reinforced plastic
	Glass reinforced epoxy
	(Unplastised) Polyvinyl chloride
	Polyethylene
	Steel
	Concrete segments bolted
	Concrete segments unbolted
	Galvanised iron
	Ductile sleeve
	Concrete pre-stressed
	High performance polyethylene
	Unknown

AK	CI	SI	CO	DI	BAC	GRP	GRE	PVC	PE	ST	CSB	CSU	GI	DS	CPS	HPE	??
----	----	----	----	----	-----	-----	-----	-----	----	----	-----	-----	----	----	-----	-----	----

Drawn by:	SamalAr	O.S.Ref:	SU4713NW
Scale:	1:2500	TITLE:	Moorhill Moorhill Road
Date:	13/10/2020		

The positions of pipes shown on this plan are believed to be correct, but Southern Water Services Ltd. accept no responsibility in the event of inaccuracy. The actual positions of pipes should be determined on site.

Based upon Ordnance Survey Digital Data with the permission of the controller of H.M.S.O. Crown Copyright Reserved Licence No. WU 298530.



Appendix E



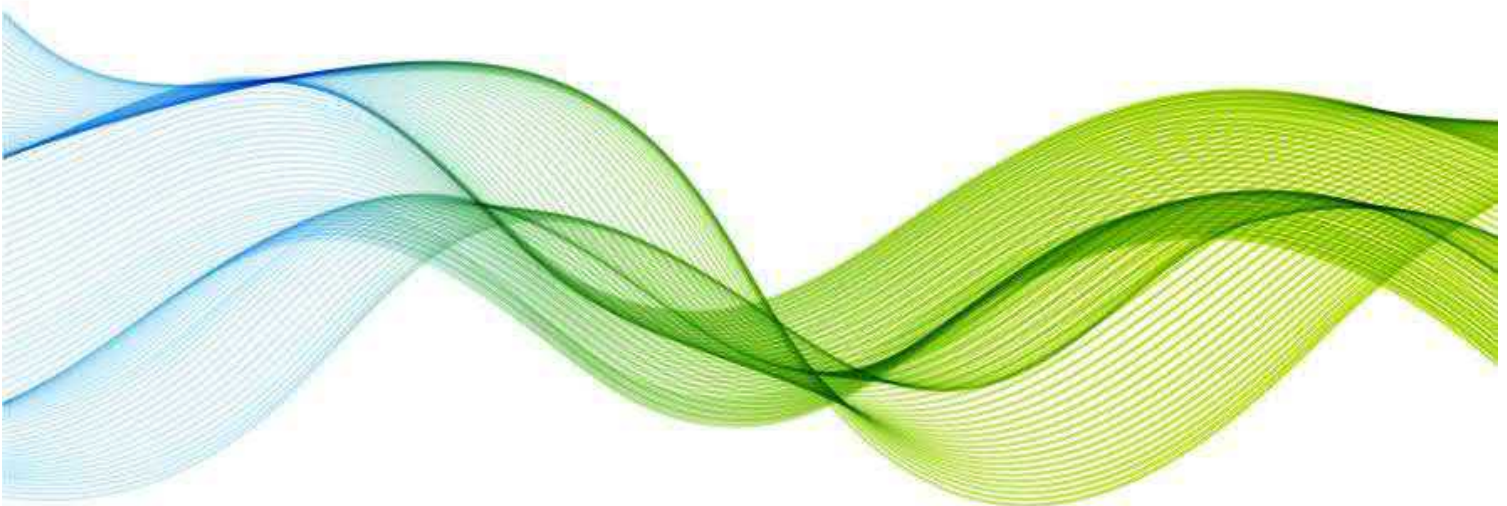
**Phase I - II
Geo-Environmental Site Assessment**

Land east of Moorhill Road, West End, Southampton, SO30 3AX

Prepared for:
Highwood Homes
The Hay Barn
Upper Ashfield Farm
Hoe Lane
Romsey
SO51 9HU

August 2022

Omnia ref: A11641/1.1



ISO Accredited Certification



QUALITY ASSURANCE

Project Number: A11641

August 2022

Phase I-II Geo-Environmental Assessment					
 Geo-Environmental	Prepared by:	H. Spurling	Date:	22/06/22	Signature:
	Checked by:	L. Burnett	Date:	29/05/22	Signature:
	Authorised by:	A. King	Date:	30/06/22	Signature:
Geotechnical Ref:					
 Geotechnical	Prepared by:	H. Spurling	Date:	23/06/22	Signature:
	Checked by:	L. Burnett	Date:	29/05/22	Signature:
	Authorised by:	A. King	Date:	30/06/22	Signature:

North Office
Millennium City Park,
Millennium Road,
Preston,
PR2 5BL

01772 963 024

Midlands Office
12 High Pavement,
Lace Market,
Nottingham,
NG1 1HN

0115 7043 492

South Office
3-6 The Quarterdeck,
Port Solent,
Portsmouth,
PO6 4TP

01489 808088

www.omnia-consulting.co.uk

We are a UK wide, truly joined up and fully collaborative multi-disciplinary
engineering and environmental consultancy.



Ecology



Acoustics



Geotechnical



Geo-
environmental



Air
Quality

Executive Summary	
Site Address	Land east of Moorhill Road, West End, Southampton, SO30 3AX
National Grid Reference	447112, 113545
Site Area	0.76 ha
Current Site Use	Open land, with demolition rubble and mixed stockpiles scattered across the site.
Site History	From the first historical map dated coniferous woodland, with a dirt track running west to east along the southern boundary until 1896. From 1896-2020 a residential house was erected with one (1no.) outbuilding in the centre of the northern boundary and two (2no.) smaller structures appeared within the southern extent, associated with the residential dwelling to the south. From 2020, the on-site residential house and associated structure are demolished, and the site is depicted as open land, with areas of hard standing.
Geology & Hydrogeology	Geology BGS records indicate that the site is directly underlain by Superficial Deposits of the River Terrace Deposits, comprising Sand and Gravel, which is classified as a Secondary A Aquifer. Bedrock geology is Wittering Formation, comprising of Clay, Silt and Sand, which is classified as a Secondary A Aquifer. The Groundsure report records no data for Artificial and Made Ground on the proposed site. Made Ground, landscaped ground and reclaimed ground were not identified within 250m of the site. The closest Made Ground being 304m north of the site. Geology encountered during intrusive works was topsoil/ made ground (within one location), over superficial deposits of River Terrace Deposits, overlaying the Wittering Formation. Hydrogeology Review of the environmental database indicates that the site is not located within a groundwater Source Protection Zone. There are no active or historical water abstractions are located within 250m of the site. The closest active groundwater abstraction is located 1012m northeast. There are no active or historical potable water abstractions are located within 250m of the site.
Hydrology & Flooding	Groundwater vulnerability data indicates that the site is underlain by a Secondary A Aquifer with medium vulnerability, as well as a Secondary A Superficial Aquifer with Medium vulnerability. Based on local topography, where the site is elevated and the location of surface watercourses it is considered that shallow groundwater, if present, will follow local topography and flow away from site West towards The River Itchen.
Landfill Sites & Ground Gases	The Groundsure Report identified no records of historic landfill sites or historic waste treatment sites within 250m of the subject site. The Groundsure Report identified no active or recently closed licensed waste sites within 250m of the site boundary.
Radon	The site lies within an area where less than 1% of the properties are above the Action Level. At these levels BRE publication BR211 indicates that no special radon protective measures are required in the construction of new extensions or dwellings.

Revised Conceptual Site Model
Following completion of the Tier 1 risk assessment no active pollution pathways have been identified based on a residential end use without homegrown produce.
Waste Acceptance Criteria Testing
WAC assessment of soils analysed at incremental depths across the site material at depths of 0.10-0.20 at (WS102) and 0.40-0.60 (WS105) is classed as Inert Waste for waste disposal purposes based on the analysis and classification with values within the Inert Waste criteria limits. Samples were also screened using Hazwaste software which classified the waste as non hazardous waste for disposal.
Omnia have provided an anticipated Waste Classification of soil derived from values presented within the laboratory results. However, the acceptance criteria for materials are dependent on the license held by the individual landfill site. As a result, waste acceptance criteria may vary between landfill sites and it is therefore recommended that the test results are submitted to the preferred waste disposal site for review.
Concrete Classification
Soils encountered beneath the site have been classified in accordance with DS-1, Aggressive Chemical Environment for Concrete Classification (ACEC) AC-3z with the recommendations provided in BRE Special Digest 1 (2005).
Geotechnical Assessment
Foundations All foundations should be placed beneath any Made Ground or Topsoil to found on the underlying natural strata. Presumed bearing capacities at 1.20m bgl within the Head Deposits provide bearing capacities of 150-500kN/m² within the granular deposits across site. In the location of WS102 where cohesive soils of the Head Deposits were encountered, bearing capacities of 200-400 kN/m² have been provided. Bearing capacities at 2.00m bgl provide bearing capacities of 500-800kN/m² within the granular soils of the Head Deposits across site. Within the shallow soils of the Wittering Formation, it is considered that a traditional strip foundation of 1.00m width at a depth 2.00m bgl provides a presumed bearing capacity of approximately 50-100 kN/m². Ground Floor Slabs Due to the High volume change potential of the ground, it is considered that ground floor slabs are not suitable for adoption and therefore a suspended floor slab should be adopted in accordance with NHBC Chapter 5.2 to mitigate against the effects of differential settlement. Pavement Construction CBR values ranged from 8.0% to 73.2% between ground level and 878mmbgl. Using a conservative approach, a CBR value of 8.0% should be adopted across the site at this stage. Notwithstanding these results, confirmatory CBR testing should be carried out at formation level once details are finalised.
Recommendations
Environmental All monitoring points should be decommissioned in accordance with Environment Agency guidance ahead of site development in order to avoid the creation of preferential pathways. If during the development stage any evidence of contamination is identified, works should be halted, and contact made with a suitably qualified Environmental Consultant. As determined appropriate by the Consultant, further investigation and sampling may be required to determine the appropriate actions. Upon completion contact should be made with the regulator to achieve sign off of the works. It is recommended that a further three (3no.) gas monitoring visits are undertaken in line with best practice and guidance provided within CIRIA C665, due to concentrations of CO₂ exceeding the screening value of 5% v/v

identified during the monitoring visits on-site.

Geotechnical

Values for foundation are based on approximate ultimate bearing capacity and are given to provide outline options and should be subject to detailed analysis by the Structural Engineer. Should the bearing strength set out above prove to be incompetent for the proposed loading, consideration should be given to a deeper foundation solution. As necessary, and as dictated by the site layout plan this may lead to a requirement for an assessment of deeper soils for a piled foundation.

TABLE OF CONTENTS

Quality Assurance	ii
Table of Contents	v
1 INTRODUCTION	8
1.1 Background	8
1.2 Proposed Development	8
1.3 Objectives	8
1.4 Sources of Information	8
1.5 Limitations	9
1.6 Confidentiality	9
2 SITE SETTING	10
2.1 Site Details	10
2.2 Current Site Use	10
2.2.1 Site Description	10
2.2.2 Hazardous Materials Storage	11
2.2.3 Potential Asbestos Containing Material (PACM)	11
2.2.4 Waste Storage	11
2.2.5 Tree Species	12
2.2.6 Potential Invasive Species	12
2.3 Surrounding Area	12
3 SITE HISTORY	13
3.1 Site History	13
3.2 Historical Tank Database	15
3.3 Historical Energy Features Database	15
3.4 Historic Garages and Petrol Stations	15
3.5 Historic Industrial Land Uses	15
3.6 Planning History	16
3.7 Unexploded Ordnance Risk Assessment	16
4 ENVIRONMENTAL SETTING.....	17
4.1 Geology and Hydrogeology	17
4.1.1 Groundwater Flooding	17
4.2 Hydrology and Flooding	17
4.3 Geotechnical Data	18
4.4 Mining and Ground Workings	18
4.5 Radon Risk Potential	19
4.6 Current Industrial Land Uses	19
4.7 Sensitive Land Uses	19
4.7.1 Sites of Special Scientific Interest (SSSI) Impact Risk Zones	20
4.7.2 Nitrate Vulnerable Zone (NVZ)	20
4.8 Site Sensitivity Assessment	20
5 CONSULTATIONS.....	21
5.1 Contaminated Land Officer	21
5.2 Landfill and Waste Treatment Sites	21
5.3 Potentially Infilled Land	21
5.4 Regulatory Database	21
6 CONCEPTUAL SITE MODEL (CSM).....	23

6.1	Initial CSM	23
6.1.1	On-site Potential Sources	23
6.1.2	Off-site Potential Sources	23
6.1.3	Potential Pathways	23
6.1.4	Potential Receptors	23
7	SITE INVESTIGATION	28
7.1	General	28
7.2	Laboratory Analysis	30
7.3	Ground Gas and Groundwater Monitoring	30
8	GROUND AND GROUNDWATER CONDITIONS	31
8.1	Summary of Ground Conditions	31
8.1.1	Made Ground	31
8.1.2	Topsoil	31
8.1.3	Superficial Deposits	31
8.1.4	Groundwater Conditions	31
8.2	Laboratory Classification Analysis	32
8.2.1	Soil Plasticity	32
8.2.2	Particle Size Distribution Analysis	33
8.2.3	Moisture Content	33
8.2.4	pH and Sulphate	33
8.3	In-Situ Testing	34
8.3.1	Standard Penetration Tests (SPT)	34
8.3.2	Dynamic Cone Penetrometer (DCP) Testing	34
8.3.3	Soil Infiltration Testing – Falling Head Permeability Test	35
8.3.4	Ground Gas	37
9	TIER 1 QUALITATIVE CONTAMINATED LAND RISK ASSESSMENT.....	39
9.1	Human Health Risk Assessment	39
9.2	Controlled Waters Assessment	41
9.3	Waste Acceptance Criteria Testing	41
9.4	Ground Gas Assessment	42
9.4.1	BS 8485:2015 – Type B Building – Private Ownership with no Central Building Management	43
10	REVISED CONCEPTUAL SITE MODEL	44
11	GEOTECHNICAL ASSESSMENT	45
11.1	Proposed Development	45
11.2	Site Preparation	45
11.3	Ground Profile	45
11.4	Shallow Foundations	46
11.4.1	In Situ-Testing	46
11.4.2	Shear Strength	46
11.4.3	Bearing Capacities	47
11.5	Groundwater Levels	48
11.6	Building Near Trees	48
11.6.1	NHBC Minimum Depth to Foundations	48
11.6.2	Lateral pressure and heave	49
11.7	Shallow Excavations	49
11.8	Ground Floor Slabs	49

11.9	Pavement Construction	49
11.10	Concrete Durability	50
11.11	Discussion	50
12	CONCLUSIONS AND RECOMMENDATIONS	51
	APPENDIX I - LIMITATIONS	53
	APPENDIX II – GLOSSARY	55
	APPENDIX III - DRAWINGS	58
	APPENDIX IV - PHOTOGRAPHS	59
	APPENDIX V - HISTORICAL MAPS	64
	APPENDIX VI - EXPLORATORY HOLE LOGS	65
	APPENDIX VII - CHEMICAL ANALYSIS CERTIFICATES	66
	APPENDIX VIII - ORIGIN OF GAC VALUES	67
	APPENDIX IX - GEOTECHNICAL ANALYSIS CERTIFICATES	68
	APPENDIX X - IN-SITU DCP TEST CERTIFICATES	69
	APPENDIX XI - BRE DG365 SOAKAWAY TEST CERTIFICATES	70

Tables

Table 2-1 Site Details	10
Table 2-2 Land Use	12
Table 3-1 Historical Land Use	13
Table 4-1 Geology	17
Table 4-2 Geotechnical Data	18
Table 5-1 Summary of Groundsure Data	22
Table 6-1 Initial Conceptual Site Model	24
Table 7-1 Site Investigation Summary	28
Table 8-1. Summary of Groundwater Conditions	32
Table 8-2. Summary of Soil Plasticity	32
Table 8-3. Summary of Particle Size Distribution	33
Table 8-4. Summary of Moisture Content	33
Table 8-5. Summary of pH and Sulphate Data	34
Table 8-6. Summary of In-situ CBR Results	34
Table 8-7. Summary of Soil Infiltration Testing	35
Table 8-8. Summary of Ground Gas and Groundwater Monitoring Results	38
Table 9-1. Summary of Inorganic and Hydrocarbon Toxicity Assessment for a Residential End Use without Home Grown Produce	39
Table 9-2 - Waste Acceptance Criteria (WAC) Summary	41
Table 9-3 Hazardous Waste Classification Summary	42
Table 10-1 Revised Conceptual Site Model	44
Table 11-1 Summary of site ground conditions	45
Table 11-2 Minimum depth of foundations (after NHBC 2021)	48

1 INTRODUCTION

1.1 Background

Omnia have been commissioned by Highwood Homes to undertake a Geo-Environmental investigation at the site of Land east of Moorhill Road, West End, Southampton, SO30 3AX to assist with their pre-planning application. A site location plan is presented as Figure 1.0 within Appendix III.

1.2 Proposed Development

It is understood that Highwood Homes are proposing to redevelop the site to comprise a Care Home with between 62 to 70 beds over 3 storeys with associated areas of vehicle parking, access routes and infrastructure to the west of the site. We note that the site has existing planning permission for a replacement dwelling, under the local authority reference [F/20/87694](#), however the proposed care home development scheme as outlined in the Feasibility Booklet entitled 'Proposed Care Home, Moorhill, West End, Southampton' (dated May 2021) requires a new planning application.

The outline proposed site layout is presented as Figure 2.0 (Appendix III).

1.3 Objectives

The objectives of the Phase I-II Geo-Environmental Site Assessment are to:

- Undertake a site walkover and inspection;
- Review historical plans, site investigations, geology, hydrogeology, site sensitivity, floodplain issues, mining records and any local authority information available in order to complete a Desk Study in line with the Environment Agency (EA) document *Land Contamination Risk Management (LCRM)*;
- Undertake an assessment of the near surface through intrusive site investigation;
- Assess the implications of any potential environmental risks, liabilities and development constraints associated with the site in relation to the future use of the site and in relation to off-site receptors;
- Provide a general geotechnical characterisation of the site, including outline recommendations for pavement design and appropriate foundation options; and,
- Provide a factual and interpretative report relating to the site and provide recommendations on any potential development issues with consideration of residential and environmental receptors.

1.4 Sources of Information

Background information was sought from the following sources:

- Groundsure Environmental Database Search (GS-8775595);

- Historical Ordnance Survey Mapping (1868 –2022);
- The British Geological Survey (BGS) map for the site (Sheet 315, Southampton, Solid and Drift Edition at a scale of 1:50,000, 1987);
- Environment Agency flood designations, aquifer designations and groundwater source protection zones (<https://magic.defra.gov.uk/MagicMap.aspx>) [Accessed: 2022/0622];
- Zetica UXO Risk Maps (<https://zeticauxo.com/downloads-and-resources/risk-maps/>); [Accessed: 2022/06/22]
- British Standard BS10175:2011+A2:2017 – Investigation of Potentially Contaminated Sites – Code of Practice;
- British Standard BS5930:2015+A1:2020 – *Code of Practice for Ground Investigations*;
- British Standard BS1377-9:1990 Incorporating Amendment No. 1 – *Methods of Test for Soils for Civil Engineering Purposes – Part 9: In-situ Tests*;
- British Standard BS8485:2015+A1:2019 – *Code of Practice for the Design of Protective Measures for Methane and Carbon Dioxide Ground Gases for New Buildings*;
- CIRIA Publication C665 (2007). *Assessing Risks Posed by Hazardous Ground Gases to Buildings*;
- BRE DG365 (2016). *Soakaway Design*;
- BRE Special Digest 1 (2005). *Concrete in Aggressive Ground*;
- Tomlinson, M.J. (2001). *Foundation Design and Construction*. 7th Edition. Pearson Prentice;
- NHBC Standards (2019). Chapter 4.2 – *Building Near Trees* (2020); and,
- British Standard BS8004:2015 - *Code of Practice for Foundations*.

1.5 Limitations

The limitations of this report are presented in Appendix I.

1.6 Confidentiality

Omnia has prepared this report solely for the use of the Client and those parties with whom a warranty agreement has been executed, or with whom an assignment has been agreed. Should any third party wish to use or rely upon the contents of the report, written approval must be sought from Omnia; a charge may be levied against such approval.

2 SITE SETTING

2.1 Site Details

Table 2-1 Site Details

Site Address	Land east of Moorhill Road, West End, Southampton, SO30 3AX
National Grid Reference	447112 113545
Site Area	0.76ha

All acronyms used within this report are defined in the Glossary presented in Appendix II.

A site location plan is presented as Figure 1.0 (Appendix III).

2.2 Current Site Use

2.2.1 Site Description

The area of investigation is located approximately 2.0 km east of Southampton city centre, and 800m southwest of West End, Southampton. It was approximately rectangular in shape, covering an area of 0.76ha. Access was from the north western corner of the site, off Moorhill Road (A27) to the west.

At the time of the site walkover the site was accessed via a private tarmac road which was noted from visual inspection to be in good condition. The site was secured by two (2no.) wooden gates with concrete pillars at this access point from Moorhill Road (Photograph 1). The wooden gates were secured by key padlocks. The remainder of the site was bordered by wooden fencing.

During the site walkover, the site comprised open, heavily vegetated land with three (3no.) mixed stockpiles scattered throughout the site. Further detail on these stockpiles are explained below. A dirt track, assumed to be previous soft landscaping ran along the west and southern border of the boundary.

Within the north-western corner of the site presumed fly-tipped waste was noted and comprised three (3no.) disused fridges (Photograph 2). Within the centre of the site was an approximately 10.00m x 3.00m x 2.00m pile of presumed demolition rubble (Photograph 3) which is presumed to be from the demolition of the former residential house evident on historical mapping. The demolition rubble contained glass, brick, concrete, and metal and was overgrown with grass.

In the centre of the northern extent of the site was a stockpile of metal (Photograph 4). This was rusted, and staining was noted on the hardcore tarmac floor from previous burning. The pile of metal contained metal racking, corrugated iron roofing approximately 5.00m x 2.00m x 2.00m in size.

On the north western boundary was a rusted green above ground storage tank (AST) tank (Photograph 5) measuring approximately 1.50m x 1.50m x 1.50m. There was no visual evidence of leaking or staining on the floor, however a tar like substance (Photograph 6) was noted within the

pipe exiting the tank. A concrete covered reservoir was also noted in the neighbouring site to the north, which ran the length of the northern boundary, which was identified as such on contemporary OS mapping.

The site was overgrown with vegetation, of dense bushes, weeds, long grass, and scattered deciduous and coniferous trees apart from in the west and centre. Multiple mature coniferous trees were present surrounding the boundary of the site and scattered in the western extent of the site. These were noted to be approximately 8.00m tall.

The site boundary was noted to be surrounded on all sides with wooden panelled fencing. One fence panel had fallen down on the southern boundary, which showed a mound associated with a covered reservoir located to the south and identified as such on contemporary OS mapping. Adjacent to the southern boundary was a control building associated with the reservoir with attached aerials presumed for a telemetry system (Photograph 7).

The general topography of the site was flat, with a gradual west to east slope.

An annotated site location plan showing observations from the walk-over survey is presented as Figure 2.0 and 3.0 (Appendix III). Relevant photographs from the site walk-over survey are located in Appendix IV.

2.2.2 Hazardous Materials Storage

In the northern extent of the site was a green above ground storage tank (Photograph 5) approximately 1.50x1.50x1.50m. There was no visual evidence that the tank was leaking and no staining on the floor, however a tar like substance was noted with the pipe exiting the tank.

2.2.3 Potential Asbestos Containing Material (PACM)

The exact ages of the demolished buildings is unknown, but they are considered to pre-date the year 2000 as historical mapping denotes a residential house and outbuilding from 1896- 2020. As such, they were considered to have the potential to contain Asbestos Containing Materials (ACMs) within the building fabric. It was noted in the site walkover that mixed stockpiles from what is assumed the previous building is still on-site, and therefore it is considered that the stockpiles of demolition rubble have the potential to contain Asbestos Containing Materials. It is therefore recommended that the material within the stockpiles is classified prior to the commencement of site works and further testing is required for potential ACMs.

2.2.4 Waste Storage

Within the north-western corner of the site were three (3no.) presumably fly-tipped disused fridges (Photograph 2) and within the centre of the site an approximately 10.0x3.0x2.0m pile of demolition rubble (Photograph 3) which is presumed to be from the residential house from historical mapping. The demolition rubble contained glass, brick, concrete, and metal and overgrown with grass.

In the centre of the northern extent of the site was a stockpile of metal (Photograph 4). This was rusted, and staining was noted on the hardcore tarmac floor from previous burning. The pile of metal contained metal racking, corrugated iron roofing approximately 5.00x2.00x2.00m.

2.2.5 Tree Species

At the time of the site walkover the site was overgrown with bushes, weeds, long grass and had multiple coniferous trees on the western boundary of the site, these were noted to be approximately 8.00m tall. Additional coniferous and deciduous trees were scattered around the site.

2.2.6 Potential Invasive Species

During the site walkover no obvious signs of potential invasive species were identified.

2.3 Surrounding Area

The surrounding land uses are summarised in Table 2-2 below:

Table 2-2 Land Use

Direction	Land Use
North	Covered reservoir Telegraph Road, with residential housing beyond.
East	Dense coniferous woodland
South	Water treatment plant, beyond is dense woodland, golf course and residential housing.
West	Moorhill Road, with residential housing beyond.

3 SITE HISTORY

3.1 Site History

A review of historical land use pertinent to the site and within a 250m radius is summarised in Table 3-1.

Table 3-1 Historical Land Use

Map Edition	Historical Land Use	
	On Site	Off Site
1868-1869 (1:10,560) (1:2,500)	Site is entirely occupied by undeveloped with coniferous trees. An access track runs west to east along the southern boundary. The southwest corner of the site is deciduous woodland.	The immediate area around the site is mapped as predominately undeveloped land, with to the south and coniferous forests immediately to the north and east. A residential house with five (5no.) associated buildings on the southern boundary on the site. Residential housing from 181m north and from 26m west. A well is noted 53m west and 119m northwest.
1896-1871 (1:10,560 -Partial mapping) (1:2,500)	The site occupied with a residential house denoted 'Fir Cottage' in the northwest of the site with an additional associated building in the centre of the northern extent. The eastern of the site is denoted as coniferous woodland. An assumed greenhouse is located within the southern extent, and a single structure within the south-eastern corner. These are both assumed to be associated with the residential development to the south.	Gravel pits located 111m and 178m north. Pump noted 143m south.
1895-1910 (1:2,500) (1:10,560)	No significant change.	The gravel pit 111m north has been extended to the south, and now is located 81m north. Additional gravel pit 227m north.
1932-1938 (1:10,560)	Partial mapping, no mapping across the site, mapping only shows from 273m west.	Partial mapping, no mapping across the site, mapping only shows from 273m west.

Map Edition	Historical Land Use	
	On Site	Off Site
1940-1950 (1:2,500- Partial mapping) (1:10,560)	No significant change.	Reservoir 24m southwest. Gravel pit 62m northeast. Gravel pit 81m north infilled, coniferous woodland present within the gravel pit. Unspecified tank 108m south. Increase in residential development to the west and north.
1951-1959 (1:2,500-Partial mapping) (1:10,560- Partial mapping)	Additional access added in the northwest corner connection the two buildings along the northern boundary. Structures within the south are no longer depicted on mapping.	Additional residential development to the west. Gravel pit 227m north no longer depicted on mapping.
1962-1967 (1:2,500) (1:10,560)	Outbuilding present on the track of the southern boundary. .	Drain noted 185m northeast, running west to east. Tank 7m southeast and 250m northeast. Gravel pit 18m northeast are no longer present.
1970-1978 (1:10,000) (1:2,500-Partial mapping)	No significant change.	Reservoir on the southern boundary of the site. Electrical substation 40m southwest. No gravel pits present.
1987 (1:10,000)	No significant change.	Reservoir north of the northern boundary of the site. This appears to contain water.
1993 (1:10,000) (1:1,250)	No significant change.	Reservoir to the south depicted as 'covered'.
2001 (1:10,000)	No significant change.	Gravel pit 227m northeast no longer present.
2003 (1:10,000)	No significant change.	Reservoir southwest, now replaced with residential housing.
2010 (1:10,000)	No significant change.	No significant change.
2020 (Aerial Photograph)	Residential house and outbuildings demolished.	No significant change.
2022 (1:10,000)	No significant change.	No significant change.

A selection of historical maps are presented in Appendix V.

3.2 Historical Tank Database

The Groundsure Report identified one (1no.) records of historical tanks within 250m of the study site. The one (1no.) record relating to a single tank located approximately 108m southeast of the site which was identified on historic mapping dated from 1940.

3.3 Historical Energy Features Database

The Groundsure Report identified two (2no.) historical energy features within a 250m radius of the subject site.

- 35-40m southwest – Electricity Substation (1970-1993), shown on historical mapping from 1970; and,
- 212m west – Electricity Substation (1955).

Due to the distance and groundwater flow direction being away from the site in a westerly direction towards the river Itchen and the low mobility of PCBs, the identified electricity sub stations are not considered to have the potential to impact the subject site and have therefore not been considered further.

3.4 Historic Garages and Petrol Stations

The Groundsure Report did not identify any historical petrol stations or historical garages within a 250m radius of the site.

3.5 Historic Industrial Land Uses

The Groundsure Report identified fourteen (14no.) records of historical industrial land uses within 250m of the study site, upon further review these relate to seven (7no.) separate historical land uses.

The identified land uses are:

- 23-27m southwest – Unspecified Heap (2 records) – (1957);
- 50-54m northeast – Gravel Pit (3 Records) – (1957);
- 82m north – Unspecified Pit (2 Records) – (1967-1993);
- 83-115m north – Gravel Pits (3 Records) – (1895-1993);
- 130m north – Unspecified Tank (2 Records) – (1977-1993);
- 184m north – Gravel Pits – (1897); and,
- 218-263m northeast - Gravel Pits (2 Records) – (1897-1957).

Due to the distance from site, the expected groundwater flow direction and the industrial use profiles, the unspecified tank is not considered to have the potential to impact the subject site and have therefore not been considered further.

3.6 Planning History

A review of the online planning portal of Eastleigh Borough Council identified five (5no.) planning applications attributed to the site postcode.

Numerous applications relate to Tree Protection Orders (TPO) and extensions, with any pertinent information summaries below. All application for tree works on TPO's were granted or withdrawn by the applicant.

No environmental conditions were places on the applications for the extensions.

One (1no.) application was the current planning permission held for a replacement dwelling, under the local authority reference [F/20/87694](#).

3.7 Unexploded Ordnance Risk Assessment

A review of publicly available information (provided by Zetica UXO) shows the site as having a 'low risk' associated with bombing density and bomb risk.

The site is consequently considered **Low Risk** with regards to unexploded ordnance.

4 ENVIRONMENTAL SETTING

4.1 Geology and Hydrogeology

British Geological Survey Map (Sheet 315, Southampton, Solid and Drift Edition at a scale of 1:50,000, 1987) indicates that the site is underlain by the following geological sequence:

Table 4-1 Geology

Geological Unit	Formation Name	Description	Aquifer Classification
Superficial	River Terrace Deposits	Sand & Gravel	Secondary A
Bedrock	Wittering Formation	Sand, silt and clay	Secondary A

The Groundsure report records no data for Artificial and Made Ground on the proposed site. Made Ground, landscaped ground and reclaimed ground were not identified within 250m of the site. The closest Made Ground being 304m north of the site.

Review of the environmental database indicates that the site is not located within a groundwater Source Protection Zone. There are no active or historical water abstractions located within 250m of the site. The closest active groundwater abstraction is located 1012m northeast. There are no active or historical potable water abstractions located within 250m of the site.

Groundwater vulnerability data indicates that the site is underlain by a Superficial Secondary A Aquifer with medium vulnerability, as well as a Secondary A Aquifer with medium vulnerability within the bedrock.

Based on local topography and the location of surface watercourses, it is considered that shallow groundwater, if present, will follow local topography and flow away from site in a westerly direction towards The River Itchen.

4.1.1 Groundwater Flooding

The Groundsure report indicates that the site is at low risk of groundwater flooding, with land within 50m north of the site having a low risk.

4.2 Hydrology and Flooding

The Groundsure report identifies three (3no.) inland watercourses within 250m of the site (two located 153-169m southeast and one located 178m northeast of the site). These are all unaffected by tidal action. Historical maps indicate these watercourses to be drainage pathways and attributed to the reservoirs.

Two (2no.) surface water body catchments were recorded onsite, noted as a costal catchment for both The River Itchen and East Hampshire Rivers. The southeast Hampshire Group was noted as

having chemical and ecological ratings of 'poor' and 'good' respectively, with an overall rating of 'poor' measured in 2016 by the Environment Agency.

No surface water abstraction licences were identified on-site or within a 250m radius.

The Groundsure Report identified the site to be within an area of both low risk of river and coastal flooding and negligible risk of surface water flooding.

4.3 Geotechnical Data

Geotechnical Data presented within the Groundsure Report identifies the following potential ground hazards which are summarised in Table 4-2 below:

Table 4-2 Geotechnical Data

Hazard	Designation
Shrink-Swell Clay	Moderate- Ground conditions predominantly high plasticity.
Landslides	Very Low- Slope instability problems are not likely to occur but consideration to potential problems of adjacent areas impacting on the site should always be considered.
Ground Dissolution	Negligible- Deposits with potential to collapse when loaded and saturated are unlikely to be present.
Compressible Ground	Negligible- Compressible strata are not thought to occur.
Collapsible Deposits	Very Low- Soluble rocks are either not thought to be present within the ground, or not prone to dissolution. Dissolution features are unlikely to be present.
Running Sand	Very Low- Running sand conditions are unlikely.

4.4 Mining and Ground Workings

The site is not located within an area that is affected by coal mining and therefore no Coal Authority mining report was obtained for the purposes of this report.

BritPits, which is a database containing information of active and closed surface and underground mineral workings, detailed two (2no.) records of pits. These are located 136m and 208m north, both named as Telegraph Wood Gravel Pit.

There are no active records of mining within 500m of the site however the Groundsure identified twenty-five (25no.) records exist for historic surface ground workings within 250m of the study site, which relate to eight (8no.) different uses, summarised below:

- 6m north - Reservoir (2 records) - (1987-1993); *-this source is still current, the date relate to the covering of the reservoir.*
- 11m south - Reservoir (3 records) - (1977-1993); *-this source is still current, the date relate to the covering of the reservoir.*
- 18-30m southwest – Reservoirs (3 records) – (1977-1993);
- 23-30m southwest - Unspecified Heap (3 records) - (1957);
- 50-54m northeast - Gravel Pit (3 records) – (1957);

- 82m north - Unspecified Pit (4 records) – (1967-1993);
- 83-184 north - Gravel Pits (4 records) – (1895-1910); and,
- 218m northeast – Gravel Pits (3 records) – (1957).

4.5 Radon Risk Potential

The site lies within an area where less than 1% of the properties are above the Action Level. At these levels BRE publication BR211 indicates that no special radon protective measures are required in the construction of new extensions or dwellings.

4.6 Current Industrial Land Uses

The Groundsure Report identified seven (7no.) current industrial land uses within a 250m radius of the subject site:

- 6m north - Reservoir (Current);- *this feature is currently active, filled with water and maintained therefore is not considered to pose a significant risk and therefore will not be considered further.*
- 11m south - Reservoir (Current);- *this feature is currently active, filled with water and maintained therefore is not considered to pose a significant risk and therefore will not be considered further.*
- 26m southwest - Pumping Station;- *this feature was identified within the site walkover as a control building for the covered reservoir.*
- 38m southwest - Electrical Substation;
- 91m southeast – Pylon- *After review this feature is not considered to pose a significant risk and therefore will not be considered further;*
- 93m south – Mast – *After review this feature is not considered to pose a significant risk and therefore will not be considered further;*
- 144m south – J P Appliances and Aztec Appliances – *After review it is a repair service operating as a home call out business and therefore is not considered to have the potential to pose a significant risk and will not be considered further; and,*
- 215m west – Electrical substation.

As set out in Section 3.3, due to the distance and direction from the site and the low mobility of PCBs, the identified electricity sub stations are not considered to have the potential to impact the subject site and have therefore not been considered further.

4.7 Sensitive Land Uses

The Groundsure report indicates that the site is located within a currently defined Nitrate Vulnerable Zone (NVZ) associated with the Hamble Estuary.

The Groundsure report also identified the site to be within a SSSI Impact Risk Zone.

4.7.1 Sites of Special Scientific Interest (SSSI) Impact Risk Zones

The Groundsure Report identified that the site is located within an SSSI Impact Risk Zone associated with Moorgreen Meadows.

The Groundsure Report states that any discharges of water or waste to ground or a surface watercourse require consultation, and it is recommended that contact should be made with a suitably qualified planning consultant for further information.

4.7.2 Nitrate Vulnerable Zone (NVZ)

The site lies within the Hamble Estuary Eutrophic Nitrate Vulnerable Zone and due to site lying within a SSSI Impact Risk Zone, the nutrient contents of all discharges, including those to the main sewer, need to be considered in combination for impacts on the surrounding area and Solent Water.

It is considered likely that a nitrate balance report will be required as part of the planning application to assess the potential risk posed from the proposed development on nitrates entering surrounding waters.

4.8 Site Sensitivity Assessment

Based on the information presented in the sections above, the site is considered as being located within a Low-Moderate sensitivity setting due to the following reasons:

- Underlying Secondary A Aquifer within superficial strata and bedrock;
- Geological mapping indicates granular deposits for both superficial deposits and bedrock deposits beneath the site;
- Site located within a SSSI impact risk zone (Moorgreen Meadows);
- Site is within a Nitrate Vulnerable Zone (NVZ); and,
- Moderate groundwater flooding risk.

5 CONSULTATIONS

5.1 Contaminated Land Officer

Contact was made with Eastleigh Borough Council via email in June 2022 regarding whether the council were aware of any environmental issues pertaining to the site.

A response was received stating that there are no entries in the register maintained under S.78 R (1) of the Environmental Protection Act 1990 regarding the site.

5.2 Landfill and Waste Treatment Sites

The Groundsure Report identified no records of historic landfill sites or historic waste treatment sites within 250m of the subject site.

The Groundsure Report identified no active or recently closed licensed waste sites within 250m of the site boundary.

5.3 Potentially Infilled Land

The Groundsure report identified no areas of infilled land within 250m of the site. However, a review of Section 4.4 and historical maps indicates historical ground workings that have the potential to have been infilled as listed below:

- 6m north - Reservoir (2 records) - (1987-1993); *-this source is still current; the dates relate to the covering of the reservoir.*
- 11m south - Reservoir (3 records) - (1977-1993); *-this source is still current; the dates relate to the covering of the reservoir.*
- 18-30m southwest – Reservoirs (3 records) – (1977-1993);
- 23-30m southwest - Unspecified Heap (3 records) - (1957);
- 50-54m northeast - Gravel Pit (3 records) – (1957);
- 82m north - Unspecified Pit (4 records) – (1967-1993);
- 83-184 north - Gravel Pits (4 records) – (1895-1910); and,
- 218m northeast – Gravel Pits (3 records) – (1957).

5.4 Regulatory Database

The following information has been obtained from a commercially available environmental database. The summary table (Table 5-1) only includes records not otherwise detailed in the report. Where more than two entries have been identified, the Table summarises the closest two entries to the site.

Table 5-1 Summary of Groundsure Data

	0- 249m	250- 500m	Details
Sites Determined as Contaminated Land	0	0	N/A
Control of Major Accident Hazards (COMAH)	0	0	N/A
Regulated Explosive Sites	0	0	N/A
Hazardous substance storage/usage	0	0	N/A
Historical licensed Industrial Activities (IPC)	0	0	N/A
Licensed Industrial Activities (Part A(1))	0	0	N/A
Licensed Pollutant Release (Part A(2)/B)	0	0	N/A
Radioactive Substance Authorisations	0	0	N/A
Licensed discharges to controlled waters	0	2	276m South – Sewage discharges into unnamed land (No longer active, revocation in 1989) 421m south – sewage discharges into unnamed land (no longer active, revocation in 1978)
Pollutant release to surface water (Red List)	0	0	N/A
Pollutant Release to public sewer	0	0	N/A
List 1 Dangerous Substances	0	0	N/A
List 2 Dangerous Substances	1	3	N/A
Pollution Incidents (EA/NRW)	0	0	N/A
Pollution Inventory Substances	0	0	N/A
Pollution Inventory Waste Transfers	0	0	N/A
Pollution Inventory Radioactive Waste	0	0	N/A

6 CONCEPTUAL SITE MODEL (CSM)

6.1 Initial CSM

In accordance with Environment Agency, CLR 11 (2004) and BSI 10175 (Code of Practice for Investigation of Potentially Contaminated Land), Omnia Environmental Consulting have developed an initial CSM to identify potential contamination sources, migration pathways and receptors within the study area. A residential end use has been adopted given the proposed site development.

6.1.1 On-site Potential Sources

- Made Ground associated with historical development of the site;
- Onsite Burning (Historic) – *Identified within the site walkover; and,*
- Metal Tank (Current) – *Identified within the site walkover.*
- *Waste stock Piles, presumed building demolition rubble and stockpile of waste metal*

6.1.2 Off-site Potential Sources

- 6m south – Electrical Substation (Current) – *Identified within Site Walkover;*
- 23-30m southwest - Unspecified Heap (Historic);
- 26m southwest- Pump station (Current);
- 30m southwest – Reservoir (1940-2003);
- 50-218m northeast and 83-184m north - Gravel Pits (Historic);
- 82m north – Unspecified Pit (Historic);
- 130m north – Unspecified tank (Historic).

6.1.3 Potential Pathways

- Inhalation and ingestion of impacted soils and dusts;
- Dermal contact with impacted soils;
- Inhalation of vapours;
- Vertical and lateral migration; and,
- Migration of gas into confined spaces.

6.1.4 Potential Receptors

- Future Site Users.
- Controlled Waters
 - Groundwater in underlying Secondary A Aquifer
 - Inland watercourses within 250m of the site (two located 153-169m southeast and one located 178m northeast of the site).

Construction workers are not considered to be a plausible receptor due to management of their exposure through the use of suitable PPE and hygienic working practices as required under HSE/CDM regulations. Furthermore, the length of any exposure is considered to be very short in comparison to the criteria for which the adopted end use has been derived. An Initial Conceptual Site Model has been prepared for the site and is presented overleaf within Table 6-1.

Table 6-1 Initial Conceptual Site Model

Source	Contaminant	Potential Migration Pathway	Potential Receptors	Likelihood of Occurrence	Magnitude of Occurrence	Overall Risk Rating	Active/Inactive
On-Site Potential Sources							
Made Ground associated with historical development of the site	Ground Gas (CO ₂ , CH ₄)	Vertical and lateral migration into confined spaces	Future site users	Low	Severe	Low/Moderate	Potentially Active – Phase II Investigation Required (See Section 7). Gas Monitoring being undertaken (See Section 8.3.4)
	Metals (As, B, Cd, Cr, Pb, Hg, Se, Ni, Zn)	Ingestion of impacted soils and dust	Future site users	Moderate	Moderate	Moderate	Potentially Active – Phase II Investigation Required (See Section 7).
		Vertical and lateral migration	Controlled Waters	Moderate	Minor	Low/Moderate	
	Total Petroleum Hydrocarbons (TPH)	Ingestion of impacted soils and dust	Future site users	Moderate	Moderate	Moderate	
		Vertical and lateral migration	Controlled Waters	Low	Minor	Low/Moderate	
	Polycyclic Aromatic Hydrocarbons (PAH)	Ingestion of impacted soils and dust	Future site users	Moderate	Moderate	Moderate	
		Vertical and lateral migration	Controlled Waters	Low	Minor	Low/Moderate	
	Asbestos	Inhalation of fibres	Future site users	Moderate	Moderate	Moderate	

Source	Contaminant	Potential Migration Pathway	Potential Receptors	Likelihood of Occurrence	Magnitude of Occurrence	Overall Risk Rating	Active/Inactive
On-site Burning	Total Petroleum Hydrocarbons (TPH)	Ingestion of impacted soils and dust	Future site users	Low	Moderate	Low/Moderate	Potentially Active – Phase II Investigation Required (See Section 7).
		Vertical and lateral migration	Controlled Waters	Low	Minor	Low/Moderate	
	Polycyclic Aromatic Hydrocarbons (PAH)	Ingestion of impacted soils and dust	Future site users	Moderate	Moderate	Moderate	
		Vertical and lateral migration	Controlled Waters	Low	Minor	Low/Moderate	
Metal above ground storage tank (AST)	Total Petroleum Hydrocarbons (TPH)	Ingestion of impacted soils and dust	Future site users	Moderate	Moderate	Low/Moderate	Potentially Active – Phase II Investigation Required (See Section 7).
		Vertical and lateral migration	Controlled Waters	Low	Minor	Low/Moderate	
Off-Site Potential Sources							
Electrical Substation 6m south (Current)	Polychlorinated Biphenyls (PCBs)	Lateral Migration	Future site users	Low	Moderate	Low/Moderate	Potentially Active – Phase II Investigation Required (See Section 7).
23-30m southwest - Unspecified Heap (1967-1993)	Ground Gas (CO ₂ , CH ₄)	Vertical and lateral migration into confined spaces	Future site users	Moderate	Severe	High	Inactive – Due to the source being a heap, it is considered that ground gas would vent freely and not migrate. In addition due direction of the source, and the anticipated groundwater flow it is considered unlikely to pose a potential risk for the future site users.
	Metals (As, B, Cd, Cr, Pb, Hg, Se, Ni, Zn)	Lateral Migration	Future site users	Low	Moderate	Low/Moderate	
		Vertical and lateral migration	Controlled Waters	Low	Minor	Low/Moderate	

Source	Contaminant	Potential Migration Pathway	Potential Receptors	Likelihood of Occurrence	Magnitude of Occurrence	Overall Risk Rating	Active/Inactive
	Total Petroleum Hydrocarbons (TPH)	Lateral Migration	Future site users	Low	Moderate	Low/Moderate	
		Vertical and lateral migration	Controlled Waters	Low	Minor	Low/Moderate	
	Polycyclic Aromatic Hydrocarbons (PAH)	Lateral Migration	Future site users	Low	Moderate	Low/Moderate	
		Vertical and lateral migration	Controlled Waters	Low	Minor	Low/Moderate	
	Asbestos	Lateral Migration	Future site users	Low	Moderate	Low/Moderate	
	Total Petroleum Hydrocarbons (TPH)	Lateral Migration	Future site users	Low	Moderate	Low/Moderate	
		Vertical and lateral migration	Controlled Waters	Low	Minor	Low/Moderate	
	Polycyclic Aromatic Hydrocarbons (PAH)	Lateral Migration	Future site users	Low	Moderate	Low/Moderate	
		Vertical and lateral migration	Controlled Waters	Low	Minor	Low/Moderate	
50-218m northeast and 83-184m north Gravel Pit (1895-1993)	Ground Gas (CO ₂ , CH ₄)	Vertical and lateral migration into confined spaces	Future site users	Moderate	Severe	High	Potentially Active – Phase II Investigation Required (See Section 7).
	Metals (As, B, Cd, Cr, Pb, Hg,	Lateral Migration	Future site users	Low	Moderate	Low/Moderate	Inactive – Due to the direction of the potential source away from site and

Source	Contaminant	Potential Migration Pathway	Potential Receptors	Likelihood of Occurrence	Magnitude of Occurrence	Overall Risk Rating	Active/Inactive
	Se, Ni, Zn)	Vertical and lateral migration	Controlled Waters	Low	Minor	Low/Moderate	the anticipated groundwater flow, it is considered unlikely to pose a potential risk for the future site users.
	Total Petroleum Hydrocarbons (TPH)	Lateral Migration	Future site users	Low	Moderate	Low/Moderate	
		Vertical and lateral migration	Controlled Waters	Low	Minor	Low/Moderate	
82m north Unspecified Pit (1967-1993)	Ground Gas (CO ₂ , CH ₄)	Vertical and lateral migration into confined spaces	Future site users	Moderate	Severe	High	Potentially Active – Phase II Investigation Required (See Section 7).
	Metals (As, B, Cd, Cr, Pb, Hg, Se, Ni, Zn)	Lateral Migration	Future site users	Low	Moderate	Low/Moderate	Inactive – Due to the direction of the potential source away from site and the anticipated groundwater flow, it is considered unlikely to pose a potential risk for the future site users.
		Vertical and lateral migration	Controlled Waters	Low	Minor	Low/Moderate	
	Total Petroleum Hydrocarbons (TPH)	Lateral Migration	Future site users	Low	Moderate	Low/Moderate	
		Vertical and lateral migration	Controlled Waters	Low	Minor	Low/Moderate	
130m north Unspecified Tank (1977-1993)	Total Petroleum Hydrocarbons (TPH)	Lateral Migration	Future site users	Low	Moderate	Low/Moderate	Inactive – Due to the direction of the potential source away from site and the anticipated groundwater flow, it is considered unlikely to pose a potential risk for the future site users.
		Vertical and lateral migration	Controlled Waters	Low	Minor	Low/Moderate	

7 SITE INVESTIGATION

7.1 General

A ground investigation was designed based on your requirements and the proposed site development as shown in Figure 2.0 (Appendix III).

Following completion of the desk study and a review of the available data, ground investigation works were required on site to investigate the potential for impacted materials to be present on-site from identified on-site and nearby off-site potential sources.

Exploratory fieldwork was conducted over two (2no.) working days, commencing on 25th May 2022 and comprised the following:

Table 7-1 Site Investigation Summary

Potential Source/Rationale	Location Hole	Type	Maximum Depth (m bgl)	Borehole Response Zone (m bgl)
To investigate any spill from the tank identified within the site walkover.	HP101	Hand Pit	0.60	N/A
Locations for the assessment of drainage conditions of shallow soils to facilitate soakaway design. To allow the assessment of potential contamination and to gather information on geotechnical characterisation of the soil and collection of chemical and geotechnical samples.	SA101	Machine Excavated Trial Pit	2.30	
Locations for the assessment of drainage conditions of shallow soils to facilitate soakaway design. To allow the assessment of potential contamination from the stockpile of mixed rubble from the previous residential house and to gather information on geotechnical characterisation of the soil and collection of chemical and geotechnical samples.	SA102		1.60	
Locations for the assessment of drainage conditions of shallow soils to facilitate soakaway design. To allow the assessment of potential contamination from the stock pile of metal and to gather information on geotechnical	SA103		2.60	

Potential Source/Rationale	Location Hole	Type	Maximum Depth (m bgl)	Borehole Response Zone (m bgl)
characterisation of the soil and collection of chemical and geotechnical samples.				
To undertake additional soakaway testing in in full accordance with BRE DG365 – <i>Soakaway Design</i> , in locations specified by the drainage engineer.	SA201		1.70	N/A
	SA202		1.70	
	SA203		1.80	
	SA204		2.10	
With locations targeting below the proposed footprint of the development onsite to allow the assessment of potential contamination and to gather information on geotechnical characterisation of the soil and collection of chemical and geotechnical samples.	WS101	Window Sampling	2.00	1.00-2.00
	WS102		1.70	N/A
To allow the assessment of potential contamination from the tank identified within the site walkover and to gather information on geotechnical characterisation of the soil and collection of chemical and geotechnical samples.	WS105		2.10	
To allow the assessment of potential contamination and to gather information on geotechnical characterisation of the soil and collection of chemical and geotechnical samples.	WS103		2.00	1.00-2.00
To allow the assessment of potential contamination from the stockpile of mixed rubble from the previous residential house and to gather information on geotechnical characterisation of the soil and collection of chemical and geotechnical samples.	WS104		1.30	0.60-1.30
Targeted below the proposed roads, used for derivation of in-situ California Bearing Ratios use to facilitate road pavement design	DCP101	Dynamic Cone Penetrometer	0.86	N/A
	DCP102		0.86	
	DCP103		0.86	
	DCP104		0.34	
	DCP105		0.87	

The exploratory hole locations are illustrated on Figure 3.0 (Appendix III). The ground conditions encountered are indicated on the exploratory hole logs, which are provided in Appendix VI.

7.2 Laboratory Analysis

Selected soil samples were submitted for a range of chemical analysis including:

- CLEA Metals;
- Asbestos fibres in soil;
- Speciated Polycyclic Aromatic Hydrocarbons (PAHs);
- Banded Gasoline Range Organics (GRO);
- Banded Extractible Petroleum Hydrocarbons (TPHs);
- Total Cyanide;
- PH;
- Phenols; and,
- Polychlorinated Biphenyls (PCBs).

Element Materials Technology of Deeside undertook the analytical work in accordance with UKAS accreditation where applicable and the laboratory analysis certificates are presented as Appendix VII and discussed in Section 9.

Selected soil samples were submitted to I2 Analytical for a range of geotechnical testing, in accordance with UKAS methodology where applicable, comprising:

- Moisture Content;
- Atterberg Limit Testing;
- Partial Size Distribution (PSD) Wet Sieve;
- PH; and,
- Water Soluble Sulphate (2:1).

The geotechnical analysis certificates are presented in Appendix IX.

7.3 Ground Gas and Groundwater Monitoring

Concentrations of methane (CH₄), carbon dioxide (CO₂) and oxygen (O₂) were measured using an infrared gas analyser (GA5000), calibrated to a reference standard (before and after each survey) and gas flow rates were measured using an internal flow pod.

Gas concentrations were recorded at thirty second intervals until gas concentrations stabilised for three (3no.) consecutive readings (a minimum of ninety seconds) at each location, at which point the maximum concentrations of CH₄ and CO₂, together with the lowest concentration of O₂ were recorded.

Groundwater monitoring was undertaken using an electronic dip tape to record the depth to groundwater. Ground gas and groundwater results are presented in Section 8.3.4 and discussed in Section 9.

8 GROUND AND GROUNDWATER CONDITIONS

8.1 Summary of Ground Conditions

The published British Geological Survey (BGS) map for the site (Sheet 315, Southampton, Solid and Drift Edition at a scale of 1:50,000, 1987) indicates that the superficial geology on-site comprises River Terrace Deposits of sand and gravel overlying bedrock deposits of the Wittering Formation across the entire site.

Geology encountered on site generally corresponds with that highlighted within published BGS Mapping and the findings have been outlined below.

8.1.1 Made Ground

Made Ground was encountered within four (4no.) intrusive locations (SA101, SA202-SA204) and generally comprised grass over reddish brown slightly silty gravelly fine to coarse SAND with frequent rootlets. Gravel was angular to subrounded fine to coarse flint, brick, concrete, and tile.

The Made Ground encountered within SA203 consisted of 200mm of Reddish brown and grey Type 1 concrete crush.

Made Ground was encountered to a maximum depth of 0.60m bgl within SA204.

8.1.2 Topsoil

Topsoil was encountered within nine (9no.) intrusive locations, and generally comprised grass over dark brown gravelly fine SAND. Gravel was subangular to rounded fine to medium flint. Topsoil was encountered to a maximum depth of 0.60m bgl.

8.1.3 Superficial Deposits

8.1.3.1 River Terrace Deposits

Superficial deposits were encountered within all thirteen (13no.) intrusive locations and generally comprised orangish brown slightly clayey gravelly fine to medium SAND. Gravel was subangular to subrounded fine to medium flint.

Within five (5no.) intrusive locations (SA101, SA103, WS101, WS105 and SA202) the superficial deposits comprised soft orange gravelly sandy CLAY/SILT. Sand was coarse, gravel was subangular to subrounded fine to coarse flint; and within one (1no.) intrusive location (SA101) and comprised soft orange mottled blueish grey CLAY.

The base of the superficial deposits was not proven by the intrusive investigation.

8.1.4 Groundwater Conditions

Groundwater strikes were encountered during works in one (1no.) location only, as summarised in Table 8-1.

Table 8-1. Summary of Groundwater Conditions

Location	Depth (m bgl)	Strata	Type of Water Strike
SA103	2.60	River Terrace Deposits	Seepage

8.2 Laboratory Classification Analysis

Soil classification testing, including Atterberg Limits, Moisture Content, Particle Size Distribution and pH and Sulphate results are summarised in Table 8-2 – Table 8-5 with analysis certificates presented in Appendix VIII.

8.2.1 Soil Plasticity

Five (5no.) samples taken from cohesive deposits across the site were submitted to the laboratory for laboratory plasticity analysis. The results of this analysis have been summarised in Table 8-2 below.

Table 8-2. Summary of Soil Plasticity

Location	Depth (m bgl)	Geology	Natural Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Percentage passing 425µm sieve (%)	Modified Plasticity Index	Plasticity	Volume Change Potential
SA101	0.40-0.50	Brown very gravelly slightly sandy CLAY	12	48	24	24	34	8	Medium	low
SA101	2.00-2.30	Yellowish brown CLAY	30	86	32	54	100	54	High	High
SA103	0.70-0.80	Yellowish brown slightly gravelly sandy CLAY	11	35	16	19	81	15	Low	Medium
WS101	0.50-0.80	Brown gravelly very sandy CLAY	17	34	24	10	41	4	Low	Low
WS102	1.30-1.50	Yellowish brown slightly sandy CLAY	20	47	21	26	100	26	Medium	Medium

The results presented in Table 8-2 indicate that the plasticity of the clay present on site is Low to High. The volume change potential generally ranges from low to high.

8.2.2 Particle Size Distribution Analysis

Two (2no.) soil samples were submitted to the laboratory for Particle Size Distribution (PSD) analysis, with the results presented below in Table 8-3. The results are consistent with the on-site observations and descriptions.

Table 8-3. Summary of Particle Size Distribution

Location	Depth (m bgl)	Laboratory Description	Granulometric Composition (%)				
			Fines (<0.063mm)		Sand	Gravel	Cobbles
			Clay	Silt			
SA101	1.90-2.00	Yellowish brown slightly silty, clayey, sandy GRAVEL	9	6	21	64	0
SA103	1.10-1.30	Yellowish brown slightly clayey, silty, very sandy GRAVEL	3	10	42	45	0

8.2.3 Moisture Content

Seven (7no.) samples taken from deposits across the site were submitted to the laboratory for moisture content analysis. The results of this analysis have been summarised in Table 8-4 below.

Table 8-4. Summary of Moisture Content

Location	Depth (m bgl)	Natural Moisture Content (%)	Lab Description
SA101	1.90-2.00	8.6	Brown clay and loam with gravel and vegetation
SA101	2.00-2.30	17	Brown clay and loam
SA103	1.10-1.30	12	Brown sand with gravel
WS101	0.50-0.80	14	Brown clay and loam with gravel and vegetation
WS102	0.10-0.20	25.5	Brown soil/stones
	1.30-1.50	12	Brown clay and sand
WS105	0.40-0.60	11.1	Brown soil/stones

8.2.4 pH and Sulphate

Chemical analysis for pH and soluble sulphate content are summarised in Table 8-5 below with analysis certificates presented as Appendix VII and IX.

Table 8-5. Summary of pH and Sulphate Data

Location	Depth (m bgl)	SO ₄ in 2:1 water / soil (mg/l)	pH Value
HP101	0.20-0.30	11.3	4.56
SA101	0.10-0.20	8.4	7.91
	1.90-2.00	67	7.2
	2.00-2.30	36	5.2
	0.40-0.60	9.4	4.96
SA102	1.10-1.30	29	4.9
WS101	0.30-0.50	26.3	6.68
	0.50-0.80	19	7.7
WS102	0.30-0.50	4.39	5.02
	1.30-1.50	4.3	4.7
WS103	0.90-1.00	87.9	4.36
WS104	0.10-0.20	9.6	6.17
WS105	0.40-0.60	38.3	7.58

Due to the size of the dataset (>10 samples), characteristic pH and SO₄ values were calculated using the highest 20% measured sulphate concentrations and the lowest 20% measured pH value as stated in the BRE Special Digest (2005) producing a site characteristic value for sulphate of 64.4mg/l and a pH value of 4.54.

Soils encountered beneath the site have been classified in accordance with DS-1, Aggressive Chemical Environment for Concrete Classification (ACEC) AC-3z for brownfield locations with the recommendations provided in BRE Special Digest 1 (2005).

8.3 In-Situ Testing

8.3.1 Standard Penetration Tests (SPT)

Standard Penetration Tests (SPT) were carried out in all windowless sampling boreholes in accordance with techniques outlined in BS1377, to assess the strength/density of the underlying strata. The 'N' value (number of blows per 300mm penetration) was recorded for each test. The results of these in-situ tests, including full blow counts, are presented on the borehole logs within Appendix VI.

8.3.2 Dynamic Cone Penetrometer (DCP) Testing

In-situ California Bearing Ratio (CBR) values for near surface strata were obtained via Dynamic Cone Penetrometer (DCP) testing and were undertaken at within locations DCP101 – DCP105 in areas of proposed access infrastructure, as presented on Figure 3.0, Appendix III. The results are summarised in Table 8-6 below with CBR values of underlying strata provided.

The DCP results sheets are included within Appendix IX. CBR results have been given from the blow counts across the strata tested, abnormally high blow counts are likely attributed from larger granular material within the strata and have been excluded as they are not considered to be representative.

Table 8-6. Summary of In-situ CBR Results

Location	Depth (mm bgl)	CBR Value (%)
DCP101	32-330	8.4
	330-600	20.3
	600-860	22.2
DCP102	21-140	17.4
	140-600	12.1
	140-862	44.7
DCP103	43-350	9.8
	350-610	7.6
	610-860	24.3
DCP104	28-110	22.4
	110-200	68.1
	200-341	34.3
DCP105	25-230	42.4
	230-640	32.0
	640-878	14.0

CBR values ranged from 7.6% to 68.1% between ground level and 878mm bgl. Using a conservative approach, a CBR value of 7.6% should be adopted across the site at this stage. Notwithstanding these results, confirmatory CBR testing should be carried out at formation level once details are finalised.

8.3.3 Soil Infiltration Testing – Falling Head Permeability Test

In-situ soil infiltration testing was undertaken in general accordance with BRE DG365 – *Soakaway Design* within the near surface at locations SA101-SA103 at a depths of 1.40-2.40m bgl during the initial intrusive investigation works undertaken in May 2022.

Additional soil infiltration testing was undertaken in full accordance with BRE DG365 – *Soakaway Design* within the near surface at locations SA201-SA104 at a depths of 1.70-2.10m bgl during the additional works undertaken in July 2022.

All soil Infiltration test certificates are presented as Appendix XI and summarised in Table 8-7 below.

Table 8-7. Summary of Soil Infiltration Testing

Location	Test	Pit Dimensions (L x W x D) (m)	Depth to fill (m bgl)	Strata Type	Duration of test (hrs:mm)	Soil Infiltrations Rate (m/s)
SA101	1*	2.10x0.55x2.00	1.30	Orange clayey gravelly SAND	24 Hours	1.83×10^{-6}
	2	2.10x0.55x2.00	0.88		5 hours 34 mins	Fail
SA102	1	2.15x0.50x1.60	0.60	Orange slightly clayey gravelly SAND	22 hours	3.25×10^{-6}
	2	2.15x0.50x1.40	0.45		6 hours 12 mins	Fail
SA103	1	2.70x0.50x2.40	1.54	Orange slightly	22 hours 25 mins	9.04×10^{-6}

Location	Test	Pit Dimensions (L x W x D) (m)	Depth to fill (m bgl)	Strata Type	Duration of test (hrs:mm)	Soil Infiltrations Rate (m/s)
	2	2.70x0.50x2.40	1.28	clayey gravelly SAND	6 hours 9 mins	7.91×10^{-6}
SA201	1	2.70x0.70x1.70	0.53	Orangish brown slightly silty gravelly SAND and sandy clayey GRAVEL	7 hours 30 mins	7.24×10^{-6}
	2	2.70x0.70x1.70	0.54		12 hours 40 mins	4.34×10^{-6}
	3	2.70x0.70x1.70	0.70		15 hours	3.82×10^{-6}
SA202	1	2.30x0.60x1.52	0.50	Orangish brown slightly silty gravelly SAND and sandy SILT	2 hours 46 mins	1.71×10^{-5}
	2	2.30x0.60x1.52	0.35		4 hours 16 mins	1.17×10^{-5}
	3	2.30x0.60x1.52	0.55		2 hours 36 mins	1.34×10^{-5}
SA203	1	2.30x0.70x1.83	0.90	Orange and dark brown slightly gravelly slightly silty SAND	49 mins	6.31×10^{-5}
	2	2.30x0.70x1.83	0.58		40 mins	7.94×10^{-5}
	3	2.30x0.70x1.83	0.48		54 mins	5.99×10^{-5}
SA204	1	2.60x0.80x1.94	0.91	Orangish brown silty gravelly SAND and clayey sandy GRAVEL	6 hours 21 mins	8.74×10^{-6}
	2	2.60x0.80x1.94	0.88		15 hours	3.59×10^{-6}
	3	2.60x0.80x1.94	0.90		22 hours 5 mins	2.52×10^{-6}

**Extrapolated data to provide an indicative soil infiltration rate only*

SA101-SA103

Test 1 within SA102 and Tests 1-2 within SA103 were considered successful as both the 25% and 75% effective storage depths were reached for each test, with infiltration rates provide above within Table 8-7 above. Due to the proximity of the results to the 25% depth intercept within Test 1 of SA101, the data has been extrapolated using a line of best fit for the linear part of the graph to provide an indicative soil infiltration rate. It should be noted that the infiltration rate for Test 1 of SA101 should be treated as indicative only and should not be used for design purposes.

The results of the soakaway tests are consistent with the encountered geology, with soakaway tests yielding soil infiltration rates ranging from 3.25×10^{-6} to 9.04×10^{-6} . By reference to published data (Carter & Bentley, 1981), the results are indicative of low to medium permeability and good drainage conditions.

The required 25% and 75% effective storage depth intercepts were not reached during Tests 2 of SA101 and SA102 and so the tests were considered to be unsuccessful and soil infiltration rates could not be calculated.

SA201-SA204

All three (3no.) tests within SA201-SA204 were considered successful as both the 25% and 75% effective storage depths were reached for each test, with infiltration rates provided above within Table 8-7 above.

The results of the soakaway tests are consistent with the encountered geology, with soakaway tests yielding soil infiltration rates ranging from 2.52×10^{-6} to 7.94×10^{-5} m/s. By reference to published data (Carter & Bentley, 1981), the results are indicative of low to medium permeability and good drainage conditions.

Based on the results presented above soils beneath the site may prove suitable for the adoption of conventional soakaway design. However, it is recommended that the calculated infiltration rates are provided to a suitability qualified drainage engineer. The application of soakaway drainage will ultimately be dependent on the specific requirements of the development. All soakaways should be designed in accordance with BRE Special Digest 365-Soakaway Design.

8.3.4 Ground Gas

Three (3no.) ground gas and groundwater monitoring visits have been undertaken across three (3no.) monitoring wells (WS101, WS103 and WS104) at the site between 06/06/2022 and 22/06/2022. The results of the gas and groundwater monitoring are presented in Table 8-8 overleaf.

Table 8-8. Summary of Ground Gas and Groundwater Monitoring Results

Well	Date	CH ₄ Peak %v/v	CH ₄ Steady %v/v	CH ₄ GSV l/hr	CO ₂ Peak %v/v	CO ₂ Steady %v/v	CO ₂ GSV l/hr	O ₂ %v/v	Atmos (mb)	Atmos. Dynamic	Flow (l/hr)	Depth to Base (m bgl)	Depth to Water (m bgl)
WS101	06/06/2022	0.1	0.1	0.0001	8.2	6.2	0.0082	14.7	1015	Steady	<0.1	1.98	Dry
	13/06/2022	0.1	0.1	0.0001	8.7	8.0	0.0087	13.8	1018	Steady	0.1	2.00	Dry
	22/06/2022	<0.1	<0.1	0.0001	8.3	6.4	0.0083	14.6	1005	Steady	0.1	1.98	Dry
	05/08/2022	<0.1	<0.1	0.0001	4.3	3.4	0.0043	18.1	1016	Rising	0.1	1.98	Dry
WS102	06/06/2022	0.1	0.1	0.0001	2.5	2.5	0.0025	18.9	1015	Steady	0.1	1.93	Dry
	13/06/2022	0.1	0.1	0.0001	2.7	2.7	0.0027	18.7	1018	Steady	0.1	1.95	Dry
	22/06/2022	<0.1	<0.1	0.0001	2.4	2.4	0.0024	19.1	1005	Steady	<0.1	1.94	Dry
	05/08/2022	<0.1	<0.1	0.0001	1.2	1.2	0.0012	20.1	1015	Rising	0.1	1.94	Dry
WS103	06/06/2022	0.1	0.1	0.0001	2.0	1.9	0.0020	19.1	1015	Steady	0.1	1.12	Dry
	13/06/2022	0.1	0.1	0.0001	2.1	2.1	0.0021	19.1	1017	Steady	<0.1	1.11	Dry
	22/06/2022	<0.1	<0.1	0.0001	1.7	1.7	0.0017	19.0	1005	Steady	0.1	1.23	Dry
	05/08/2022	<0.1	<0.1	0.0001	1.0	1.0	0.0010	20.4	1015	Rising	0.1	1.23	Dry

9 TIER 1 QUALITATIVE CONTAMINATED LAND RISK ASSESSMENT

Omnia has undertaken a Tier 1 qualitative risk assessment to determine if any potential contaminants within the underlying soils pose an unacceptable level of risk to the identified receptors.

9.1 Human Health Risk Assessment

At a Tier 1 stage the long term (chronic) human health toxicity of the soil has been assessed by comparing the on-site concentrations of organic and inorganic compounds with reference values published by the EA (Contaminated Land Exposure Assessment (CLEA) Soil Guideline Values (SGV)) and where absent, Generic Assessment Criteria (GACs) published by LQM/CIEH Suitable for Use Levels (S4UL) 2015. There are no currently defined screening values specifically for end use as a residential care home set out within UK guidance. Therefore, based on our understanding of the proposed development and a review of the proposed site layout, Omnia have adopted a conservative approach and have assessed soil concentrations against Tier 1 screening values for a residential end use without homegrown produce. The origin of the GAC values are presented within Appendix VIII.

The results of this comparison have been summarised within Table 9-1.

Table 9-1. Summary of Inorganic and Hydrocarbon Toxicity Assessment for a Residential End Use without Home Grown Produce

Determinant	Units	GAC	n	MC	Loc. of Ex	Pathway	Assessment
Inorganics							
Metals							
Arsenic	mg/kg	40	8	16.1	N/A	1	No Further Action
Beryllium	mg/kg	1.7	8	0.7	N/A	1	No Further Action
Boron	mg/kg	11,000	8	0.5	N/A	1	No Further Action
Cadmium	mg/kg	85	8	<0.1	N/A	1	No Further Action
Chromium (III)	mg/kg	910	8	91.2	N/A	1	No Further Action
Chromium (VI)	mg/kg	6	8	<0.3	N/A	1	No Further Action
Copper	mg/kg	7,100	8	20	N/A	1	No Further Action
Lead	mg/kg	310	8	256	N/A	1	No Further Action
Mercury	mg/kg	56	8	<0.1	N/A	4	No Further Action
Nickel	mg/kg	180	8	19.4	N/A	1	No Further Action
Selenium	mg/kg	430	8	2	N/A	1	No Further Action
Vanadium	mg/kg	1,200	8	53	N/A	1	No Further Action
Zinc	mg/kg	40,000	8	95	N/A	1	No Further Action
General Inorganics							
Asbestos	%	0.001	9	NAD	N/A	6	No Further Action
Total Cyanide *	mg/kg	50	9	0.9	N/A	1	No Further Action
Organics							
General Organics							
Phenol	mg/kg	750	9	<0.15	N/A	4,1	No Further Action
PAH							
Naphthalene	mg/kg	2.3	9	0.05	N/A	4	No Further Action
Acenaphthylene	mg/kg	2,900	9	0.12	N/A	1	No Further Action
Acenaphthene	mg/kg	3,000	9	<0.05	N/A	1	No Further Action
Fluorene	mg/kg	2,800	9	0.05	N/A	1	No Further Action
Phenanthrene	mg/kg	1,300	9	0.98	N/A	1	No Further Action
Anthracene	mg/kg	31,000	9	0.13	N/A	1	No Further Action

Fluoranthene	mg/kg	1,500	9	1.49	N/A	1	No Further Action
Pyrene	mg/kg	3,700	9	1.21	N/A	1	No Further Action
Benzo(a)Anthracene	mg/kg	11	9	0.54	N/A	1	No Further Action
Chrysene	mg/kg	30	9	0.67	N/A	1	No Further Action
Benzo(b)Fluoranthene	mg/kg	3.9	9	0.92	N/A	1	No Further Action
Benzo(k)Fluoranthene	mg/kg	110	9	0.36	N/A	1	No Further Action
Benzo(a)Pyrene	mg/kg	3.2	9	0.62	N/A	1	No Further Action
Indeno(123-cd)Pyrene	mg/kg	45	9	0.6	N/A	1	No Further Action
Dibenzo(a,h)Anthracene	mg/kg	0.31	9	0.11	N/A	1	No Further Action
Benzo(ghi)Perylene	mg/kg	360	9	0.61	N/A	1	No Further Action
BTEX							
Benzene	mg/kg	0.38	9	<5	N/A	4	No Further Action
Toluene	mg/kg	880	9	<5	N/A	4	No Further Action
Ethylbenzene	mg/kg	83	9	<5	N/A	4	No Further Action
Xylenes (p-Xylene)	mg/kg	79	9	<5	N/A	4	No Further Action
MTBE	mg/kg	73	9	<5	N/A	4	No Further Action
Banded TPH							
TPH EC 5-6**	mg/kg	42	9	<0.1	N/A	4	No Further Action
TPH EC >6-8**	mg/kg	100	9	<0.1	N/A	4	No Further Action
TPH EC >8-10**	mg/kg	27	9	<5	N/A	4	No Further Action
TPH EC >10-12**	mg/kg	130(vap)	9	<10	N/A	4	No Further Action
TPH EC >12-16**	mg/kg	1,100(sol)	9	<10	N/A	4	No Further Action
TPH EC >16-21**	mg/kg	1,900	9	32	N/A	2	No Further Action
TPH EC >21-35**	mg/kg	1,900	9	362	N/A	1	No Further Action
TPH EC >35-44**	mg/kg	1,900	9	61	N/A	1	No Further Action

Notes

Main Exposure Pathways: 1 = Ingestion of Soil & Indoor Dust, 2 = Consumption of Homegrown Produce & Attached Soil; 3 = Dermal Contact (Indoor & Outdoor); 4 = Inhalation of Vapour (Indoor & Outdoor); 5 = Inhalation of Dust (Indoor & Outdoor), 6 = Inhalation of Fibres

Abbreviations: GAC = General Assessment Criteria, n = number of samples, MC = Maximum Concentration; Loc of Ex = Location of Exceedance.

Total cyanide Tier 1 GAC is taken from the Dutch Intervention Value (2010) for complex cyanide.

* The Tier 1 GAC for the banded hydrocarbon fraction is derived from the CIEH/S4UL assessment for petroleum hydrocarbons Criteria Working Group (CWG) for both aliphatic and aromatic compounds. Omnia has utilised the lowest of the aliphatic and aromatic chain lengths in order to adopt a conservative approach, which is considered satisfactory for the protection of human health.

(sol) – GAC presented exceeds the solubility saturation limit

(vap) – GAC presented exceeds the vapour saturation limit.

Two (2no.) samples were also screened for PCBs which were less than the level of detect and therefore no active pollution pathways have been identified based on a residential end use without homegrown produce.

Following the completion of the Tier 1 risk assessment no exceedance were identified and therefore no active pollution pathways have been identified based on a residential end use without homegrown produce.

9.2 Controlled Waters Assessment

The site is considered to present a low risk to controlled waters for the following reasons:

- Site is Underlain by superficial and bedrock strata classified as Secondary A Aquifers;
- No history of industrial land use on site with the site comprising a residential property, outbuilding and associated garden since c.1896 with the site showing no significant change in configuration;
- No history of significant industrial land use in the surrounding area;
- Laboratory results generally show low concentrations across the site and do not suggest widespread impact of the underlying soils;
- Short chain, highly mobile TPH determinants were encountered at concentrations of less than the laboratory limit of detection;
- Long-chain, low mobility hydrocarbons were identified at relatively low concentrations and are not considered to have the potential to present a significant risk to controlled waters;
- The site is not located within a currently defined Source Protection Zone;
- There are no groundwater abstractions, including potable water supply abstractions within 250m of the subject site; and,
- The closest surface waters receptor is an inland watercourse located approximately 159-169m southeast of the site.

9.3 Waste Acceptance Criteria Testing

Two (2no.) composite soil samples were collected from across the site area and scheduled for Waste Acceptance Criteria (WAC) testing. The results of the laboratory testing are presented in Table 9-2 below and certificates are presented within Appendix VII.

Table 9-2 - Waste Acceptance Criteria (WAC) Summary

Sample Location (depth, m)	Classification	Exceedances
WS102 (0.10-0.20)	Inert Waste	N/A
WS105 (0.40-0.60)	Inert Waste	N/A

Based on the above assessment of soils analysed at incremental depths across the site material at depths of 0.10-0.20m bgl (WS102) and 0.40-0.60m bgl (WS105) is likely to be classed as Inert Waste for waste disposal purposes based on the analysis and classification above with values within the Inert Waste criteria limits.

Omnia have provided an anticipated Waste Classification of soil derived from values presented within the laboratory results. However, the acceptance criteria for materials are dependent on the license held by the individual landfill site. As a result, waste classifications may vary between landfill sites, and it is therefore recommended that the test results are submitted to the preferred waste disposal site for confirmation of suitability.

The two (2no.) soil samples results were entered in Hazardous Waste Classification software (Hazwaste) to determine the likely classification of the material for waste disposal purposes. The

results of this classification are presented in Table X below and Hazardous Waste Classification certificated are presented within Appendix VII.

Table 9-3 Hazardous Waste Classification Summary

Sample Location (depth, m)	Classification	Exceedances
WS102 (0.10-0.20)	Non Hazardous Waste	N/A
WS105 (0.40-0.60)	Non Hazardous Waste	N/A

Based on the above assessment of soils analysed at incremental depths across the site material at depths of 0.10-0.20 at WS102, and 0.40-0.60 at WS105 is likely to be classed as Inert Waste for waste disposal purposes based on the analysis and classification above with values within the Inert Waste criteria limits.

Omnia have provided an anticipated Waste Classification of soil derived from values presented within the laboratory results. However, the acceptance criteria for materials are dependent on the license held by the individual landfill site. As a result, waste acceptance criteria may vary between landfill sites and it is therefore recommended that the test results are submitted to the preferred waste disposal site for review.

9.4 Ground Gas Assessment

The potential impact on the development from ground gases has been assessed with reference to standards and guidelines published in CIRIA Report C665 (*Assessing risks posed by hazardous ground gases to buildings*, 2007). However, it is recommended that the full ground gas assessment and any recommended protection measures are agreed with the local authority prior to the adoption of any protection measures on-site. Furthermore, the installation of any gas protection measures should be validated by a suitably qualified engineer.

The results of the ground gas monitoring and calculated Gas Screening Values (GSVs) are presented in Table 8-8.

Three (3no.) ground gas monitoring visits have been undertaken at locations WS101, WS103, and WS104. CH₄ concentrations were recorded to a maximum concentration of 0.1% v/v at all locations. CO₂ concentrations were recorded to a maximum of 8.7% v/v at location WS101. Negligible ground gas flow rates were recorded across the site, with a maximum flow rate of 0.1l/hr recorded at all locations.

In accordance with the methodology outlined within the CIRIA publication C665, Omnia have utilised the results of the ground gas monitoring surveys to calculate a tentative Gas Screening Value (GSV). The maximum GSV calculated for methane was 0.0001l/hr whilst the maximum GSV for carbon dioxide was 0.0087l/hr.

It is understood that the proposed development is for the construction of a residential Care Home between 62 to 70 beds over 3-storeys with associated areas of vehicle parking, access routes and infrastructure to the west of the site.

Therefore, the proposed development is composed of low-rise residential dwellings assessed under BS8485:2015 classed as a **Type B** building.

9.4.1 BS 8485:2015 – Type B Building – Private Ownership with no Central Building Management

Guidance set out in BS 8485(2015)+A1(2019), which is equivalent to the Characteristic Situations of the modified Wilson & Card classification established in CIRIA Publication C665, stipulates a site characteristic GSV of <0.07 l/hr, with typical permissible concentrations of 1%v/v (CH_4) and 5% v/v (CO_2), for classification as Characteristic Situation 1 (CS-1); a very low hazard potential.

The maximum recorded CH_4 and CO_2 concentrations of 0.1% v/v and 8.7% v/v respectively exceed the typical permissible concentrations of 1% (CH_4) and 5% (CO_2) for classification as CS-1. The maximum GSV guidance value of <0.07 l/hr for both CH_4 (0.0001l/hr) and CO_2 (0.0087l/hr) were under the GSV guidance value.

As concentrations of CO_2 exceeding the screening value of 5% v/v have been recorded on-site, it is recommended further three monitoring visits are undertaken in line with best practice and guidance provided within CIRIA C665.

10 REVISED CONCEPTUAL SITE MODEL

Following completion of the Tier 1 risk assessment no active pollution pathways have been identified based on a residential end use without homegrown produce.

Table 10-1 Revised Conceptual Site Model

Source	Potential Migration Pathway	Potential Receptors	Discussion of Pollutant Linkage
Ground Gas	Vertical and Lateral Migration	Future Site Users	Elevated concentrations of carbon dioxide have been identified on-site. As concentrations of CO₂ exceeding the screening value of 5% v/v for a CS-1 classification have been recorded on-site, it is recommended further three monitoring visits are undertaken in line with best practice and guidance provided within CIRIA C665.

11 GEOTECHNICAL ASSESSMENT

11.1 Proposed Development

It is understood that Highwood Homes are proposing to redevelop the site to comprise a Care Home with between 62 to 70 beds over 3 storeys with associated areas of vehicle parking, access routes and infrastructure to the west of the site. We note that the site has existing planning permission for a replacement dwelling, under the local authority reference [F/20/87694](#), however the proposed care home development scheme as outlined in the Feasibility Booklet entitled 'Proposed Care Home, Moorhill, West End, Southampton' (dated May 2021) requires a new planning application.

The outline proposed site layout is presented as Figure 2.0 (Appendix III).

11.2 Site Preparation

The site should be cleared of any vegetation below the areas of proposed development and stripped in accordance with [Series 200 of Specification of Highway Works](#).

Any roots present below the footprint of proposed structures and infrastructure should be grubbed out and the resulting voids in-filled with suitable compacted material. This should also be undertaken for any redundant or re-routed services.

11.3 Ground Profile

Based on the findings on the current ground investigation, ground conditions at the site comprise Topsoil/Made Ground overlying superficial deposits of River Terrace Deposits, further underlain by bedrock attributed to Wittering Formation to the full depth of the ground investigation, discussed in 8.1. Site ground conditions are summarised in Table 11-1.

Table 11-1 Summary of site ground conditions

Borehole	Topsoil Thickness (m)	Made Ground Thickness (m)	Superficial Deposits	Bedrock	Groundwater (m bgl)
			FORMATION 1 Thickness (m)	FORMATION 2 Thickness (m)	
HP101	0.30	-	0.30	-	-
SA101	-	0.40	2.00	-	-
SA102	0.40	-	1.20	-	-
SA103	0.60	-	2.00	-	2.60
WS101	0.20	-	1.80	-	-
WS102	0.25	-	1.45	-	-
WS103	0.40	-	1.60	-	-
WS104	0.40	-	0.90	-	-
WS105	0.60	-	2.10	-	-

11.4 Shallow Foundations

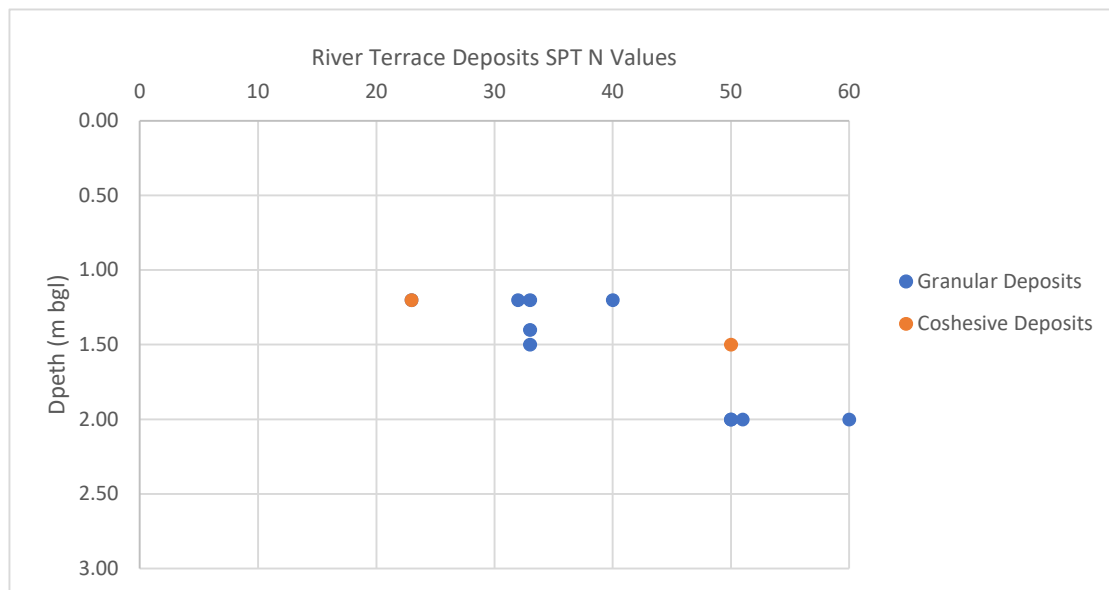
The following geotechnical assessment has been undertaken based on in-situ testing, laboratory analysis, and descriptions on the underlying geology. Foundation depths presented are indicative only based on a minimum presumed bearing value for a particular foundation type. Line loadings have not been made available such that the final depth and type of foundation required following design could vary.

It is considered that Topsoil/Made Ground would not form a suitable founding stratum due to characteristic variability and the associated potential for differential settlement. As such it is recommended that loads are transferred through the Topsoil/Made Ground to a depth at which competent geology, sufficient to support the proposed load, is encountered.

11.4.1 In Situ-Testing

Standard Penetration Testing was undertaken throughout the granular/cohesive River Terrace Deposits. The results are presented in **Error! Reference source not found.** below:

Figure 11-1 SPT vs Depth



The SPT data shows an increase in N-value with depth from N=23 at 1.20m bgl to N>50 at 2.00m bgl for the River Terrace Deposits.

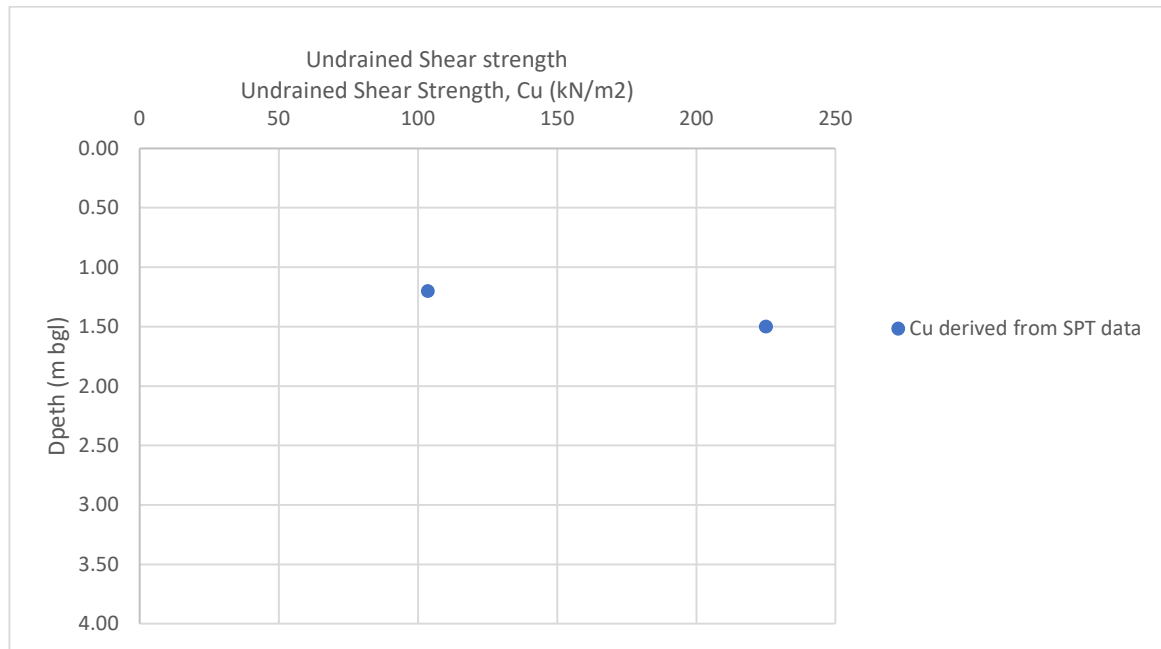
11.4.2 Shear Strength

The undrained Shear Strength of the cohesive layers within the River Terrace Deposits have been determined by using the widely accepted empirical relationship, where f_1 is based on the correlation factor based on the plasticity index of the soil (Stroud, 1974):

$$C_u = f_1 \times SPTN$$

Using a correlation factor of 4.5 gives characteristic undrained shear strengths (C_{uk}) of 104 kN/m² at 1.20m bgl within WS101 and 225kN/m² at a depth of 1.50m bgl within WS102, represented in **Error! Reference source not found.** Table 11-2 below. These values are consistent with the formation becoming medium strength material.

Table 11-2 Shear Strength vs Depth



11.4.3 Bearing Capacities

11.4.3.1 River Terrace Deposits

Indicative Bearing Capacity at 1.20m bgl

At a depth of 1.20m bgl within the coarse-grained soils of the River Terrace Deposits, SPT N values were recorded as N=23 to N=40, indicating medium dense to dense materials. It is considered a traditional strip foundation of 1.00m width at a depth 1.20m bgl provides a presumed bearing capacity of approximately 150-500kN/m².

Within WS102 fine-grained soils of the River Terrace Deposits were encountered at 1.20m bgl, with a recorded SPT N value of N=23, providing undrained shear strengths of 104 kN/m², indicating firm soils. It is considered that a traditional strip foundation at a depth of 1.20m bgl provides a presumed bearing capacity of approximately 200-400kN/m².

Indicative Bearing Capacity at 2.00m bgl

At a depth of 2.00m bgl within the coarse-grained soils of the River Terrace Deposits, SPT N values recorded as N=50 to N=>50, indicating dense to very dense materials. It is considered that a traditional strip foundation at a depth 2.00m bgl provides a presumed bearing capacity of approximately 500-800 kN/m².

Within one (1no.) location (SA101) at a depth of 2.00m bgl. Hand Shear Vane (HSV) data was collected from this location, with undrained shear strengths recorded between 20 and 32 kN/m² indicating very soft to soft soils.

Within the shallow soils of the River Terrace Deposits, it is considered that a traditional strip foundation at a depth 2.00m bgl provides a presumed bearing capacity of approximately 50-100 kN/m².

11.5 Groundwater Levels

Consideration should also be given to shallow groundwater encountered across the site. Groundwater was encountered at 2.60m bgl across the site. If groundwater is below the base of the foundation at a depth of less than the width of the proposed foundation, then groundwater can significantly reduce the bearing capacity of fine-grained soils.

11.6 Building Near Trees

11.6.1 NHBC Minimum Depth to Foundations

The shallow fine-grained soils on site have been shown via laboratory analysis to generally be of low to high plasticity and low to very high volume change potential. Modified plasticity indices range from 8% to 54%, it is considered that a conservative approach is taken, and therefore soils of the Head Deposits are of very high Volume Change Potential.

NHBC guidance offers two foundation depth scenarios dependant on future planting regimes for High Volume Change Soils which utilises Tables 4 and 5 of NHBC Chapter 4.2 – Building Near Trees, summarised in Table 11-3 below.

Table 11-3 Minimum depth of foundations (after NHBC 2021)

Depth of Foundation	Description	No Tree Planting Zone (m)		
		High Water Demand	Moderate Water Demand	Low Water Demand
1.0m	No tree planting within Zone of Influence	1.25m x mature height	0.75 x mature height	0.50 x mature height
1.50m	Restricted tree planting within zone of influence	1.0 x mature height	0.50 x mature height	0.20 x mature height

NHBC guidance indicates a minimum foundation depth of 1.00m bgl for high volume change soils outside of the zone of tree influence (Column B, Table 5) which is dependent on the tree species but may be up to 1.25 x mature tree height. Foundation depths will need to be increased within the zones of influence of existing or recently removed trees, as set out by NHBC Guidance (Chapter 4.2 – Building near Trees).

11.6.2 Lateral pressure and heave

Where foundations are more than 1.5m deep, within the influence of trees which are to remain or be removed, and may be subject to heave, they should be protected by voids, void formers or compressible materials to be take into account the effects of lateral swelling of soils. Minimum thicknesses of voids are set out in Table 7 of NHBC Chapter 4.2 – Building Near Trees.

Guidance is set out in NHBC the basic requirement is that compressible material or void former should be installed on the inside faces of external foundation walls. With piled foundation additional voids are required below ring beams. Position of heave precautions are set out in Table 8 of NHBC Chapter 4.2 – Building Near Trees.

11.7 Shallow Excavations

Particular consideration should be made when excavating due to high groundwater/pit instability being encountered during site works and follow-on monitoring visits, which may cause pit instability within granular deposits. Where sand deposits are encountered with high groundwater, running sands may be encountered, which may require the local deepening of foundations. It is recommended that special construction techniques are utilised, when necessary, when excavating foundations, such as dewatering and pit stabilisation.

11.8 Ground Floor Slabs

Due to the Volume Change Potential of the soil it is considered that ground floor slabs are not considered suitable for adoption and therefore it is recommended that a suspended floor slab should be adopted in accordance with NHBC Chapter 5.2 to mitigate against the effects of differential settlement.

If levels were to be changed on site requiring steps in the substructure, further consideration should be given to the adoption of floor slabs, with reference to NHBC Standards (2011) 5.1 – *Substructure and ground bearing floors*.

11.9 Pavement Construction

CBR values ranged from 7.6% to 68.1% between ground level and 878mmbgl. Using a conservative approach, a CBR value of 7.6% should be adopted across the site at this stage. Notwithstanding these results, confirmatory CBR testing should be carried out at formation level once details are finalised.

11.10 Concrete Durability

Due to the size of the dataset (>10 samples), characteristic pH and SO_4 values were calculated using the highest 20% measured sulphate concentrations and the lowest 20% measured pH value as stated in the BRE Special Digest (2005) producing a site characteristic value for sulphate of 64.4mg/l and a pH value of 4.54.

Soils encountered beneath the site have been classified in accordance with DS-1, Aggressive Chemical Environment for Concrete Classification (ACEC) AC-3z with the recommendations provided in BRE Special Digest 1 (2005).

11.11 Discussion

At this stage, It is understood that a Highwood Homes are within the pre-application stage of planning for a Care Home between 62 to 70 beds over 3 storeys with associated areas of vehicle parking, access routes and infrastructure to the west of the site.

Presumed bearing capacities at 1.20m bgl within the River Terrace Deposits provide bearing capacities of 150-500kN/m² within the granular deposits across site. In the location of WS102 where cohesive soils of the River Terrace Deposits were encountered, bearing capacities of 200-400 kN/m² have been provided.

Bearing capacities at 2.00m bgl provide bearing capacities of 500-800kN/m² within the granular soils of the River Terrace Deposits across site.

Within the shallow soils of the Wittering Formation, it is considered that a traditional strip foundation of 1.00m width at a depth 2.00m bgl provides a presumed bearing capacity of approximately 50-100 kN/m².

Should loadings exceed those set out above then alternative founding solutions will need to be explored.

Subject to regulatory requirements, the potential requirement exists to calculate bearing capacities and undertaken settlement analysis for foundations through production of a Geotechnical Design Report (GDR) which would provide calculations to current guidance, UK National Annex to EC7. Foundation design should be completed by a suitably qualified Structural Engineer, with specific consideration given to the variability in soil strengths.

A minimum foundation depth of 1.00m bgl is anticipated for a High Change Volume soil within the Wittering Formation outside of the zone of tree influence, in accordance with NHBC. Where foundations are likely to be within the influence of trees foundation depths will require locally deepening. The extent to which they should be deepened should be in accordance with NHBC guidance, Chapter 4.2 – Building Near Trees (Tables 4 and 5). Existing mature trees that are presumed to be remaining along the boundaries of the site and scattered throughout.

12 CONCLUSIONS AND RECOMMENDATIONS

Revised Conceptual Site Model
Following completion of the Tier 1 risk assessment no active pollution pathways have been identified based on a residential end use without homegrown produce.
Waste Acceptance Criteria Testing
WAC assessment of soils analysed at incremental depths across the site material at depths of 0.10-0.20 at (WS102) and 0.40-0.60 (WS105) is classed as Inert Waste for waste disposal purposes based on the analysis and classification with values within the Inert Waste criteria limits. Samples were also screened using Hazwaste software which classified the waste as non hazardous waste for disposal.
Omnia have provided an anticipated Waste Classification of soil derived from values presented within the laboratory results. However, the acceptance criteria for materials are dependent on the license held by the individual landfill site. As a result, waste acceptance criteria may vary between landfill sites and it is therefore recommended that the test results are submitted to the preferred waste disposal site for review.
Concrete Classification
Soils encountered beneath the site have been classified in accordance with DS-1, Aggressive Chemical Environment for Concrete Classification (ACEC) AC-3z with the recommendations provided in BRE Special Digest 1 (2005).
Geotechnical Assessment
Foundations All foundations should be placed beneath any Made Ground or Topsoil to found on the underlying natural strata. Presumed bearing capacities at 1.20m bgl within the Head Deposits provide bearing capacities of 150-500kN/m² within the granular deposits across site. In the location of WS102 where cohesive soils of the Head Deposits were encountered, bearing capacities of 200-400 kN/m² have been provided. Bearing capacities at 2.00m bgl provide bearing capacities of 500-800kN/m² within the granular soils of the Head Deposits across site. Within the shallow soils of the Wittering Formation, it is considered that a traditional strip foundation of 1.00m width at a depth 2.00m bgl provides a presumed bearing capacity of approximately 50-100 kN/m². Ground Floor Slabs Due to the High volume change potential of the ground, it is considered that ground floor slabs are not suitable for adoption and therefore a suspended floor slab should be adopted in accordance with NHBC Chapter 5.2 to mitigate against the effects of differential settlement. Pavement Construction CBR values ranged from 8.0% to 73.2% between ground level and 878mmbgl. Using a conservative approach, a CBR value of 8.0% should be adopted across the site at this stage. Notwithstanding these results, confirmatory CBR testing should be carried out at formation level once details are finalised.
Recommendations
Environmental All monitoring points should be decommissioned in accordance with Environment Agency guidance ahead of site development in order to avoid the creation of preferential pathways. If during the development stage any evidence of contamination is identified, works should be halted, and contact made with a suitably qualified Environmental Consultant. As determined appropriate by the Consultant, further

investigation and sampling may be required to determine the appropriate actions. Upon completion contact should be made with the regulator to achieve sign off of the works.

It is recommended that a further three (3no.) gas monitoring visits are undertaken in line with best practice and guidance provided within CIRIA C665, due to concentrations of CO₂ exceeding the screening value of 5% v/v identified during the monitoring visits on-site.

Geotechnical

Values for foundation are based on approximate ultimate bearing capacity and are given to provide outline options and should be subject to detailed analysis by the Structural Engineer. Should the bearing strength set out above prove to be incompetent for the proposed loading, consideration should be given to a deeper foundation solution. As necessary, and as dictated by the site layout plan this may lead to a requirement for an assessment of deeper soils for a piled foundation.

APPENDIX I - LIMITATIONS

1. This report and its findings should be considered in relation to the terms of reference and objectives agreed between Omnia and the Client as indicated in Section 1.2.
 2. For the work, reliance has been placed on publicly available data obtained from the sources identified. The information is not necessarily exhaustive and further information relevant to the site may be available from other sources. When using the information, it has been assumed it is correct. No attempt has been made to verify the information.
 3. This report has been produced in accordance with current UK policy and legislative requirements for land and groundwater contamination, which are enforced, by the local authority and the Environment Agency. Liabilities associated with land contamination are complex and requires advice from legal professionals.
 4. During the site walkover reasonable effort has been made to obtain an overview of the site conditions. However, during the site walkover no attempt has been made to enter areas of the site that are unsafe or present a risk to health and safety, are locked, barricaded, overgrown, or the location of the area has not been made known or accessible.
 5. Access considerations, the presence of services and the activities being carried out on the site limited the locations where sampling locations could be installed and the techniques that could be used.
 6. Site sensitivity assessments have been made based on available information at the time of writing and are ultimately for the decision of the regulatory authorities.
 7. Where mention has been made to the identification of Japanese Knotweed and other invasive plant species and asbestos or asbestos-containing materials this is for indicative purposes only and do not constitute or replace full and proper surveys.
 8. The executive summary, conclusions and recommendations sections of the report provide an overview and guidance only and should not be specifically relied upon without considering the context of the report in full.
 9. Omnia cannot be held responsible for any use of the report or its contents for any purpose other than that for which it was prepared. The copyright in this report and other plans and documents prepared by Omnia is owned by them, and no such plans or documents may be reproduced, published or adapted without written consent. Complete copies of this may, however, be made and distributed by the client as is expected in dealing with matters related to its commission. Should the client pass copies of the report to other parties for information, the whole report should be copied, but no professional liability or warranties shall be extended to other parties by Omnia in this connection without their explicit written agreement there to by Omnia.
 10. New information, revised practices or changes in legislation may necessitate the re-interpretation of the report, in whole or in part.
-

APPENDIX II – GLOSSARY

AST	Above Ground Storage Tank
BGS	British Geological Survey
BSI	British Standards Institute
BTEX	Benzene, Toluene, Ethylbenzene, Xylenes
CIEH	Chartered Institute of Environmental Health
CIRIA	Construction Industry Research Association
CLEA	Contaminated Land Exposure Assessment
CSM	Conceptual Site Model
DNAPL	Dense Non-Aqueous Phase Liquid (Chlorinated Solvents, PCB)
DWS	Drinking Water Standard
EA	Environment Agency
EQS	Environmental Quality Standard
GAC	General Assessment Criteria
GL	Ground Level
GSV	Gas Screening Value
HCV	Health Criteria Value
ICSM	Initial Conceptual Site Model
LNAPL	Light Non-Aqueous Phase Liquid (Petrol, Diesel, Kerosene)
ND	Not Detected
LMRL	Lower Method Reporting Limit
NR	Not Recorded
PAH	Polycyclic Aromatic Hydrocarbon
PCB	Poly-Chlorinated Biphenyl
PID	Photo-Ionisation Detector
QA	Quality Assurance
SGV	Soil Guideline Value
SPH	Separate Phase Hydrocarbon
TPH (CWG)	Total Petroleum Hydrocarbon (Criteria Working Group)
SPT	Standard Penetration Test
SVOC	Semi Volatile Organic Compound
UST	Underground Storage Tank
VCCS	Vibro Concrete Columns
VOC	Volatile Organic Compound
WTE	Water Table Elevation

UNITS

M	Metres
KM	Kilometres
%	Percent
%V/V	Percent Volume in Air
MB	Milli Bars (Atmospheric Pressure)
L/HR	Litres Per Hour
µG/L	Micrograms Per Litre (Parts Per Billion)
PPB	Parts Per Billion
MG/KG	Milligrams Per Kilogram (Parts Per Million)
PPM	Parts Per Million
MG/M ³	Milligram Per Metre Cubed
M BGL	Metres Below Ground Level

M BCL	Metres Below Cover Level
MAOD	Metres Above Ordnance Datum (Sea Level)
KN/M ²	Kilo Newtons Per Metre Squared
µM	Micrometre

APPENDIX III - DRAWINGS

Key

 Site Boundary



0 250 500 m

Scale	Paper Size
1:15,456.834879	A4

Contains OS data © Crown copyright and database right 2021. Contains Environment Agency Lidar Data available under the Open Government Licence (OGL). © OpenStreetMap contributors

The client must not amend any drawing, design or other intellectual property produced by Omnia without permission in writing from Omnia in advance of any amendments being made.

In the event that such written permission is not obtained in advance of the amendments being made Omnia shall not be liable for any damage and/or losses incurred as a result of the amended drawing, design or intellectual property.

Omnia Consulting, 3-6 The Quarterdeck, Port Solent,
Portsmouth, Hampshire, PO6 4TP
T: (01489) 808 088
E: info@omnia-consulting.co.uk
W: www.omnia-consulting.co.uk



Job Title:
Moorhill, Southampton

Client:
Highwood

Project Number:
A11641

Drawn By:
T.Holloway

Date:
25/05/2022

Authorised By:
O.Maxwell

Drawing Title:
Figure 1.0
Site Location Map

