Graven Hill Care Home

Flood Risk Assessment

June 2024

Waterman Infrastructure & Environment Limited
5th Floor, One Cornwall Street, Birmingham, B3 2DX
www.watermangroup.com

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This document has been prepared and checked in accordance with
Waterman Group's IMS (BS EN ISO 9001: 2015, BS EN ISO 14001: 2015 and BS EN ISO 45001:2018)

Issue	Date	Prepared by	Checked by	Approved by
1	29/05/2024	R. Lal Apprentice Engineer	Ryan Panter Senior Engineer	S.Songprasit Senior Associate Director
2	17/06/2024	Ryan Panter Senior Engineer	Nick Jones-Hill Technical Director	Nick Jones-Hill Technical Director
3	20/06/2024	Ryan Panter Senior Engineer	Nick Jones-Hill Technical Director	Nick Jones-Hill Technical Director
3	11/11/2024	Reeya Lal Apprentice Engineer	Darryl Pearson Associate Dircetor	Nick Jones-Hill Technical Director

Comments

Drainage Strategy omitted

Comments

Disclaimer

This report has been prepared by Waterman Infrastructure & Environment Limited, with all reasonable skill, care and diligence within the terms of the Contract with the client, incorporation of our General Terms and Condition of Business and taking account of the resources devoted to us by agreement with the client.

We disclaim any responsibility to the client and others in respect of any matters outside the scope of the above.

This report is confidential to the client and we accept no responsibility of whatsoever nature to third parties to whom this report, or any part thereof, is made known. Any such party relies on the report at its own risk.

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1. Introduction

1.1 Background

Waterman Infrastructure & Environment Limited ("Waterman") have been commissioned by LNT Care Developments (hereafter 'the Client') to prepare a Flood Risk Assessment to support a planning application for a Site at Graven Hill Care Home, Graven Hill Village, Bicester, Cherwell District, Oxfordshire, OX26 6HG, (hereafter referred to as 'the Site').

The purpose of this report is to provide details of flood risk from all sources that would impact the proposed development and necessary flood risk mitigations to manage flood risk on Site, ensuring that the Site would be safe in its lifetime and would not increase flood risk elsewhere.

Oxfordshire County Council is the Lead Local Flood Authority (LLFA) and the Local Planning Authority (LPA) is Cherwell District Council. Thames Water is the sewerage undertaker.

1.2 Site Description

The Site is located at Graven Hill Care Home, Graven Hill Village, Bicester, Cherwell District, Oxfordshire. The Site is currently a vacant development plot within the Graven Hill village development adjacent to the A41. The majority of the Site is covered in low-level vegetation, with several small partially demolished buildings, typically 300-400mm above surrounding levels. During a site visit in March 2024, it was noted that surface water was ponding across much of the site. This is understood to be due to previous archaeological investigation excavation works which created low-lying spots.

The Site is located within an existing ongoing development area, comprising residential housing and local amenities. The Site has an area of 1.056 hectares (Ha) and is located at an approximate Ordnance Survey grid reference SP 58864 21245 with coordinates X: 458864, Y: 221245 with the nearest postcode being OX26 6HG.

A Site location plan is shown in **Figure 1-1**.

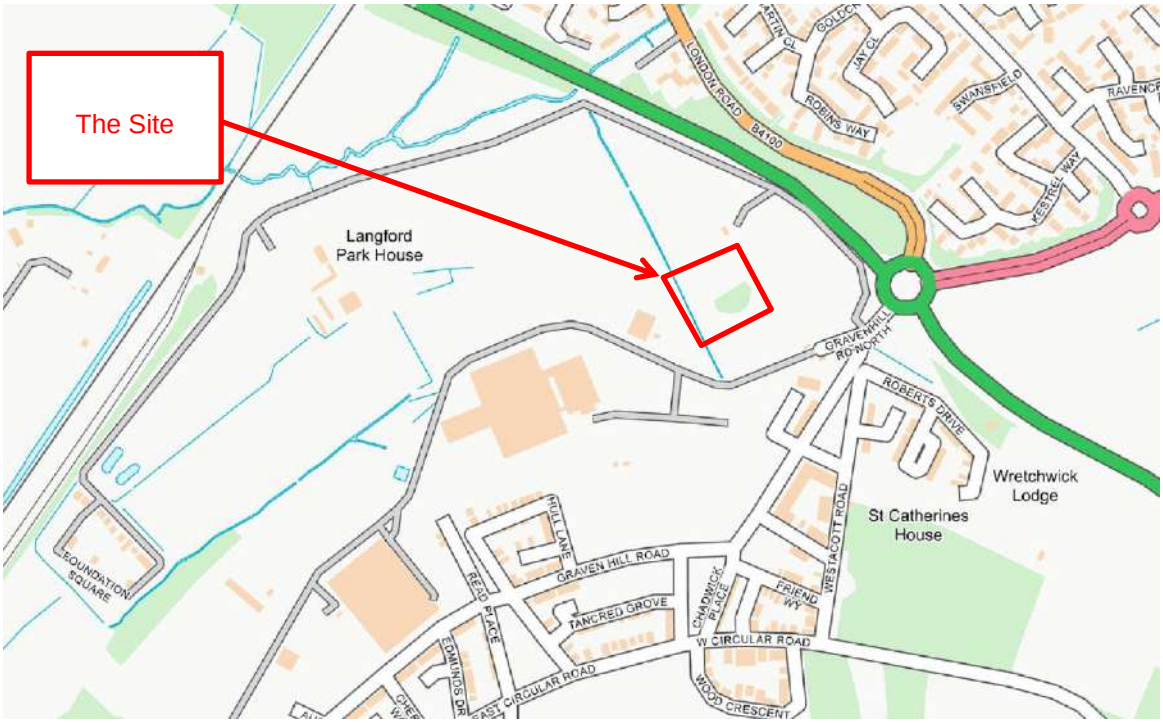


Figure 1-1: Site Location Plan

1.3 Development Proposals

The development is to comprise a new residential care home with a total of 66 bedrooms and associated parking.

A copy of the Site layout is presented in **Appendix A**.

2. Planning Policy and Guidance

2.1 National Planning Policy Framework

The National Planning Policy Framework (NPPF) last updated in December 2023 states that inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk (whether existing or future). Where development is necessary in such areas, the development should be made safe for its lifetime without increasing flood risk elsewhere.

Development should only be allowed in areas at risk of flooding where, in the light of a Site-specific flood risk assessment (and the sequential and exception tests, as applicable) it can be demonstrated that:

a) within the Site, the most vulnerable development is located in areas of lowest flood risk, unless there are overriding reasons to prefer a different location;

b) the development is appropriately flood resistant and resilient such that, in the event of a flood, it could be quickly brought back into use without significant refurbishment;

c) it incorporates sustainable drainage systems, unless there is clear evidence that this would be inappropriate;

d) any residual risk can be safely managed; and

e) safe access and escape routes are included where appropriate, as part of an agreed emergency plan.

Major developments should incorporate sustainable drainage systems unless there is clear evidence that this would be inappropriate. The systems used should:

a) take account of advice from the lead local flood authority;

b) have appropriate proposed minimum operational standards;

c) have maintenance arrangements in place to ensure an acceptable standard of operation for the lifetime of the development; and

d) where possible, provide multifunctional benefits.

NPPF Annex 3: Flood risk vulnerability classification is provided in **Appendix B**.

2.2 Planning Practice Guidance

The NPPF supporting Planning Practice Guidance[1] (PPG), which was first published in November 2016 and last updated in February 2024, states that developers and Local Planning Authorities (LPAs) should seek opportunities to reduce the overall level of flood risk in the area and beyond through the layout and form of the development, and the appropriate application of SuDS.

Opportunities to reduce flood risk overall and measures to manage the flood risk resulting from the development could be achieved by:

a) Incorporating green infrastructure within the layout and form of development to make additional space for the flow and storage of flood water;
b) Providing Sustainable Drainage Systems, that manage flood risk beyond the proposed Site and above the usual standard, such as by removing surface water from existing combined sewers;
c) Providing or making contributions to flood risk management infrastructure that will provide

[1] Ministry of Housing, Communities and Local Government, November 2016. Planning Practice Guidance.

additional benefits to existing communities and/or by safeguarding the land that would be needed to deliver it.

Where possible, preference should be given to multi-functional sustainable drainage systems, and to solutions that allow surface water to be discharged according to the following hierarchy of drainage options:

1. into the ground (infiltration);
2. to a surface water body;
3. to a surface water sewer, highway drain, or another drainage system;
4. to a combined sewer.

Table 1 of the PPG: Definition of Flood Zones, Table 2 of the PPG: Flood risk vulnerability and flood zone 'incompatibility', and NPPF Annex 3: Flood risk vulnerability classification are provided in **Appendix B**.

2.3 Non-statutory Technical Standards for Sustainable Drainage Systems

The Non-statutory Technical Standards for SuDS[2] was published in March 2015 and is the current guidance for the design, maintenance and operation of SuDS.

The standards set out that the peak runoff rates should be as close as is reasonably practicable to the greenfield rate but should never exceed the pre-development runoff rate.

The standards also set out that the drainage system should be designed so that flooding does not occur on any part of the Site for a 1 in 30-year rainfall event, and that no flood of a building (including basement) would occur during a 1 in 100-year rainfall event.

It is also noted within the standards that pumping should only be used when it is not reasonably practicable to discharge by gravity.

2.4 Local Planning Policy

2.4.1 The Cherwell Local Plan 2011-2031 (Adopted July 2015)

Policy ESD 6: Sustainable Flood Risk Management

Policy ESD 6 states that:

> *Site specific flood risk assessments will be required to accompany development proposals in the following situations:*
>
> > *All development proposals located in flood zones 2 or 3*
> >
> > *Development proposals of 1 hectare or more located in flood zone 1 Development Sites located in an area known to have experienced flooding problems*
> >
> > *Development Sites located within 9m of any watercourses.*
>
> *Flood risk assessments should assess all sources of flood risk and demonstrate that:*
>
> > *There will be no increase in surface water discharge rates or volumes during storm events up to and including the 1 in 100 year storm event with an allowance for climate change (the design storm event)*
> >
> > *Developments will not flood from surface water up to and including the design storm event*

[3] Department for Environment, Food, and Rural Affairs, March 2015. Non-statutory technical standards for sustainable drainage systems.

or any surface water flooding beyond the 1 in 30 year storm event, up to and including the design storm event will be safely contained on Site.

Development should be safe and remain operational (where necessary) and proposals should demonstrate that surface water will be managed effectively on Site and that the development will not increase flood risk elsewhere, including sewer flooding.

Policy ESD 7: Sustainable Drainage Systems (SuDS)

Policy ESD 7 states that:

"All development will be required to use sustainable drainage systems (SuDS) for the management of surface water run-off.

Where Site specific Flood Risk Assessments are required in association with development proposals, they should be used to determine how SuDS can be used on particular Sites and to design appropriate systems.

In considering SuDS solutions, the need to protect ground water quality must be taken into account, especially where infiltration techniques are proposed. Where possible, SuDS should seek to reduce flood risk, reduce pollution and provide landscape and wildlife benefits. SuDS will require the approval of Oxfordshire County Council as LLFA and SuDS Approval Body, and proposals must include an agreement on the future management, maintenance and replacement of the SuDS features."

Policy Bicester 2: Graven Hill

Graven Hill is included within the Bicester 2 development area, as identified in the Adopted Cherwell District Council Local Plan. A copy of the Policy Map for Bicester 2 is shown overleaf and link to the Local Plan is provided below.

Final_adopted_Local_Plan_2011_2031_incorprating_re_adopted_policy_Bicester_13 (1).pdf

The Bicester 2 development area (**Figure 2-1**) seeks to deliver approximately 2,100 dwellings and associated infrastructure including extra care, education and employment land. As stated earlier a new outline application is to be submitted for the residual areas of the development Site.

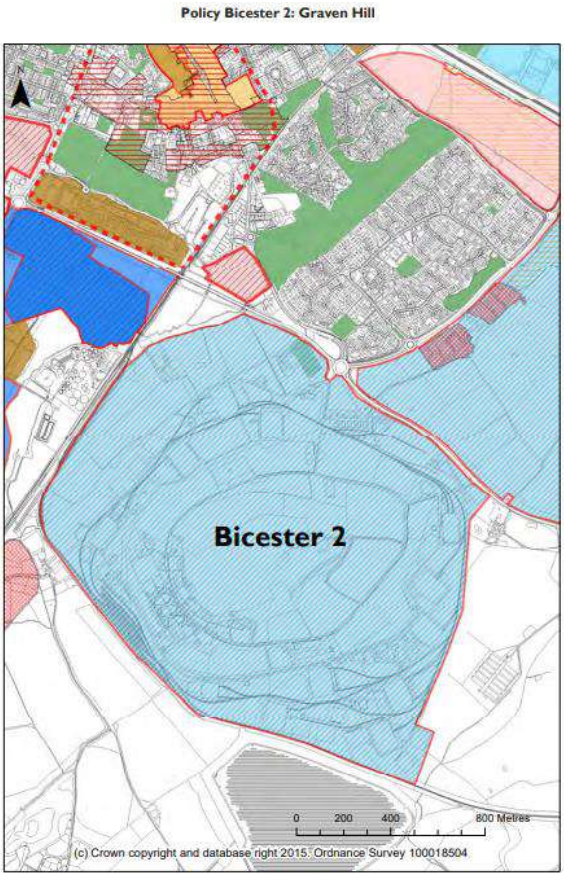


Figure 2-1: Cherwell Local Plan Policy Map Bicester 2

3. Baseline Conditions

3.1 Topography

The topographical and utilities survey data was produced by MK Surveys in 2024 and 2022, respectively. The survey shows that the Site generally falls from a high point in the south down to the north.

In the north, the ground levels are approximately 66.602 mAOD. Rising to the south, where the ground levels are approximately 67.816 mAOD. Towards the east of the Site, the levels are approximately 67.381 mAOD and to the west 67.174 mAOD.

The topographical survey is filed in **Appendix C**.

3.2 Hydrology

An existing ditch flows along the westernmost boundary of the site, flowing from southeast to northwest. This ditch outfalls via a headwall into the Gateway Park attenuation pond, which forms part of the wider drainage scheme on the Graven Hill development.

3.3 Geology

Geological information and maps have been extracted from the British Geological Survey (BGS) Digital Geological map of Great Britain at 1:50,000 scale, to be used for a geological assessment of the Site.

Bedrock geology is a term used for the main mass of rocks forming the Earth that are present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water. The bedrock geology at the Site is found to be Peterborough Member - Mudstone. Sedimentary bedrock formed between 166.1 and 163.5 million years ago during the Jurassic period.

Superficial Deposits are the youngest geological deposits formed during the most recent period of geological time. They rest on older deposits or rocks referred to as Bedrock. BGS mapping does not record any superficial deposits on the Site.

3.4 Groundwater Vulnerability

Based on the Groundwater Vulnerability Maps from the Environment Agency presented in Magic Maps, the Site is within an area of ‘unproductive’ groundwater vulnerability. Above the north of the Site, there is a section of ‘high’ classification of groundwater vulnerability. This can be seen in **Figure 3-1.**

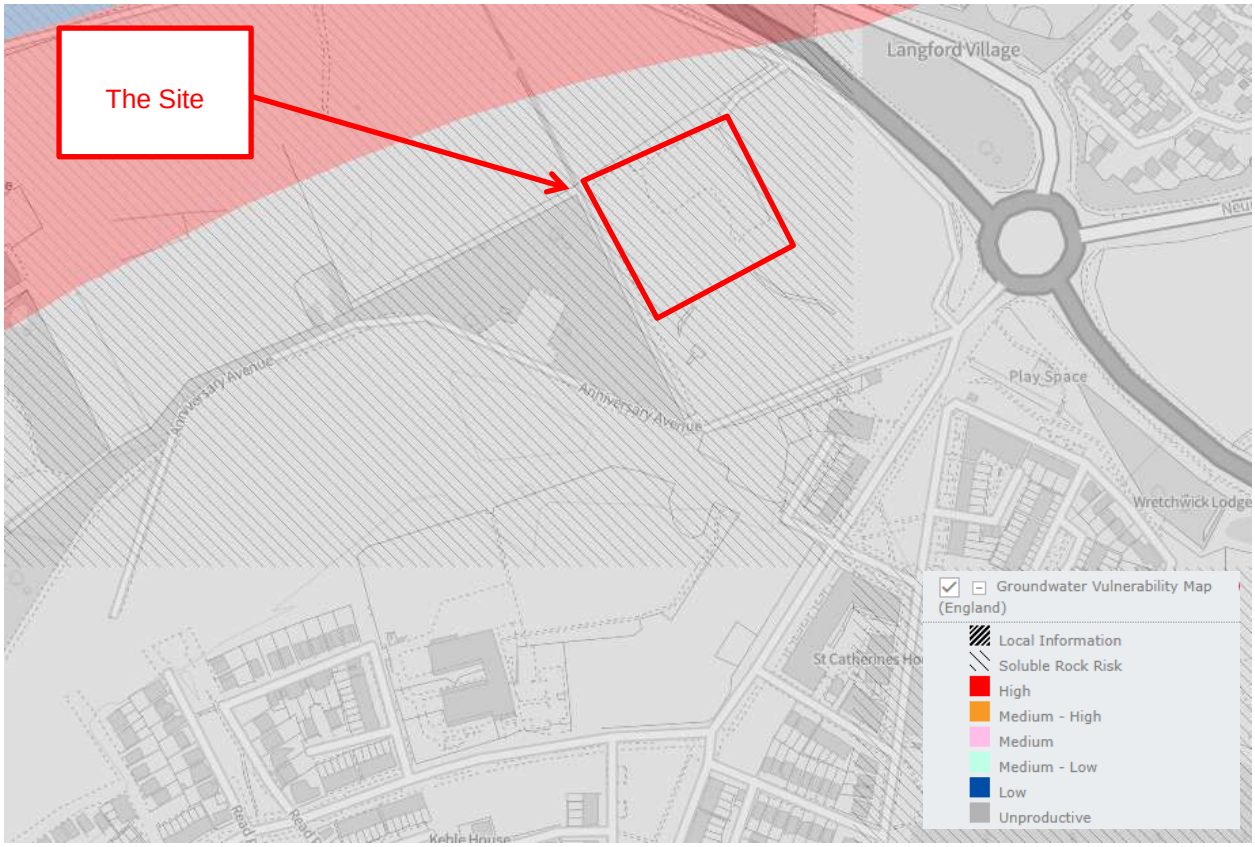


Figure 3-1: Groundwater Vulnerability Map

The 'high' zones are high-priority groundwater resources that have some natural protection resulting in a moderate overall groundwater risk. Activities in these areas should, as a minimum, follow good practice to ensure they do not cause groundwater pollution.

3.4.1 Groundwater Source Protection Zone

The EA's Ground Source Protection Zone map indicates that the Site is not within a Ground Source Protection Zone.

3.5 Borehole Data

A Site investigation has been undertaken by Geotechnical Engineering Ltd to advise on ground conditions. Exploratory boreholes and trial holes were undertaken across the Graven Hill development area, with the results confirming the BGS data and revealing CLAY at depths of up to 8.0m below ground level (bgl). The borehole and trial pit records most relevant to the Site are included in **Appendix D.**

BRE 365 infiltration testing was undertaken as part of the Site investigation for the wider Graven Hill development, and none of the tests returned a permeability value that would support infiltration-based SuDS. The infiltration test results are included in **Appendix D,** with those most relevant to the Site being TP543 & TP548.

4. Sources of Potential Flooding

4.1 Rivers

According to the EA Flood Map for Planning shown in **Figure 4-1**, the Site is situated within Flood Zone 1, defined within the National Planning Policy Framework (NPPF) as 'less than 1 in 1,000 annual probability of river or sea flooding in any year. Locations in flood zone 1 have a low probability of flooding. This means in any year land has a less than 0.1% chance of flooding from rivers or the sea.'

Langford Brook is located approximately 200 meters north of the site and flows from east to west. While it does not directly affect the flood risk of the site, it significantly influences Flood Zones 2 and 3 to the north of the brook. These zones indicate areas with medium to high probabilities of flooding, highlighting the importance of considering local hydrology in planning and development.

There is an ordinary watercourse to the west of the Site which flows in a northerly direction.

There is a ditch which runs adjacent to the northern boundary of the site, flowing in a eastward direction. . The surface water routes through a culvert, beneath the Graven Hill / LEDA access track, then conveys northwest adjacent the A41 discharging into the water course north of the LEDA land, Langford Brook. The ditch conveys surface water from the neighbouring farmland and as part of the development proposals the FFL of the Site is to be raised, therefore limiting potential surface water flooding from the ditch.

As the Site is within Flood Zone 1, the risk of flooding from fluvial sources is low. Risks to development could be reduced by using the sequential approach to locate development away from the watercourse.

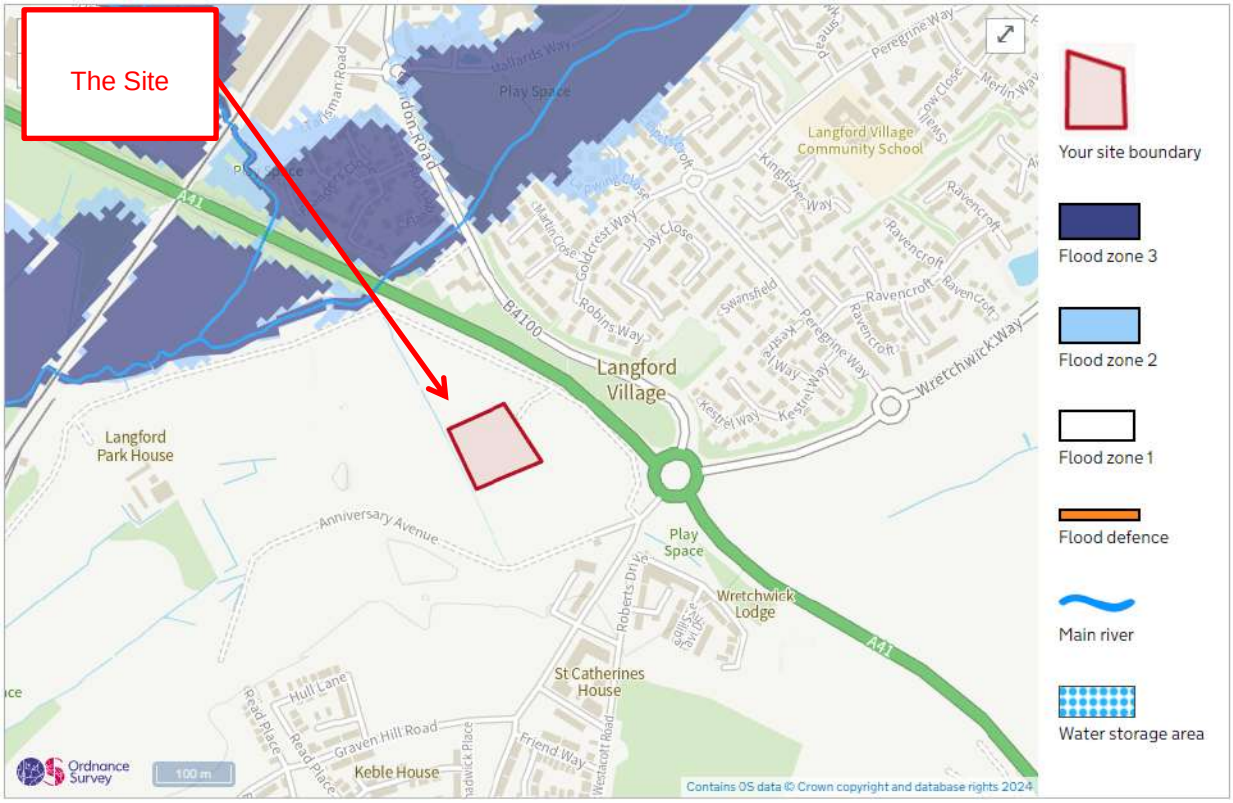


Figure 4-1: Fluvial Flood Map

Source: *Flood risk information for this location - Flood map for planning - GOV.UK (flood-map-for-planning.service.gov.uk)*

4.2 Surface Water

The Environment Agency (EA) surface water flooding map, as shown in **Figure 4-2**, indicates that there is a 'low' risk of surface water flooding along the watercourse on the western boundary of the Site. A 'low' risk of surface water flooding is also found in a small section in the centre of the north of the Site. The majority of the Site area is in a 'very low' risk of surface water flooding.

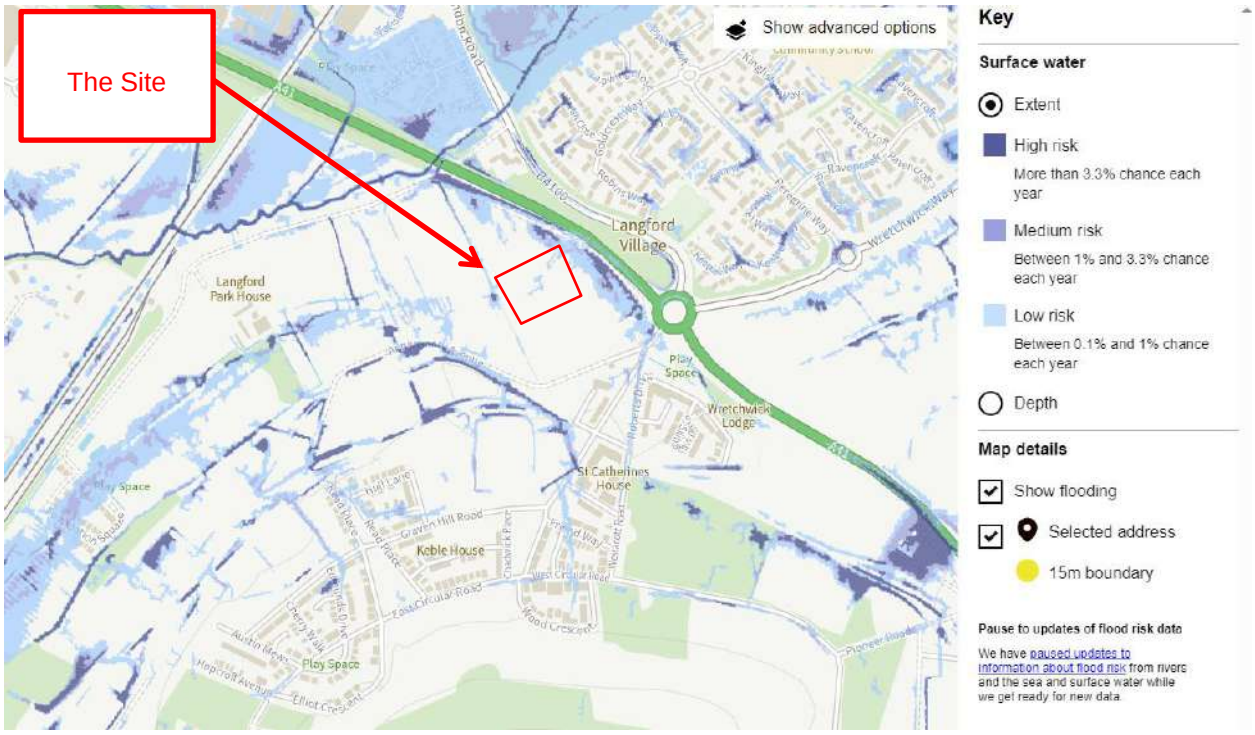


Figure 4-2: Surface Water Flood Map

Source: [See flood risk on a map - Check your long term flood risk - GOV.UK (check-long-term-flood-risk.service.gov.uk)]

To avoid increasing flood risk elsewhere, surface water management techniques should be adopted using Sustainable Drainage System (SuDS).

It is noted that during a Site visit, undertaken in March 2023, severe surface water ponding was recorded on the site. It is understood that the site was previously excavated for other works. This results in water ponding in the area. It is likely that this has occurred due to a lack of drainage infrastructure and impermeable ground conditions.

4.3 Flooding from Drainage Systems

Sewer flooding poses the highest risk of frequent flooding. Flooding from drainage systems occurs when flow entering a system exceeds its discharge capacity, the system becomes blocked or, in the case of surface water sewers, it cannot discharge due to high water level in the receiving watercourse. Sewer flooding is often caused by sewer capacity being exceeded in large rainfall events causing a backing up of flood waters within properties or through manholes.

Currently, there are no public surface water sewers serving the Site. There is a foul sewer that runs along the western boundary.

Any risk of sewer flooding post-development will be managed through the surface water drainage strategy.

Reservoir, Canal and Artificial Sources

There are no canals, reservoirs or other artificial sources that may provide a flood risk in the vicinity of the Site. The Environment Agency's Reservoir Flood Map indicates that the Site is not considered to be at risk of reservoir breach.

5. The Sequential and Exception Test

5.1 National Planning Policy Framework

The NPPF sets out the approach LPAs should take when determining planning applications. LPAs should ensure flood risk is not increased elsewhere and only consider development appropriate in areas at risk of flooding where, informed by a Site-specific flood risk assessment following the Sequential Test, and if required the Exception Test, it can be demonstrated that:

- Within the Site, the most vulnerable development is located in areas of lowest flood risk unless there are overriding reasons to prefer a different location; and
- Development is appropriately flood resilient and resistant, including safe access and escape routes where required, and that any residual risk can be safely managed, including by emergency planning; and it gives priority to the use of sustainable drainage systems.

The Site falls within Flood Risk Vulnerability Zone 1. This zone comprises land assessed as having a less than 1 in 1000 annual probability of river or sea flooding in any year (<0.1%). It is considered that all uses of land are appropriate in this zone.

In this zone, developers and local authorities should seek opportunities to reduce the overall level of flood risk in the area and beyond through the layout and form of the development, and the appropriate application of sustainable drainage systems.

5.2 The Sequential Test

Paragraph 168 of the NPPF gives guidance on the aim of the Sequential Test, which states:

> "The aim of the sequential test is to steer new development to areas with the lowest risk of flooding from any source. Development should not be allocated or permitted if there are reasonably available Sites appropriate for the proposed development in areas with a lower risk of flooding. The strategic flood risk assessment will provide the basis for applying this test. The sequential approach should be used in areas known to be at risk now or in the future from any form of flooding".

The Environment Agency's (EA) Flood Zone Map indicates that the Site falls within Flood Zone 1 and therefore, a sequential test has been passed.

5.3 The Exception Test

Paragraph 169 of the NPPF states that:

> "If it is not possible for development to be located in areas with a lower risk of flooding (taking into account wider sustainable development objectives), the exception test may have to be applied. The need for the exception test will depend on the potential vulnerability of the Site and of the development proposed, in line with the Flood Risk Vulnerability Classification set out in Annex 3".

Annex 3: Flood risk Vulnerability Classification classes the proposed Care home residential institution establishment as 'more vulnerable'. According to Table 2 Flood Risk Vulnerability and Flood Zone Compatibility of the Planning Practice Guidance (PPG), 'More Vulnerable' development in Flood Zones 1 is appropriate and, therefore, the Site does not require to undergo the Exception Test.

Table 1 of the PPG: Definition of Flood Zones, Table 2 of the PPG: Flood risk vulnerability and flood zone 'incompatibility', and NPPF Annex 3: Flood risk vulnerability classification are provided in **Appendix B**.

6. Conclusions and Recommendations

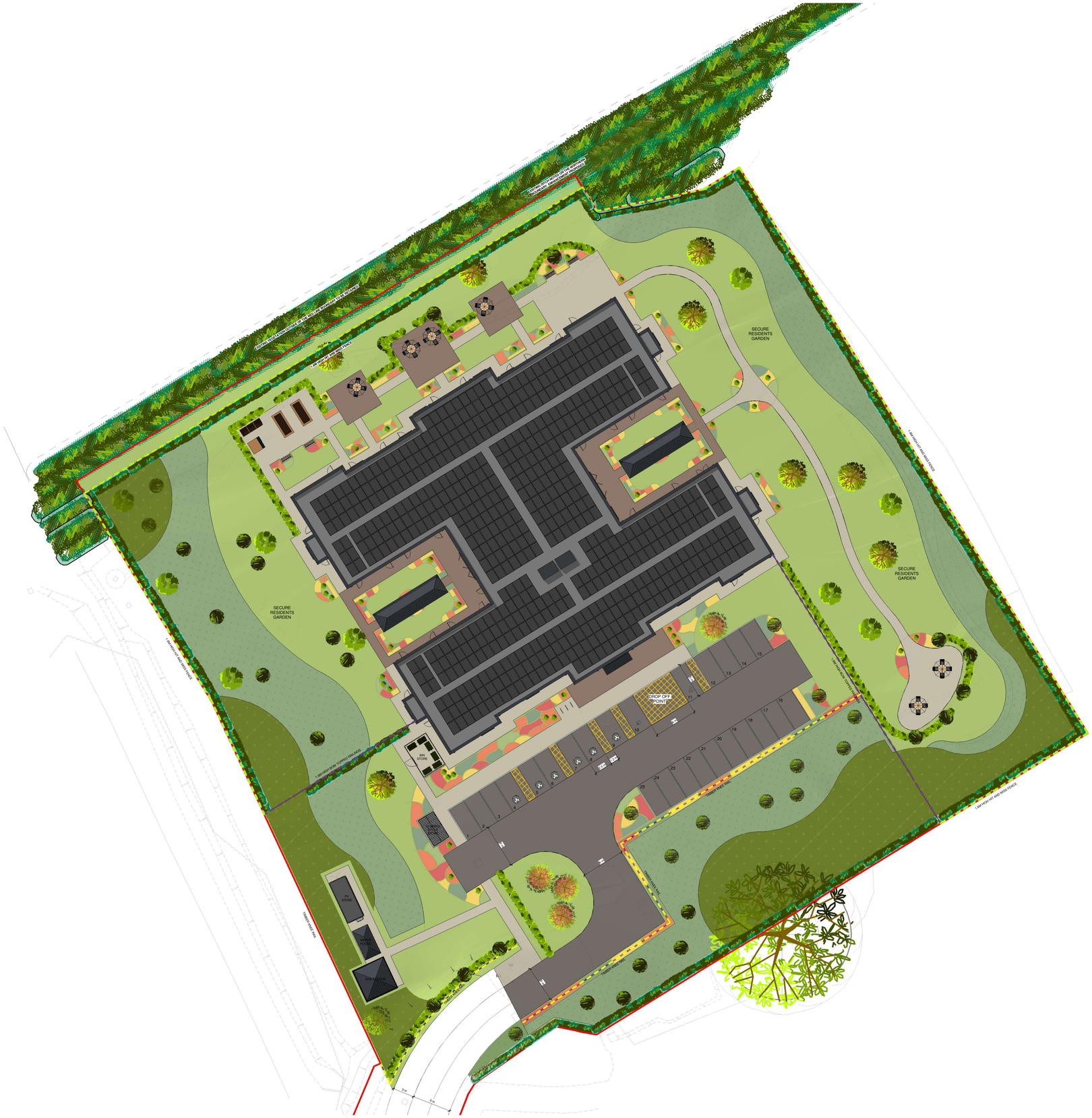
Waterman have been commissioned by LNT Care Developments to prepare a Flood Risk Assessment to support a planning application for a Site at Graven Hill Care Home, Graven Hill Village, Bicester, Cherwell District, Oxfordshire, OX26 6HG.

Based on the above assessment, our conclusions are as follows:

- There is an ordinary watercourse flowing along the west, parallel to the Site.
- The Site geology indicates no superficial deposits and a mudstone bedrock suggesting a low permeability. It is considered unlikely that infiltration-based SuDS would be appropriate.
- The topographical survey indicates that the Site generally falls in a northern direction.
- The EA's Ground Source Protection Zone map indicates that the Site is not within a Ground Source Protection Zone.
- The Site is situated in Flood Zone 1, therefore, the risk of flooding from fluvial sources is low.
- There is a 'low' risk of surface water flooding along the watercourse on the western boundary of the Site. The majority of the Site area is in a 'very low' risk of surface water flooding.
- The Environment Agency's (EA) Flood Zone Map indicates that the Site falls within Flood Zone 1 and therefore, a sequential test has been passed.
- 'More Vulnerable' developments in Flood Zones 1 is appropriate and, therefore, the Site does not require to undergo the Exception Test.

APPENDICES

A. Site Layout



PROPOSED SITE PLAN
1 : 200

0 1 2 4 6 8 10m 1:200

N

PROPOSED 66 BED CARE HOME

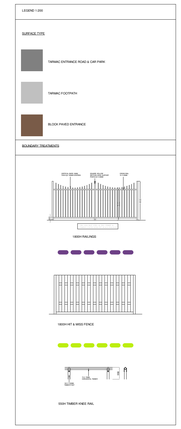
SITE AREA 9951m² (2.45 acres)

BUILDING FOOTPRINT 1787m²

AMENITY SPACE 7197m²

25No PARKING SPACES (INC. 6 No ELECTRIC VEHCILE CHARGING POINTS & 2 No DISABLED SPACES)

1 x 10 SPACE CYCLE STORE.
3 x SHEFFIELD HOOPS.



REV	DATE	DETAILS OF AMENDMENTS	DRAWN
B	19/11/2024	PARKING LAYOUT AMENDED IN LINE WITH PLANNING CONSULTATIONS. BOUNDARY TREATMENT LOCATION ON THE NORTH WESTERN BOUNDARY HAS BEEN AMENDED TO PROTECT EXISTING WATERCOURSE. LANDSCAPING UPDATED ACCORDINGLY.	L-JL
A	1/10/2024	SITE LAYOUT UPDATED TO INCLUDE ADDITIONAL CYCLE SPACES. DIMENSIONS NOTING THE RADII OF THE CAR PARK KERBING & EXISTING ROAD/FOOTPATH WIDTH ADDED.	L-JL

REVISIONS

LNT Construction

LNT CONSTRUCTION LTD
UNIT 2, HELIOS 47
ISABELLA ROAD
GARFORTH
LS25 2DY
Tel: 0113 385 3858
Fax: 0113 385 3859

CLIENT
LNT CARE DEVELOPMENTS

SITE
GRAVEN HILL
BICESTER
OX25 2BF

TITLE
PROPOSED SITE PLAN

SCALE @A0	As indicated	DATE	19/11/2024 11:49:33
DRAWN	L-JL	DWG NO.	OX25 2BF A-03-B

DRAWING STATUS
FOR PLANNING APPROVAL

CHECKED BY		DATE	
APPROVED BY		DATE	

B. National Planning Policy Framework and Planning Practice Guidance

Table 1 of the Planning Practice Guidance Flood Zones

In accordance with the sequential test in the National Planning Policy Framework, sites are to be classed as follows:

Flood Risk Vulnerability	Definition	Appropriate Uses	FRA Requirements	Policy Aims
Zone 1 – Low Probability	This zone comprises land assessed as having a less than 1 in 1000 annual probability of river or sea flooding in any year (<0.1%).	All uses of land are appropriate in this zone.	For development proposals on sites comprising one hectare or above the vulnerability to flooding from other sources as well as from river and sea flooding, and the potential to increase flood risk elsewhere through the addition of hard surfaces and the effect of the new development on surface water run-off, should be incorporated in a FRA. This need only be brief unless the factors above or other local considerations require particular attention.	In this zone, developers and local authorities should seek opportunities to reduce the overall level of flood risk in the area and beyond through the layout and form of the development, and the appropriate application of sustainable drainage systems.
Flood Zone 2 – Medium Probability	This zone comprises land assessed as having between a 1 in 100 and 1 in 1000 annual probability of river flooding (1% - 0.1%) or between a 1 in 200 and 1 in 1000 annual probability of sea flooding (0.5% - 0.1%) in any year.	Essential infrastructure and the water-compatible, less vulnerable and more vulnerable uses as set out in table 2 are appropriate in this zone. The highly vulnerable uses are only appropriate in this zone if the Exception Test is passed.	All development proposals in this zone should be accompanied by a FRA.	In this zone, developers and local authorities should seek opportunities to reduce the overall level of flood risk in the area and beyond through the layout and form of the development, and the appropriate application of sustainable drainage systems.
Zone 3a - High Probability	This zone comprises land assessed as having a 1 in 100 or greater annual probability of river (>1%) or a 1 in 200-year greater annual probability of flooding from the sea (>0.5%) in any year.	The water-compatible and less vulnerable uses of land (table 2) are appropriate in this zone. The highly vulnerable uses in the table below should not be permitted in this zone. The more vulnerable uses and essential infrastructure should only be permitted in this zone if the Exception Test is passed.	All development in this zone should be accompanied by a FRA.	In this zone, developers and local authorities should seek opportunities to: i. reduce the overall level of flood risk in the area and beyond through the layout and form of the development, and the appropriate application of sustainable drainage systems; ii. relocate existing development to land in zones with a lower probability of flooding; and

Flood Risk Vulnerability	Definition	Appropriate Uses	FRA Requirements	Policy Aims
		Essential infrastructure permitted in this zone should be designed and constructed to remain operational and safe for users in times of flood.		iii. create a space for flooding to occur by restoring functional and flood flow pathways and by identifying, allocating and safeguarding open space for flood storage.
Zone 3b - The Functional Floodplain	This zone comprises land where water has to flow or be stored in times of flood. Local Planning Authorities should identify in their SFRAs areas of functional floodplain and its boundaries accordingly, in agreement with the Environment Agency. The identification of functional floodplain should take account of local circumstances and not be defined solely on rigid probability parameters. But land which would flood with an annual probability of 1 in 20 (5%) or greater in any year or is designed to flood in an extreme (0.1%) flood, should provide a starting point for consideration and discussions to identify the functional floodplain.	Only the water-compatible uses and essential infrastructure listed in table 2 that has to be there should be permitted in this zone. It 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. Essential infrastructure in this zone should pass the Exception Test.	All development in this zone should be accompanied by a FRA.	In this zone, developers and local authorities should seek opportunities to: i. reduce the overall level of flood risk in the area and beyond through the layout and form of the development, and the appropriate application of sustainable drainage techniques; and ii. relocate existing development to land with a lower probability of flooding.

National Planning Policy Framework Annex 3 - Flood Risk Vulnerability Classification

Vulnerability	Land Use Types
Essential Infrastructure	• Essential transport infrastructure (including mass evacuation routes) which has to cross the area at risk; • Essential utility infrastructure which has to be located in a flood risk area for operational reasons, including electricity generating power stations and grid and primary stations; water treatment works that need to remain operational in times of flood; • Wind turbines. • Solar farms.
Highly Vulnerable	• Police stations, Ambulance stations and Fire stations and Command Centres and telecommunications installations required to be operational during flooding; • Emergency dispersal points; • Basement dwellings; • Caravans, mobile homes and park homes intended for permanent residential use; • Installations requiring hazardous substances consent.
More Vulnerable	• Hospitals; • Residential institutions such as residential care homes, children's homes, social services homes, prisons and hostels; • Buildings used for: dwelling houses; student halls of residence; drinking establishments; nightclubs; and hotels; • Non-residential uses for health services, nurseries and educational establishments; • Landfill and sites used for waste management facilities for hazardous waste; • Sites used for holiday or short-let caravans and camping, subject to a specific warning and evacuation plan.
Less Vulnerable	• Police stations, Ambulance stations and Fire stations which are not required to be operational during flooding; • Buildings used for: shops; financial, professional and other services; restaurants and cafes; hot food takeaways; offices; general industry; storage and distribution; non-residential institutions not included in 'more vulnerable'; and assembly and leisure; • Land and buildings used for agriculture and forestry; • Waste treatment (except landfill and hazardous waste facilities); • Minerals working and processing (except for sand and gravel working); • Water treatment plants which are not required to be operational during flooding; • Sewage treatment plants (if adequate measures to control pollution and manage sewage during flooding events are in place). • Car parks
Water-compatible Development	• Flood control infrastructure; • Water transmission infrastructure and pumping stations; • Sewage transmission infrastructure and pumping stations; • Sand and gravel workings; • Docks, marinas and wharves; • Navigation facilities; • Ministry of Defence installations; • Ship building, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location • Water-based recreation (excluding sleeping accommodation); • Lifeguard and coastguard stations; • Amenity open space, nature conservation and biodiversity, outdoor sports and recreation and essential facilities such as changing rooms; • Essential ancillary sleeping or residential accommodation for staff required by uses in this category, subject to a specific warning and evacuation plan

Table 2 of the Planning Practice Guidance - Flood Risk Vulnerability and Flood Zone Compatibility

Flood Risk Vulnerability	Essential Infrastructure	Water Compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Zone 1	√	√	√	√	√
Zone 2	√	√	Exception Test Required	√	√
Zone 3a	Exception Test Required	√	X	Exception Test Required	√
Zone 3b	Exception Test Required	√	X	X	X

√ - Development is appropriate.

X – Development should not be permitted.

Notes: This table does not show:

1. The application of the Sequential Test which gives development to Flood Zone 1 first, then Zone 2, and then Zone 3;
2. Flood risk assessment requirements; or
3. The policy aims for each flood zone.

C. Topographical Survey

Notes:

1. GRID AND LEVELS BASED ON ORDNANCE DATUM, DERIVED FROM THE NATIONAL GNSS NETWORK. LOCAL SCALE FACTOR 0.99964 APPLIED.
2. TREE AND HEDGE SPECIES HAVE BEEN IDENTIFIED AS ACCURATELY AS POSSIBLE BUT SHOULD BE CROSS CHECKED IN CRITICAL AREAS.

Coordinate Table

Station	Description	Easting	Northing	Level
S1	Road Nail	458906.033	221302.860	67.501
S2	Road Nail	458927.971	221267.301	67.826
S3	Peg	458905.288	221206.432	68.188
S4	Peg	458865.073	221231.668	67.464
S5	Road Nail	458949.285	221343.581	67.243
S10	Peg	458870.476	221164.527	69.700
S11	Hilti Nail	458889.185	221097.122	69.668

TOPOGRAPHICAL KEY

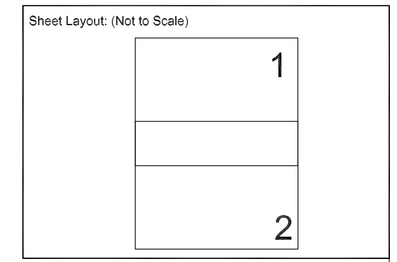
GENERAL ABBREVIATIONS

SURVEY STATION	5	AIR CONDITIONING UNIT	ACU
	TOP	AVERAGE	AV
BANKING	90/100	BACK DROP	BD
		BASE LEVEL	BL
HEDGE SPREADS		BOLLARD BEACON	BB
		BOLLARD	BO
WOODLAND CANOPY		BOLLARD LIGHT	BOL
		BRICK	BK
ARROW ON STEPS / RAISE / KICKS / DIRECTION UP/RAMPS		BUS STOP	BS
		CABLE RISER	CR
TREES	SPREAD & GIRTH SHOWN TO SCALE	CABLE TV COVER	CTV
		CABLES TO GROUND	CTG
		CATCH PIT	CP
		CONTROL BOX	CB
		COVER LEVEL	CL
		CROSSING CONTROL BUTTON	CCB
		DRAINAGE COURSE	DCO
		DRAINAGE CHANNEL	DCH
		DROP KERB	DK
GATE		ELECTRICITY POLE	EP
		EARTH ROD	ER
KERB CHANNEL		FIRE HYDRANT	FH
		FLOOD LEVEL	FL
ROAD UNKERBED		FOOTPATH	FP
		FOUL WATER	FW
FOOTPATH		GAS RISER	GR
		GAS VALVE	GV
CHANGE IN SURFACE		GULLY	GY
		HAND BID	HB
FENCE		HIGHWAY DRAIN COVER	HD
		INVERT LEVEL	IL
WALL		KERB OUTLET	KO
		LAMP POST	LP
OVERHEAD ELECTRIC		MANHOLE	MH
		MARKER POST	MP
OVERHEAD TELECOM		METER	MT
		NO PIPES VISIBLE	NPV
FOUL SEWER		ORDNANCE SURVEY BENCH MARK	OSBM
		P-TRAP	PT
SURFACE SEWER		POST	PO
		POST BID	P BOX
P-TRAP		RAIN WATER EYE	RE
		ROAD BOX	RB
BACK DROP (EXTERNAL)		RAIN WATER PIPE	RWP
		RETAINING WALL	RW
BACK DROP (INTERNAL)		SOFT BID	SB
		STOP COCK	SC
BUILDING		STREET NAME PLATE	SNP
		SOIL VALVE	SV
OPEN SIDED BUILDING		SOIL PIPE	SP
		SOIL VENT PIPE	SVP
OVERHANG / CANOPY		SURFACE WATER	SW
		TACTILE PAVING	TAC
GLASSHOUSE		TELEGRAPH POLE	TP
		TELEPHONE JUNCTION COVER	TJC
CONTOUR	20.00	TELEPHONE CALL BOX	TEL
SPOT LEVEL	+ 127.13	TIDIGET MACHINE	TM
SONAR LEVEL	⊙ 127.13	TOP OF WALL	TOW
BORE HOLE	BH	TRAFFIC LIGHT	TL
TRIAL HOLE	TH	TRAFFIC LIGHT CONTROLLER	TLC
		UNABLE TO ACCESS	UTA
		UNABLE TO LOCATE	UTL
		UNABLE TO RABBI	UTR
		UNABLE TO SURVEY	UTS
		VENT PIPE	VP
		WATER LEVEL	WL
		WATER METER	WM
		WATER POST	WP
		WATER RISER	WR
		WATER TAP	WT

FENCE ABBREVIATIONS

BARBED WIRE FENCE	BW	IRON RAILINGS	IR
CLOSE BOARDED FENCE	CB	LARCH LAP FENCE	LL
CONCRETE PANEL FENCE	CPL	POST AND RAIL FENCE	R/R
CORRUGATED IRON FENCE	CI	POST AND WIRE FENCE	R/W
CHAIN LINK FENCE	CL	WIRE MESH FENCE	W/M
CHESTNUT PALING	CHP		

Sheet Layout: (Not to Scale)



Revision	Description	Drn. by	Chkd. by	Appr. by	Date
2	Area to North extended.	CB	CB	CB	September 2024
1	New access road added	BB	KC	JS	April 2024

0m 2 4 6 8 10 12 14 16 18 20 22

Topographical Survey

Client:

LNT Care Developments

Care Home Site
Graven Hill
Bicester
Oxfordshire

Scale:	Sheet Size:	Sheet Number:	Date:
1:200	A0	1	September 2024

Project Number:	Rev:	Surveyed by:	Checked by:	Approved by:
33902	2	SB	AG	JS

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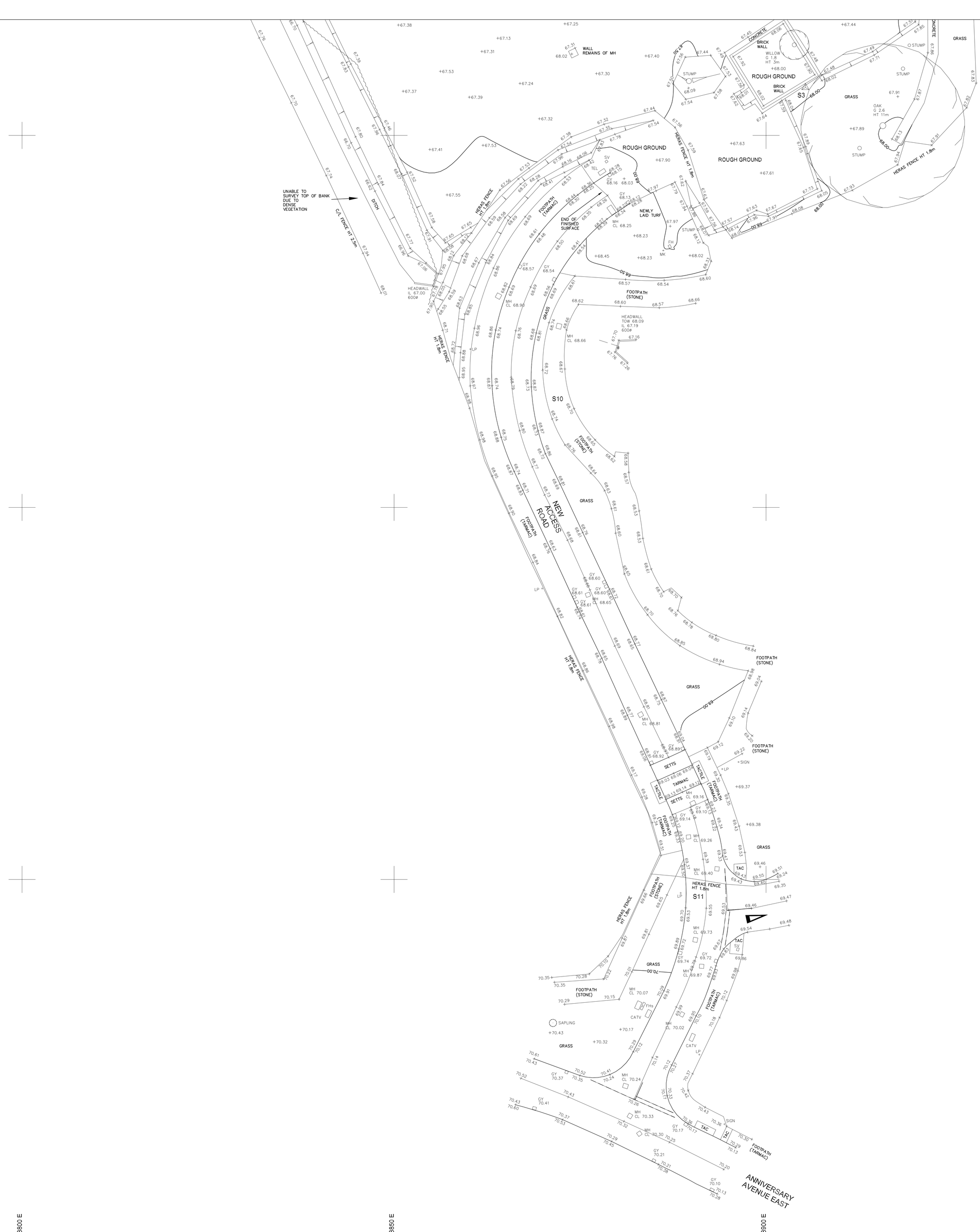
Head Office: Milton Keynes t: 01908 565561 e: mail@mksurveys.co.uk



Notes:

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2. TREE AND HEDGE SPECIES HAVE BEEN IDENTIFIED AS ACCURATELY AS POSSIBLE BUT SHOULD BE CROSS CHECKED IN CRITICAL AREAS.

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TOPOGRAPHICAL KEY

GENERAL ABBREVIATIONS

SURVEY STATION	5	AIR CONDITIONING UNIT	ACU
	TOP	AVERAGE	AV
BANKING	90° / 135°	AVERAGE	AV
		BACK DROP	BD
HEDGE SPREADS		BASE LEVEL	BL
		BOLLARD BEACON	BB
WOODLAND CANOPY		BOLLARD	BOL
		BOLLARD LIGHT	BOL
ARROW ON STEPS / RAMPS INDICATES DIRECTION UP/RAMPS		BRICK	BK
		BUS STOP	BS
TREES	SPREAD & GIRTH SHOWN TO SCALE	CABLE RISER	CR
		CABLE TV COVER	CATV
		CABLES TO GROUND	CTG
		CATCH PIT	CP
GATE		CONTROL BOX	CB
		COVER LEVEL	CL
KERB CHANNEL		CROSSING CONTROL BUTTON	CCB
		DRAINAGE COURSE	DC
ROAD UNMARKED		DRAINAGE CHANNEL	DCH
		DROP KERB	DK
FOOTPATH		ELECTRICITY POLE	EP
		EARTH ROD	ER
CHANGE IN SURFACE		FIRE HYDRANT	FH
		FLOOR LEVEL	FL
FENCE		FOOTPATH	FP
		FOUL WATER	FW
WALL		GAS RISER	GR
		GAS VALVE	GV
OVERHEAD ELECTRIC	N	GULLY	GY
		HARD BED	HB
OVERHEAD TELECOM	T	INSPECTION COVER	IC
		INVERT LEVEL	IL
FOUL SEWER		KERB OUTLET	KO
		LAMP POST	LP
SURFACE SEWER		MANHOLE	MH
		MARKER POST	MP
P-TRAP		METER	MR
		NO PIPES VISIBLE	NPV
BACK DROP (EXTERNAL)		ORDNANCE SURVEY BENCH MARK	OSBM
		P-TRAP	PT
BACK DROP (INTERNAL)		POST	PO
		POST BOX	P BOX
BUILDING		ROAD EYE	RE
		ROAD SIGN	RS
OPEN SIDED BUILDING		RWH WATER PIPE	RWP
		RETAINING WALL	RW
OVERHANG / CANOPY		SOFT BED	SB
		STOP COCK	SC
GLASSHOUSE		STREET NAME PLATE	SNP
		STOP VALVE	SV
CONTOUR	25.00	SOIL PIPE	SP
		SOIL VENT PIPE	SVP
SPOT LEVEL	+ 127.13	SURFACE WATER	SW
		TACTILE PAVING	TAC
SPRING LEVEL	O 127.13	TELEGRAPH POLE	TP
		TELECOM DP	TEL
BORE HOLE	BH	TELECOM INSPECTION COVER	TIC
		TELECOM'S DIAL BOX	TD
TRIAL HOLE	TH	TIDGET MACHINE	TM
		TOP OF WALL	TOW
		TRAFFIC LIGHT	TL
		TRAFFIC LIGHT COVER	TLC
		TRIAL HOLE	TH
		UNABLE TO LOCATE	UTL
		UNABLE TO RISE	UTR
		UNABLE TO SURVEY	UTS
		VENT PIPE	VP
		WATER LEVEL	WL
		WATER METER	WM
		WATER POST	WP
		WATER RISER	WR
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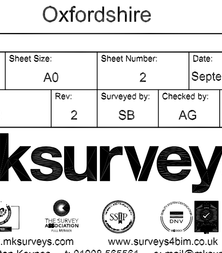
Sheet Layout: (Not to Scale)



Rev/apv	Description	Born by	Check, by/apv by	Date
2	Area to North extended	CB	CB	CB	September 2024
1	New access road added	SB	AG	JS	April 2024

0m 2 4 6 8 10 12 14 16 18 20 22

Topographical Survey

Client:

LNT Care Developments

Care Home Site
Graven Hill
Bicester
Oxfordshire

Scale:	Sheet Size:	Sheet Number:	Date:
1:200	A0	2	September 2024
Project Number:	Rev:	Surveyed by:	Checked by:	Approved by:
33902	2	SB	AG	JS

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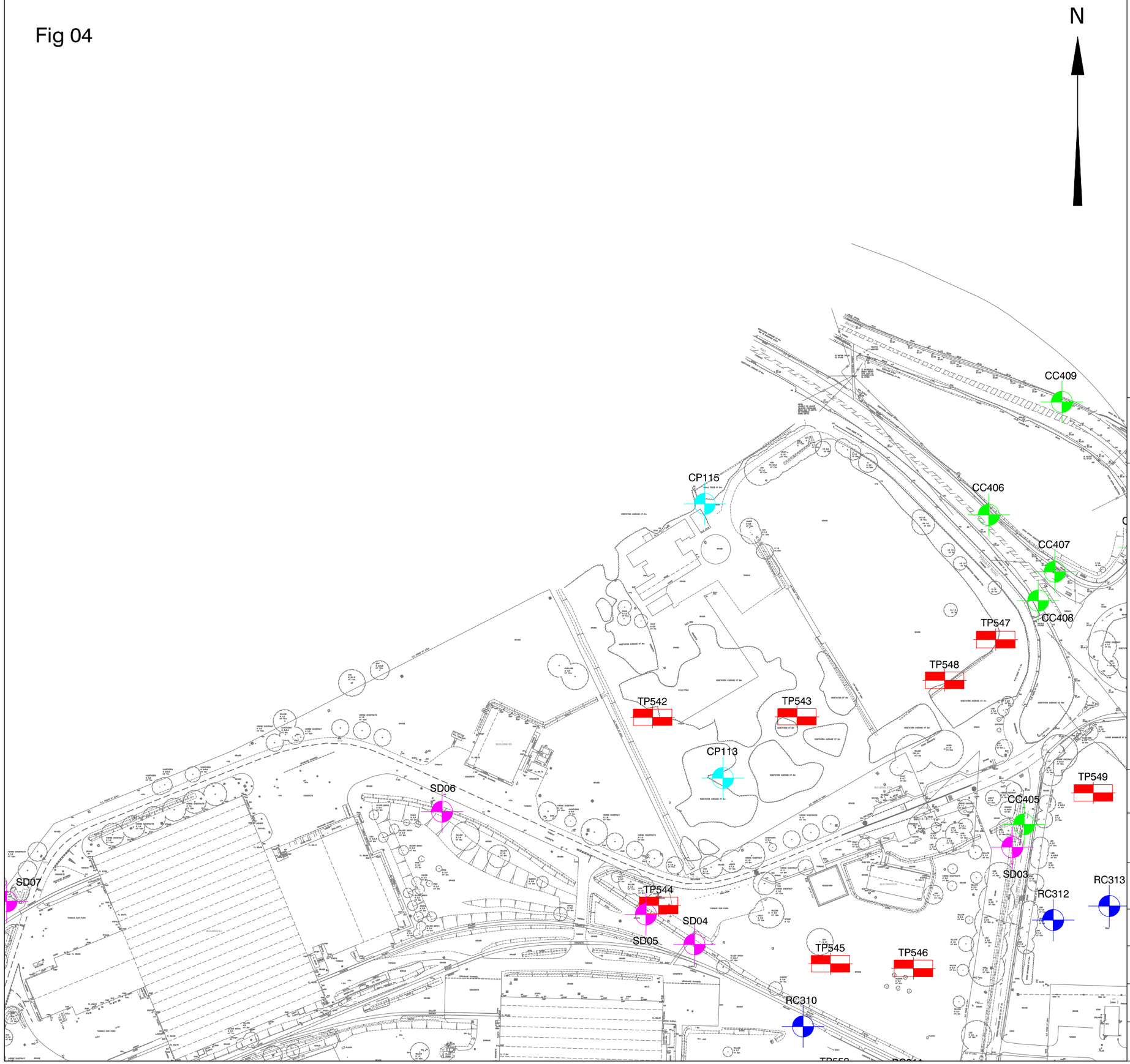
www.mksurveys.com www.surveys4bim.co.uk
Head Office: Milton Keynes t: 01908 565561 e: mail@mksurveys.co.uk

D. Borehole Data

Fig 04



Key.

- Rotary Core Location
- Cable Percussive Location
- Concrete Core/Dynamic Sample Location
- Surface Drain Sample Location
- Plate Load Location
- Trial Pit Location
- Trial Pit (Hand Dug) Location

Notes:

Drawing supplied by client.

geotechnical

Geotechnical Engineering Ltd

Centurion House, Olympus Park, Quedgeley, Gloucester GL2 4NF
Telephone: (01452) 527743 Facsimile: (01452) 729314
E-mail: geotech@geoeng.co.uk Web: www.geoeng.co.uk

Client:	Graven Hill Village Development Company		
Consultant:	Waterman Infrastructure & Environment		
Site:	Graven Hill		
Title:	Exploratory Hole Location Plan		
Drawn By: MPE	Checked By: DO	Paper Size: A3	
Scale: 1:2000	Date: May 2015		
Contract: 30378	Figure: 04		

Geotechnical Engineering Limited

BOREHOLE LOG

CP113

CLIENT GRAVEN HILL VILLAGE DEVELOPMENT COMPANY

SITE GRAVEN HILL NEW URBAN COMMUNITY, BICESTER — Sheet 1 of 2

Start Date 25 March 2015 — Easting 458905.2 — Scale 1 : 50

End Date 25 March 2015 — Northing 221152.0 — Ground level 68.45mOD — Depth 8.20 m

progress date/time water depth	sample no & type	depth (m) from	depth (m) to	casing depth (m)	test type & value	samp. /core range	instru -ment	description	depth (m)	reduced level (m)	legend
25/03/15 0800hrs	D*	0.25						Grass over firm brown mottled orangish brown slightly sandy silty CLAY with frequent rootlets (up to 1mm diam). (MADE GROUND)	0.25	68.20	
	1B	0.25									
	2D*	0.50						Firm brown sandy silty CLAY with frequent rootlets (up to 1mm diam).			
	3B	0.50									
	4D*	1.00							1.00	67.45	
	5B	1.00						Firm fissured orangish brown and bluish grey slightly sandy silty CLAY with frequent black fine and medium gravel sized organic fragments.			
	6D	1.20	1.25								
	7UT	1.70	2.10	1.70							
	8D	2.10	2.20						2.20	66.25	
	9D	2.20	2.65	1.70	S 10			Firm fissured brownish grey slightly sandy silty CLAY with orangish brown and yellowish brown silt on fissure surfaces and rare fine and medium gravel sized gypsum crystals.			
	10UT	2.70	3.10	1.70							
	11D	3.10	3.20						3.20	65.25	
	12D	3.20	3.65	1.70	S 12			Firm brownish grey silty CLAY with rare fine and medium gravel sized pockets of orangish brown silt and frequent coarse gravel sized gypsum crystals.			
	13UT	3.70	4.10	1.70							
	14D	4.10	4.20						4.20	64.25	
	15D	4.20	4.65	1.70	S 18			Firm becoming stiff brownish grey silty CLAY with rare fine and medium gravel sized shell fragments.			
	16UT	4.70	5.10	1.70							
	17D	5.10	5.20								
	18D	5.20	5.65	1.70	S 24						
	19D	6.20	6.25								
	20UT	6.20	6.60	1.70							
	21D	6.60	6.70								
	22D	6.70	7.15	1.70	S 39			6.70m: Very stiff with frequent fine to coarse gravel sized shell fragments.			
	23D	7.70	7.75								
25/03/15 1100hrs	24UT	7.70	8.10	1.70							
								Continued Next Page	{8.00}		

EQUIPMENT: Light cable percussive (shell and auger) rig.

METHOD: Hand dug inspection pit 0.00-1.20m. Cable percussion (150mm) 1.20-8.20m.

CASING: 150mm diam to 1.70m.

BACKFILL: On completion, a slotted standpipe (50mm) was installed to 8.00m, granular response zone 8.20-0.40m, bentonite seal 0.40-0.10m, concrete and traffic rated cover 0.10-0.00m.

EXPLORATORY HOLE LOGS SHOULD BE READ IN CONJUNCTION WITH KEY SHEETS

water strike (m)	casing (m)	rose to (m)	time to rise (min)	remarks
				Groundwater not encountered.

AGS

CONTRACT	CHECKED
30378	EC

Geotechnical Engineering Limited

BOREHOLE LOG

CP113

CLIENT GRAVEN HILL VILLAGE DEVELOPMENT COMPANY

SITE GRAVEN HILL NEW URBAN COMMUNITY, BICESTER — Sheet 2 of 2

Start Date 25 March 2015 — Easting 458905.2 — Scale 1 : 50

End Date 25 March 2015 — Northing 221152.0 — Ground level 68.45mOD — Depth 8.20 m

progress date/time water depth	sample no & type	depth (m) from	depth (m) to	casing depth (m)	test type & value	samp. /core range		instru -ment	description	depth (m)	reduced level (m)	legend
Dry	25D	8.10	8.20						8.10 - 8.20m: Indistinctly laminated.	8.20	60.25	
									Borehole completed at 8.20m.			
										{18.00}		

water strike (m) casing (m) rose to (m) time to rise (m) remarks

Groundwater not encountered.

AGS

CONTRACT 30378

CHECKED EC

Geotechnical Engineering Limited

TRIAL PIT LOG

TP542

CLIENT	GRAVEN HILL VILLAGE DEVELOPMENT COMPANY						
SITE	GRAVEN HILL NEW URBAN COMMUNITY, BICESTER					Sheet	1 of 1
Start Date	2 March 2015	Easting	458867.6			Scale	1 : 25
End Date	2 March 2015	Northing	221184.6	Ground level	68.00mOD	Depth	3.00 m

water record	sample/test no/type	sample/test result	sample/test depth (m)	description	depth (m)	level (m)	legend
	1D*		0.30	Very soft dark brown slightly sandy gravelly CLAY with frequent roots and rootlets (up to 8mm diam). Gravel is subrounded and subangular fine and medium quartz with a low brick cobble content. (MADE GROUND)	0.20	67.80	
	2D		0.30	Soft and firm brown and orangish brown mottled slightly sandy slightly gravelly CLAY with frequent rootlets (up to 2mm diam). Gravel is subrounded fine to coarse limestone.	0.80	67.20	
	3D*		1.00	Firm mottled light brown, orangish brown and greyish brown silty CLAY with rare rootlets (up to 2mm diam) and rare cobble sized pockets of fine and medium gravel sized angular shell fragments.			
	4B	H 87	1.00				
	5B		1.50- 1.70	1.50 - 1.70m: Lens of soft light grey very sandy CLAY.			
		H 100	2.40				
	6B		2.60	Stiff fissured dark brown silty CLAY with partially decomposed roots (up to 3mm diam). Fissures are subhorizontal very closely spaced infilled with orangish brown fine sand. 2.60 - 2.80m: Fine and medium gravel sized angular gypsum crystals.	2.60	65.40	
Dry				Trial pit completed at 3.00m.	3.00	65.00	

Notes

Trial pit excavated by JCB 3CX mechanical excavator.
Groundwater not encountered.
Trial pit sides remained stable and vertical.
Trial pit dimensions 1.80x0.65x3.00m.
On completion, the trial pit was backfilled with materials arising.

Sketch of Foundation - Not to scale. All dimensions in metres.

EXPLORATORY HOLE LOGS SHOULD BE READ IN CONJUNCTION WITH KEY SHEETS

AGS

CONTRACT	CHECKED
30378	EC

Geotechnical Engineering Limited

TRIAL PIT LOG

TP543

CLIENT	GRAVEN HILL VILLAGE DEVELOPMENT COMPANY						
SITE	GRAVEN HILL NEW URBAN COMMUNITY, BICESTER					Sheet	1 of 1
Start Date	2 March 2015	Easting	458944.8			Scale	1 : 25
End Date	2 March 2015	Northing	221184.9	Ground level	68.20mOD	Depth	3.00 m

water record	sample/test no/type	sample/test result	sample/test depth (m)	description	depth (m)	level (m)	legend
				Very soft dark brown slightly sandy silty CLAY with frequent roots and rootlets (up to 3mm diam).	0.15	68.05	
	1D*		0.30	Firm reddish brown mottled orangish brown silty CLAY with frequent fine rootlets (up to 2mm diam).			
	2D	H 54	0.30				
					0.80	67.40	
	3D*		1.00	Firm light brown and orangish brown locally mottled light grey slightly gravelly sandy CLAY with rare rootlets (up to 2mm diam). Gravel is subrounded medium flint.			
	4B	H 58	1.00				
	5D		1.00				
				1.60m: Light grey locally orangish brown very sandy lenses.			
					2.40	65.80	
		H 74	2.40	Stiff fissured dark brown locally light brown CLAY with frequent fine and medium gravel sized angular gypsum crystals and rare coarse gravel pockets of orangish brown silty clay.			
	6B		2.40- 2.60				
				2.90 - 3.00m: Dark bluish grey.	3.00	65.20	
Dry				Trial pit completed at 3.00m.			

Notes

Trial pit excavated by JCB 3CX mechanical excavator.
Groundwater not encountered.
Trial pit sides remained stable and vertical.
Trial pit dimensions 1.70x0.60x3.00m.
On completion, the trial pit was backfilled with materials arising.

Sketch of Foundation - Not to scale. All dimensions in metres.

EXPLORATORY HOLE LOGS SHOULD BE READ IN CONJUNCTION WITH KEY SHEETS

CONTRACT	CHECKED
30378	EC

Geotechnical Engineering Limited

SOAKAWAY TEST

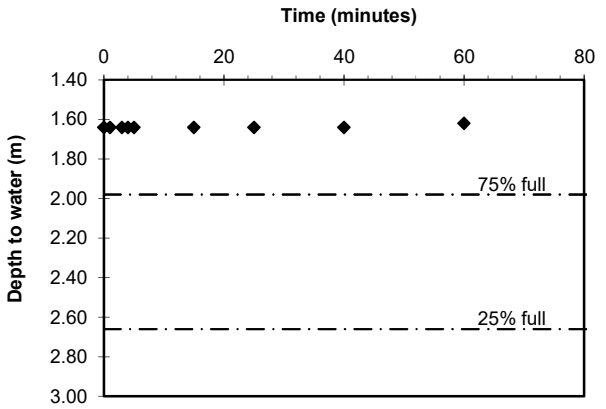
CLIENT	GRAVEN HILL VILLAGE DEVELOPMENT COMPANY		
SITE	GRAVEN HILL, BICESTER	TRIAL PIT	**TP501**
DATE	05/03/2015		

TEST 1

LENGTH	1.80	m
BREADTH	0.60	m
DEPTH	3.00	m
WATER LEVEL	Damp	
FILL LEVEL	1.64	m
v_{p75-25}	0.734	m^3
a_{p50}	4.344	m^2
t_{p75-25}		min

soil infiltration rate, *f* **ms^{-1}**

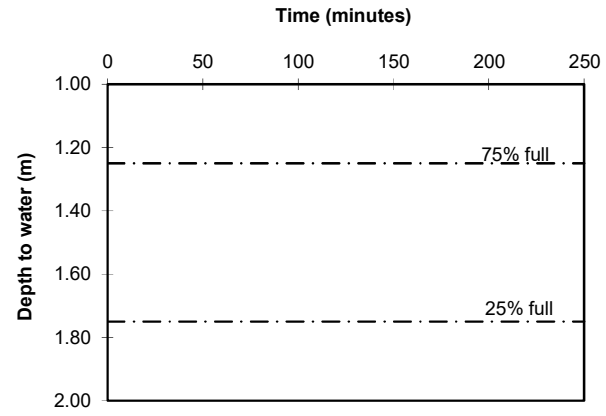
Insufficient fall in water level to calculate infiltration rate



TEST 2

LENGTH		m
BREADTH		m
DEPTH		m
WATER LEVEL		m
FILL LEVEL		m
v_{p75-25}		m^3
a_{p50}		m^2
t_{p75-25}		min

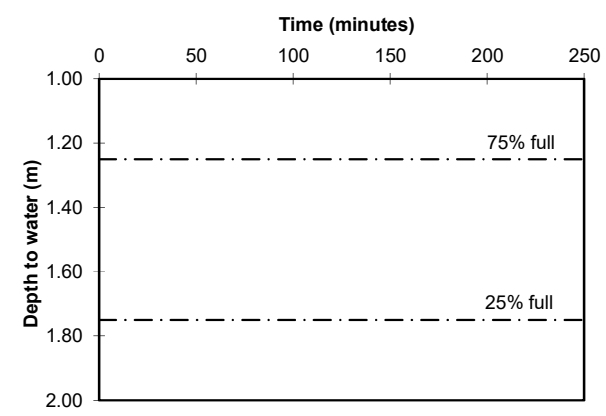
soil infiltration rate, *f* **ms^{-1}**



TEST 3

LENGTH		m
BREADTH		m
DEPTH		m
WATER LEVEL		m
FILL LEVEL		m
v_{p75-25}		m^3
a_{p50}		m^2
t_{p75-25}		min

soil infiltration rate, *f* **ms^{-1}**



Remarks	Test carried out in general accordance with BRE 365 (2007).	CONTRACT	CHECKED
	Seepage of groundwater encountered at 0.80m during excavation.	**30378**	**EC**

RD / DO

08/06/09 JH

Geotechnical Engineering Limited

SOAKAWAY TEST

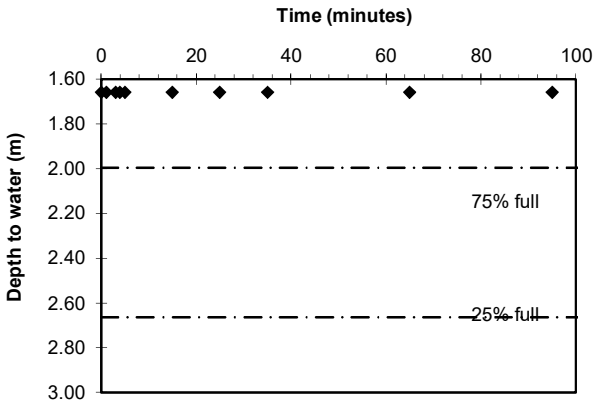
CLIENT GRAVEN HILL VILLAGE DEVELOPMENT COMPANY
SITE GRAVEN HILL, BICESTER TRIAL PIT **TP502**
DATE 04/03/2015

TEST 1

LENGTH	1.90	m
BREADTH	0.70	m
DEPTH	3.00	m
WATER LEVEL	Dry	
FILL LEVEL	1.66	m
v_{p75-25}	0.891	m^3
a_{p50}	4.814	m^2
t_{p75-25}		min

soil infiltration rate, *f* **ms^{-1}**

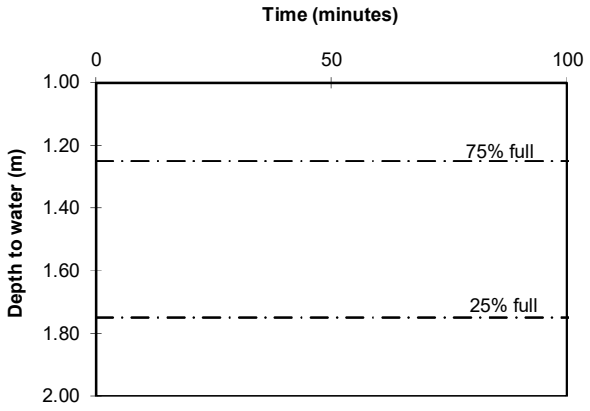
Insufficient fall in water level to calculate infiltration rate



TEST 2

LENGTH		m
BREADTH		m
DEPTH		m
WATER LEVEL		m
FILL LEVEL		m
v_{p75-25}		m^3
a_{p50}		m^2
t_{p75-25}		min

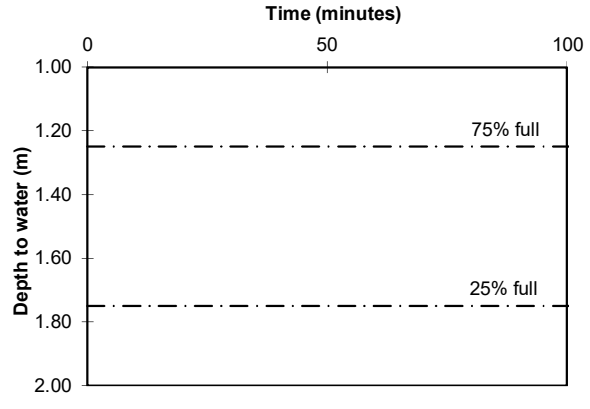
soil infiltration rate, *f* **ms^{-1}**



TEST 3

LENGTH		m
BREADTH		m
DEPTH		m
WATER LEVEL		m
FILL LEVEL		m
v_{p75-25}		m^3
a_{p50}		m^2
t_{p75-25}		min

soil infiltration rate, *f* **ms^{-1}**



Remarks Test carried out in general accordance with BRE 365 (2007).

CONTRACT	CHECKED
30378	**EC**

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SOAKAWAY TEST

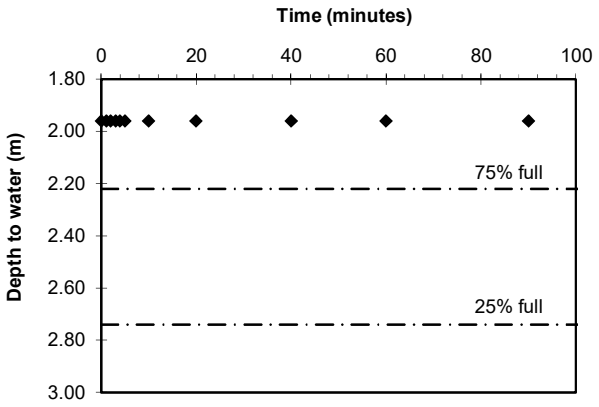
CLIENT GRAVEN HILL VILLAGE DEVELOPMENT COMPANY
SITE GRAVEN HILL, BICESTER TRIAL PIT **TP543**
DATE 02/03/2015

TEST 1

LENGTH	1.70	m
BREADTH	0.60	m
DEPTH	3.00	m
WATER LEVEL	Dry	
FILL LEVEL	1.96	m
v_{p75-25}	0.530	m^3
a_{p50}	3.412	m^2
t_{p75-25}		min

soil infiltration rate, *f* **ms^{-1}**

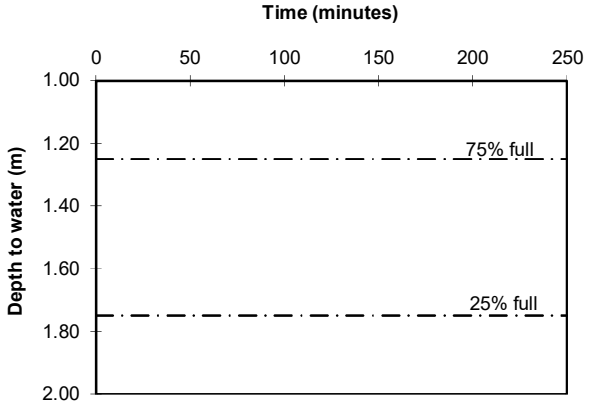
Insufficient fall in water level to calculate infiltration rate



TEST 2

LENGTH		m
BREADTH		m
DEPTH		m
WATER LEVEL		m
FILL LEVEL		m
v_{p75-25}		m^3
a_{p50}		m^2
t_{p75-25}		min

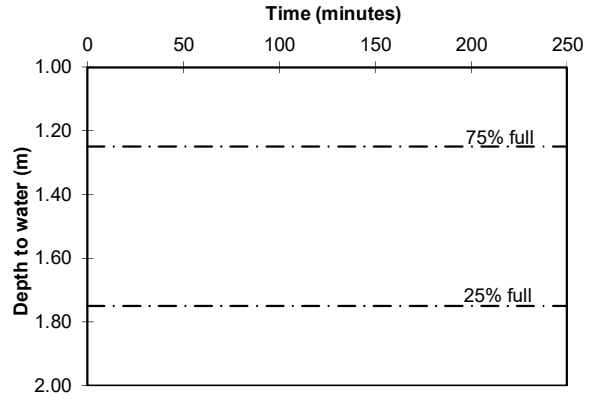
soil infiltration rate, *f* **ms^{-1}**



TEST 3

LENGTH		m
BREADTH		m
DEPTH		m
WATER LEVEL		m
FILL LEVEL		m
v_{p75-25}		m^3
a_{p50}		m^2
t_{p75-25}		min

soil infiltration rate, *f* **ms^{-1}**



Remarks Test carried out in general accordance with BRE 365 (2007).

CONTRACT	CHECKED
30378	**EC**

RD / DO

08/06/09 JH

Geotechnical Engineering Limited

SOAKAWAY TEST

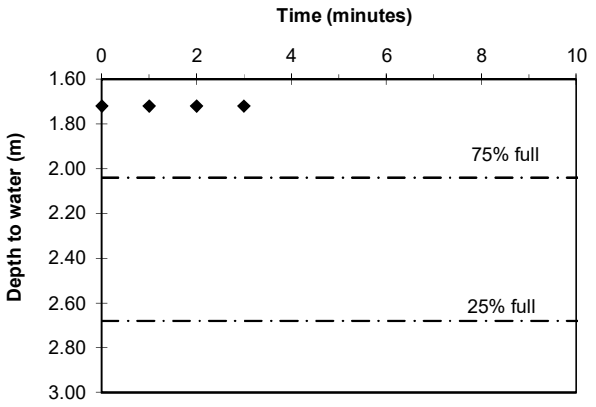
CLIENT GRAVEN HILL VILLAGE DEVELOPMENT COMPANY
SITE GRAVEN HILL, BICESTER TRIAL PIT **TP548**
DATE 03/03/2015

TEST 1

LENGTH	1.90	m
BREADTH	0.65	m
DEPTH	3.00	m
WATER LEVEL	Dry	
FILL LEVEL	1.72	m
v_{p75-25}	0.790	m^3
a_{p50}	4.499	m^2
t_{p75-25}		min

soil infiltration rate, *f* **ms^{-1}**

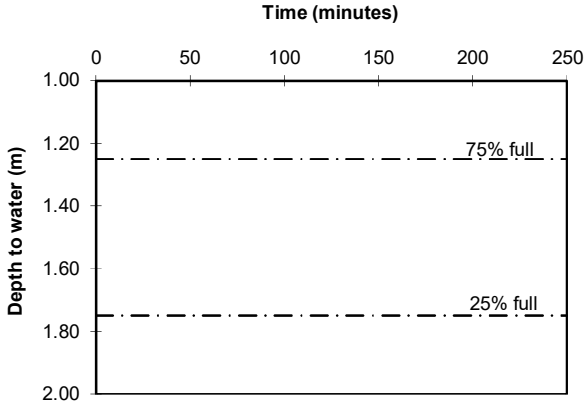
Test abandoned due to sidewall collapse



TEST 2

LENGTH		m
BREADTH		m
DEPTH		m
WATER LEVEL		m
FILL LEVEL		m
v_{p75-25}		m^3
a_{p50}		m^2
t_{p75-25}		min

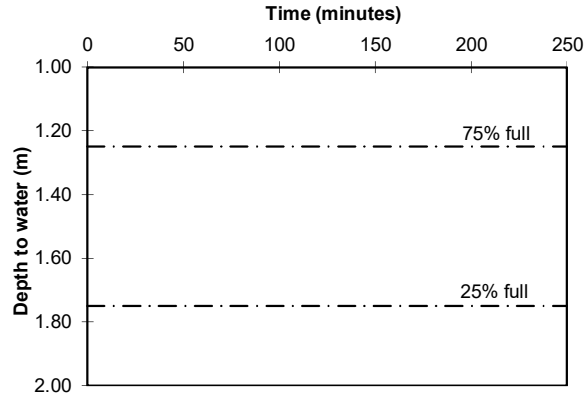
soil infiltration rate, *f* **ms^{-1}**



TEST 3

LENGTH		m
BREADTH		m
DEPTH		m
WATER LEVEL		m
FILL LEVEL		m
v_{p75-25}		m^3
a_{p50}		m^2
t_{p75-25}		min

soil infiltration rate, *f* **ms^{-1}**



Remarks Test carried out in general accordance with BRE 365 (2007).

CONTRACT	CHECKED
30378	**EC**

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SOAKAWAY TEST

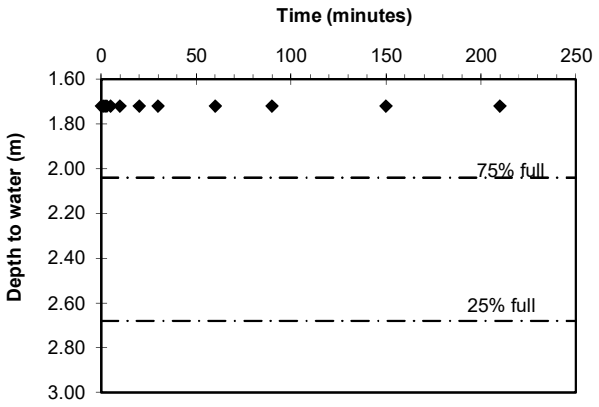
CLIENT GRAVEN HILL VILLAGE DEVELOPMENT COMPANY
SITE GRAVEN HILL, BICESTER TRIAL PIT **TP548A**
DATE 04/03/2015

TEST 1

LENGTH	1.80	m
BREADTH	0.60	m
DEPTH	3.00	m
WATER LEVEL	Dry	
FILL LEVEL	1.72	m
v_{p75-25}	0.691	m^3
a_{p50}	4.152	m^2
t_{p75-25}		min

soil infiltration rate, *f* **ms^{-1}**

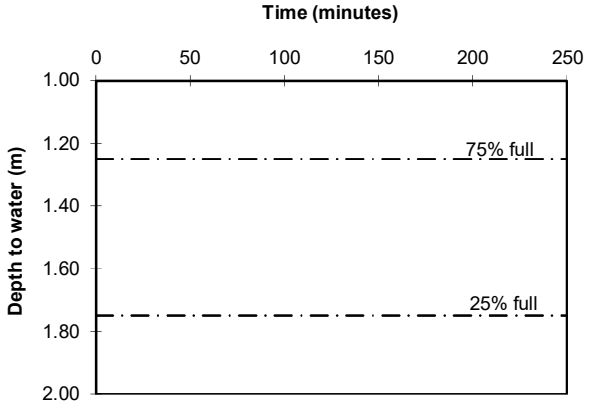
Insufficient fall in water level to calculate infiltration rate



TEST 2

LENGTH		m
BREADTH		m
DEPTH		m
WATER LEVEL		m
FILL LEVEL		m
v_{p75-25}		m^3
a_{p50}		m^2
t_{p75-25}		min

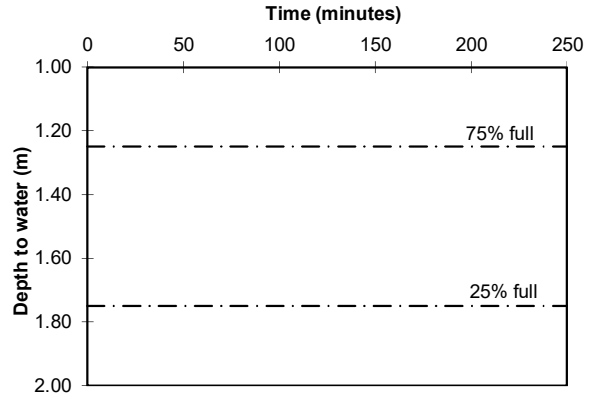
soil infiltration rate, *f* **ms^{-1}**



TEST 3

LENGTH		m
BREADTH		m
DEPTH		m
WATER LEVEL		m
FILL LEVEL		m
v_{p75-25}		m^3
a_{p50}		m^2
t_{p75-25}		min

soil infiltration rate, *f* **ms^{-1}**



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CONTRACT	CHECKED
30378	**EC**

RD / DO

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We are Waterman, where every project matters

We deliver progressive, sustainability-driven environmental and engineering consultancy services across every sector. We think differently, and we're harnessing our collective expertise to deliver greener, healthier and well-connected communities, networks and built environments.

Based in strategic locations throughout the UK and Ireland, our team of specialists is at the forefront of tackling the climate emergency and forging a path to a Net Zero built environment.

UK & Ireland Office Locations