MARKIDES ASSOCIATES

Flood Risk and Drainage Report

Wickhurst Green, Broadbridge Heath, West Sussex

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Prepared for Vistry South East

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Contents

Sections

Tables

Figures

Appendices

1. Introduction

1.1.1 Markides Associates have been instructed by Vistry to prepare a Flood Risk Assessment (FRA), including a surface water and foul water Drainage Strategy (DS), to support a planning application located on land at Wickhurst Green, Broadbridge Heath, Horsham, West Sussex, within the administrative boundary of Horsham District Council (HDC), who act as the Local Planning Authority (LPA). The Lead Local Flood Authority (LLFA) for the site is West Sussex County Council (WSCC).

1.1.2 The development proposal includes the construction of 89 residential dwellings, with 35% allocated for affordable housing, as well as associated access and parking, and open space. Access to the site will be provided via Sargent Way, with additional pedestrian access from Broadbridge Way and Wickhurst Lane.

1.1.3 The site is located within Flood Zone 1. However, according to the Environment Agency (EA) flood mapping, the site is at risk of surface water flooding and covers and area greater than 1 hectare. As a result, a site-specific FRA is required to support the planning application.

1.1.4 The aims of this report are to:

- Review the risk of flooding from all sources to the proposed development, including whether it is likely to be affected by current or future flooding from any source,
- Review the potential impact of the development on flooding in the surrounding area and whether it may increase flood risk elsewhere,
- Describe the development proposals, including site conditions such as hydrology, geology, and hydrogeology,
- Assess the most suitable options for discharge of surface water and foul water,
- Explore the use of sustainable drainage (SuDS) to improve water quantity, water quality, amenity, and biodiversity,
- Propose a surface water and foul water drainage strategy to mitigate potential flood risks on and off site and ensure that foul drainage can be disposed of in a suitable manner, and confirm whether mitigation measures are appropriate,
- Provide evidence for the local planning authority to apply the Sequential Test (if necessary) and confirm whether the development will be safe and meet the requirements of the Exception Test, if applicable.

1.1.5 This report has been prepared in accordance with the National Planning Policy Framework (NPPF) and current flood risk management policies, with references to the West Sussex Local Flood Risk Management Strategy, Horsham District Planning Framework and HDC Level 1 Strategic Flood Risk Assessment (SFRA). The drainage strategy aligns with the planning policy requirements and environmental regulations, ensuring all sources of flooding are considered.

1.1.6 Additionally, the design complies with the Non-Statutory Technical Standards for SuDS, ensuring that surface water run-off is managed in line with local planning policy and environmental regulations. The proposed drainage strategy reflects best practices for sustainable water management and meets the requirements set by the LLFA.

1.1.7 Refer to **Table 1.1** below for a summary of the site details, and **Figure 3.1** for the site location plan.

Table 1.1 Site Details

	Site details
Site Address	Land at Wickhurst Green, Broadbridge Heath, West Sussex, RH12 3LT.
Grid Reference	TQ148309 (Easting: 514884, Northing: 130983)
Topography	Western Parcel: Falls from the northwest to the southeast Eastern Parcel: Falls from the northeast to the southwest
Geology	Bedrock Geology: Weald Clay Formation (Mudstone) Superficial deposits: None
Site Area	2.422 ha
Existing Use	Greenfield
Boundaries	North: Broadbridge Way
	East: Old Wickhurst Lane
	South: Kilhams Close / Carter Drive / Residential dwellings
	West: Sargent Way
Access	From Sargent Way
Local Planning Authority	Horsham District Council
Lead Local Flood Authority	West Sussex County Council

2. Planning Policy

2.1 National Planning Policy Framework

2.1.1 The NPPF provides national guidance to planning authorities, developers, the public, and the EA, to ensure that the risk of flooding from all sources is considered at all stages of the planning process.

2.1.2 The key policy provision within the NPPF 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.
- Strategic policies must be informed by a strategic flood risk assessment and manage flood risk from all sources. They should consider cumulative impacts in, or affecting, local areas susceptible to flooding, and take account of advice from the EA and other relevant flood risk management authorities, such as Lead Local Flood Authorities and internal drainage boards.
- When determining any planning applications, local planning authorities should ensure that flood risk from all sources is not increased elsewhere. Where appropriate, applications should be supported by a site-specific flood-risk assessment.
- Sustainable drainage systems (SuDS) must be considered for all developments, regardless of scale, and implemented in a manner proportionate to the nature of the scheme.

2.1.3 Additionally, Paragraph 175 of the NPPF states:

"The sequential test should be used in areas known to be at risk now or in the future from any form of flooding, except in situations where a site-specific flood risk assessment demonstrates that no built development within the site boundary, including access or escape routes, land raising or other potentially vulnerable elements, would be located on an area that would be at risk of flooding from any source, now and in the future (having regard to potential changes in flood risk)."

When is a site-specific FRA required:
For all sites which are located in Flood Zone 2 and 3. For sites located in Flood Zone 1 where: • The development site area is 1 hectare or more; • The site has been identified by the EA as having critical drainage problems; • The site has been identified in a strategic flood risk assessment as being at increased flood risk in future; • Land that may be subject to other sources of flooding, where its development would introduce a more vulnerable use;

2.1.4 Development should only be allowed in areas at risk of flooding where, in the light of this 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 brough 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.

2.2 Planning Practice Guidance (PPG)

2.2.1 The PPG provides additional guidance to make the planning process more accessible and includes a section on Flood Risk and Coastal Change.

2.2.2 Within this section, amongst other things, there is guidance on:

- Carrying out site-specific FRAs
- The sequential and exception tests
- Addressing residual flood risk
- Sustainable drainage systems

2.2.3 This FRA and DS will be carried out in accordance with the PPG.

2.3 Sustainable Drainage Systems: Non-statutory technical standards

2.3.1 This document sets out non-statutory technical standards for SuDS, which should be used in conjunction with the NPPF and PPG.

2.3.2 The Local Planning Authority may set local requirements for planning permission that have the effect of more stringent requirements than the non-statutory technical standards.

2.4 West Sussex LLFA Policy for the Management of Surface Water

2.4.1 The West Sussex LLFA Policy for the Management of Surface Water includes a number of policies relevant to flood risk and drainage that have been adopted in-order to follow statutory policy and best practice, as summarised below.

SuDS Policy 1: Follow the drainage hierarchy
1. Surface runoff not collected for use must be discharged according to the following discharge hierarchy: • To ground

- To a surface water body
- To a surface water sewer, highway drain, or another drainage systems, or
- To a combined sewer where there are absolutely no other options, and only where agreed in advance with the relevant sewerage undertaker

2. The selection of a discharge point should be clearly demonstrated and evidenced.

SuDS Policy 2: Manage Flood Risk Through Design

1. The drainage scheme proposed is to:

- Protect people and property on the development site from flooding; and
- Avoid creating any additional flood risk outside of the development in any part of the catchment, either upstream or downstream.

2. Any drainage scheme must manage all sources of surface water, including exceedance flows and surface flows from offsite, provide for emergency ingress and egress and ensure adequate connectivity.
3. For large sites where development is to be phased, there will need to be a strategic site surface water management system that allows different parts of the site to be development at different times while ensuring that each of the design criteria can be met.

SuDS Policy 3: Mimic Natural Flows and Drainage Flow Paths

1. Drainage schemes should be designed to match greenfield discharge rates and follow natural drainage routes as far as possible; pumps should therefore not form part of drainage schemes.
2. Greenfield runoff should be calculated from FEH or a similar approved method. SAAR and any other rainfall data used in run-off storage calculations should be based upon FEH rainfall values.

SuDS Policy 4: Seek to Reduce Existing Flood Risk

1. New development should be designed to take full account of any existing flood risk, irrespective of the source of flooding.
2. Where a site or its immediate surroundings have been identified to be at flood risk, all opportunities to reduce the identified risk should be investigated at an early stage and subsequently incorporated at the detailed design stage.

SuDS Policy 5: Maximise Resilience

1. The design of the drainage systems must account for the likely impacts of climate change and changes in impermeable area over the design life of the development. Appropriate allowances should be applied in each case.
2. A sustainable drainage approach which considers control of surface runoff at the surface and at source is preferred and should be explored prior to other design solutions.
3. Culverting an existing watercourse should only be considered if there is no feasible alternative.

SuDS Policy 7: Safeguard Water Quality

1. When designing a surface water management scheme, full consideration should be given to the system's capacity to remove pollutants and to the cleanliness of the water being discharged from the site, irrespective of the receiving system.
2. Interception of small rainfall events should be incorporated into the design of the drainage system.

SuDS Policy 8: Design for Amenity and Multi-Functionality

Drainage design should from the outset consider opportunities for inclusion of amenity and biodiversity objectives and thus provide multifunctional use of open space with appropriate design for drainage measures within the public realm.

SuDS Policy 9: Enhance Biodiversity

Drainage design should from the outset consider opportunities for biodiversity enhancement, through optimising the scope for surface systems, consideration of connectivity to adjacent water bodies or natural habitats, and appropriate planting specification.

SuDS Policy 10: Link to Wider Landscape Objectives

Drainage design should from the outset consider opportunities to contribute to the wider landscape and ensure proposals are coherent with the surrounding landscape character area.

2.5 Horsham District Planning Framework (HDPF)

2.5.1 The HDPF (November 2015) includes the following policy with parts that are relevant to flood risk and drainage, summarised below.

Strategic Policy 38: Flooding

1. Development proposals will follow a sequential approach to flood risk management, giving priority to development sites with the lowest risk of flooding and making required development safe without increasing flood risk elsewhere. Development proposals will;

- Take a sequential approach to ensure most vulnerable uses are placed in the lowest risk areas
- Avoid the functional floodplain (Flood zone 3b) except for water-compatible uses and essential infrastructure
- Only be acceptable in Flood Zone 2 and 3 following completion of a sequential test and exceptions test if necessary
- Require a site-specific Flood Risk Assessment for all developments over 1 hectare in Flood zone 1 and all proposals in Flood Zone 2 and 3.

2. Comply with the tests and recommendations set out in the Horsham District SFRA
3. Where there is the potential to increase flood risk, proposals must incorporate the use of SuDS where technically feasible, or incorporate water management measures which reduce the risk of flooding and ensure flood risk is not increased elsewhere
4. Consider the vulnerability and importance of local ecological resources such as water quality and biodiversity when determining the suitability of SuDS. New development should undertake more detailed assessments to consider the most appropriate SuDS methods for each site. Consideration should also be given to amenity value and green infrastructure.
5. Utilise drainage techniques that mimic natural drainage patterns and manage surface water as close to its source as possible will be required where technically feasible.
6. Be in accordance with the objective of the Water Framework Directive, and accord with the findings of the Gatwick Sub Region Water Cycle Study in order to maintain water quality and water availability in rivers and wetlands and wastewater treatment requirements.

2.6 Horsham District Council Strategic Flood Risk Assessment (SFRA)

2.6.1 The HDC SFRA contains policy recommendations for consideration on various measures in-order to manage and mitigate flood risk for developments. This includes advice on:

- Application of the sequential test
- Finished Floor Levels
- Flood Resilience
- Flood Compensation Storage
- Sustainable Drainage Systems (SuDS)
- Flood warning and evacuation plan

2.6.2 The HDC SFRA also provides information on the risk of flooding, including mapping, from various sources including fluvial (rivers), surface water, groundwater, sewer and reservoirs.

3. Existing Site Information

3.1 Site Description

3.1.1 The site is located on land at Wickhurst Green, Broadbridge Heath, Horsham, West Sussex and consists of greenfield land with an ordinary watercourse running down the central spine, dividing the site into two parcels. A tree belt is situated along the watercourse that intersects the site as well as to the north along Broadbridge Way.

3.1.2 The total area of the site is 2.422 hectares (24,220m^2) and is bound to the north by Broadbridge Way and Sargent Way to the east. To the south of the eastern parcel, the site is bound by Carter Drive, while to the south of the western parcel, the site is bound by Kilhams Close. To the west, the site is bound by Sargent Way.

Figure 3.1 Site Location Plan

Source: Google Maps

3.2 Site Topography

3.2.1 Based on the topographical survey carried out by MK Surveys Ltd (dated October 2024), the western parcel generally falls from the northwest to the southeast, with a ridge that runs from the west to the north, along the northwest of the parcel. South of the ridge, there is a fall from the northwest to the southeast corner of approximately 3.69m (from 40.69mAOD to 37.00mAOD), with an additional crossfall from the northwest to the east, towards an ordinary watercourse that intersects the site, of approximately 2.76m (from 40.69mAOD to 37.93mAOD).

3.2.2 In contrast to the western parcel, the eastern parcel falls from the northeast to the southwest, with a bank that runs from the east to the northwest, along the northern section of the parcel. While the northeastern section of the parcel was not surveyed, there is a fall from the northeast to the southwest of approximately 3.06m (from 40.87mAOD to 37.81mAOD).

3.2.3 The topographical survey is included in **Appendix A**.

3.3 Existing Hydrology

3.3.1 There is an ordinary watercourse that intersects the site that flows in a southerly direction along Beale Close. The nearest main river is the River Arun located approximately 0.93km west of the site. Refer to **Figure 3.2** below:

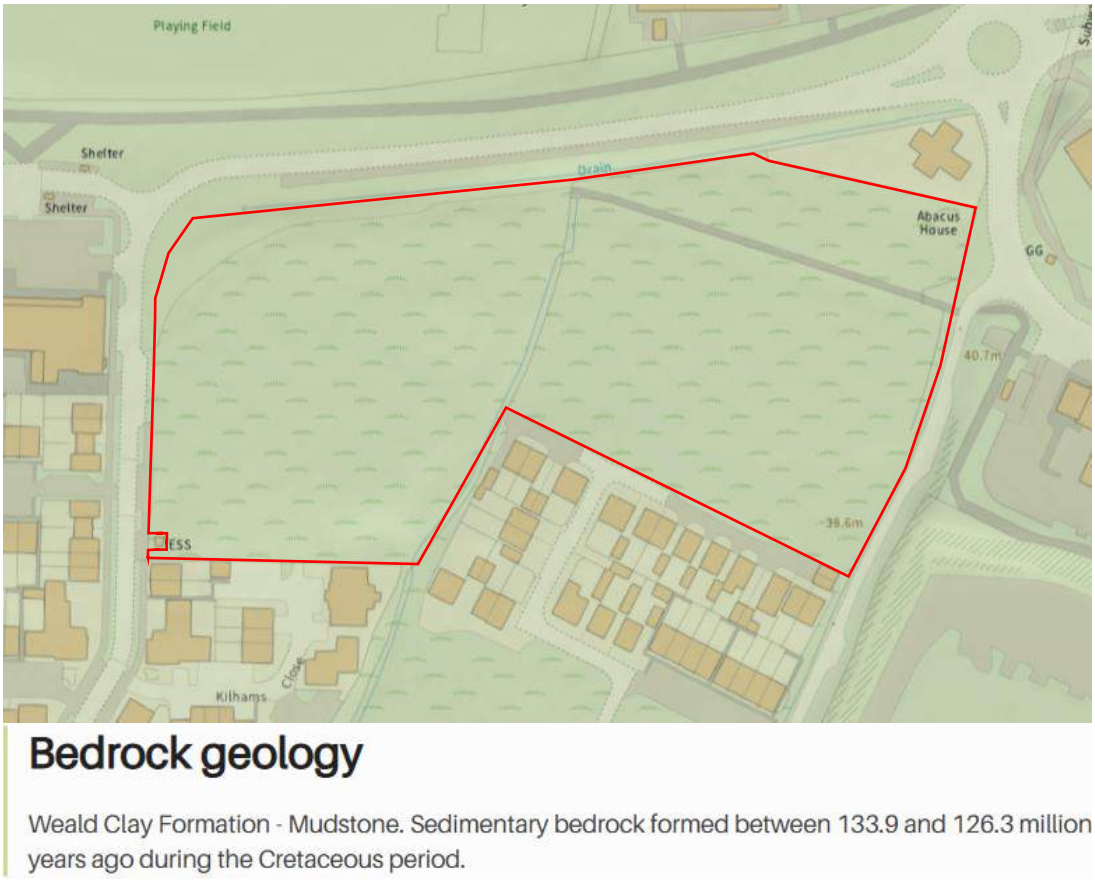
Figure 3.2 Main Rivers and Ordinary Watercourses

Source: EA Main River Map

3.4 Existing Geology and Hydrogeology

3.4.1 Based on the British Geological Survey (BGS) online geology viewer, the site is underlain by Weald Clay Formation (Mudstone) at the bedrock layer with no record of superficial deposits. Refer to **Figure 3.3** below:

Figure 3.3 Underlying Bedrock Geology



Source: BGS Geology Viewer

3.4.2 The site is situated within an area of very low (unproductive) susceptibility to groundwater pollution (groundwater vulnerability).

3.4.3 The site is not situated within a source protection zone.

4. Proposed Development

4.1 Proposed Development Description

4.1.1 The development proposals are for the construction of 89 dwelling, with 35% being affordable housing, including associated access, open space, landscaping, parking, drainage and infrastructure works.

4.1.2 Vehicular and pedestrian access to both parcels of the site will be provided from the western parcel along Sargent Way. Pedestrian access to the site will also be available from Broadbridge Way on the western parcel, and Wickhurst Lane on the eastern parcel.

4.1.3 See **Figure 4.1** below for the proposed site layout and refer to **Appendix B** for the proposed site layout.

Figure 4.1 Proposed Site Layout

Source: FINC Architects Ltd

5. Flood Risk

5.1 Planning Policy Context

5.1.1 In line with the requirements of the NPPF, as well as the HDPF and HDC SFRA, due to the proposed development being located in Flood Zone 1 and having an area greater than 1 ha, as well as being at risk of surface water flooding, a site-specific FRA has been carried out.

5.2 Flood from Rivers and the Sea

5.2.1 Based on the EA Flood map for planning, the site is located within Flood Zone 1, indicating a low risk of flooding from rivers and the sea. Refer to **Figure 5.1** below:

Figure 5.1 EA Flood Map for Planning

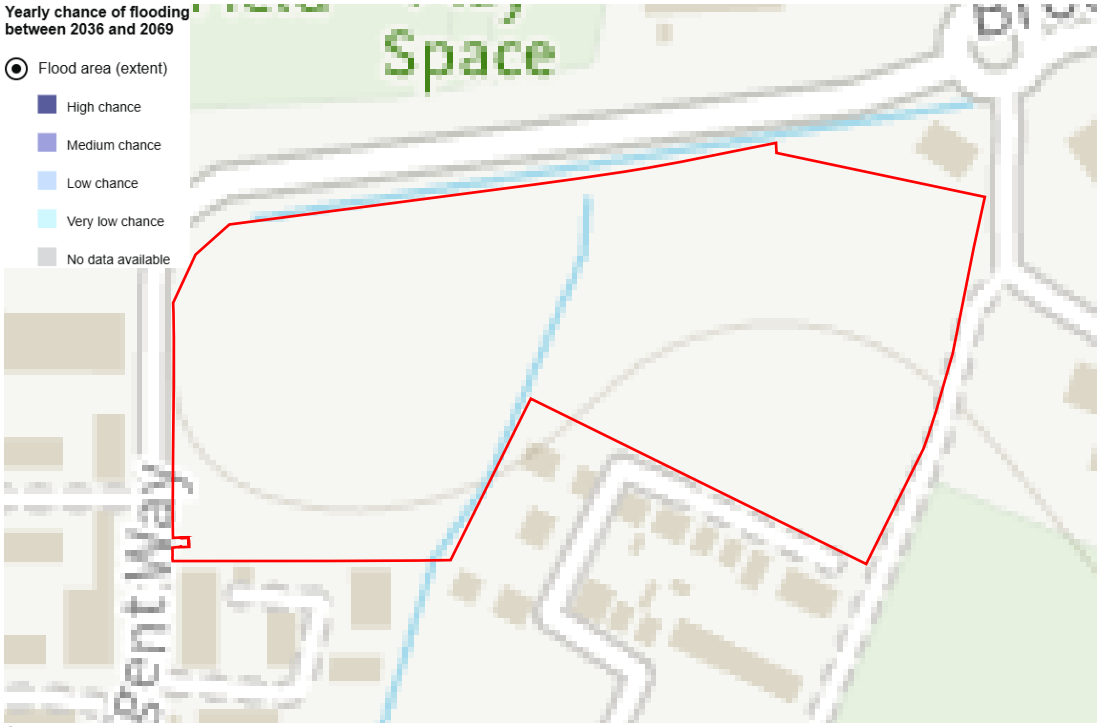
Source: EA

5.2.2 Based on the EA's Long-Term Flood Risk Map for Rivers and the Sea, the site is at a very low risk of flooding from fluvial flooding and continues to be at a very low risk in the 2036 – 2069 epoch. Very low risk means that each year, the area at risk has a likelihood of flooding of less than 0.1%. Refer to **Figures 5.2 and 5.3** below:

Figure 5.2 EA Flood Map (Rivers and the Sea)

Source: EA

Figure 5.3 EA Flood Map (Rivers and the Sea) (2036 – 2069)



Source: EA

5.3 Flooding from Surface Water

5.3.1 Surface water flooding typically occurs when intense rainfall overwhelms drainage systems or when natural and artificial drainage channels become blocked, leading to water accumulation on the surface. This typically occurs during very intense rainfall events.

5.3.2 Based on the EA's Flood map for planning, the extent of surface water flooding on site is shown to be to be situated in a few localised areas on both the eastern and western parcels of the site. Refer to **Figure 5.4** below:

Figure 5.4 EA Flood Map for Planning (Surface Water) (1 in 1000)

Source: EA

5.3.3 Based on the EA's Long-Term Flood Risk Map for Surface Water, the majority of the site is at a very low risk from surface water, with some areas of localised flooding on the western parcel ranging from low to high around the centre.

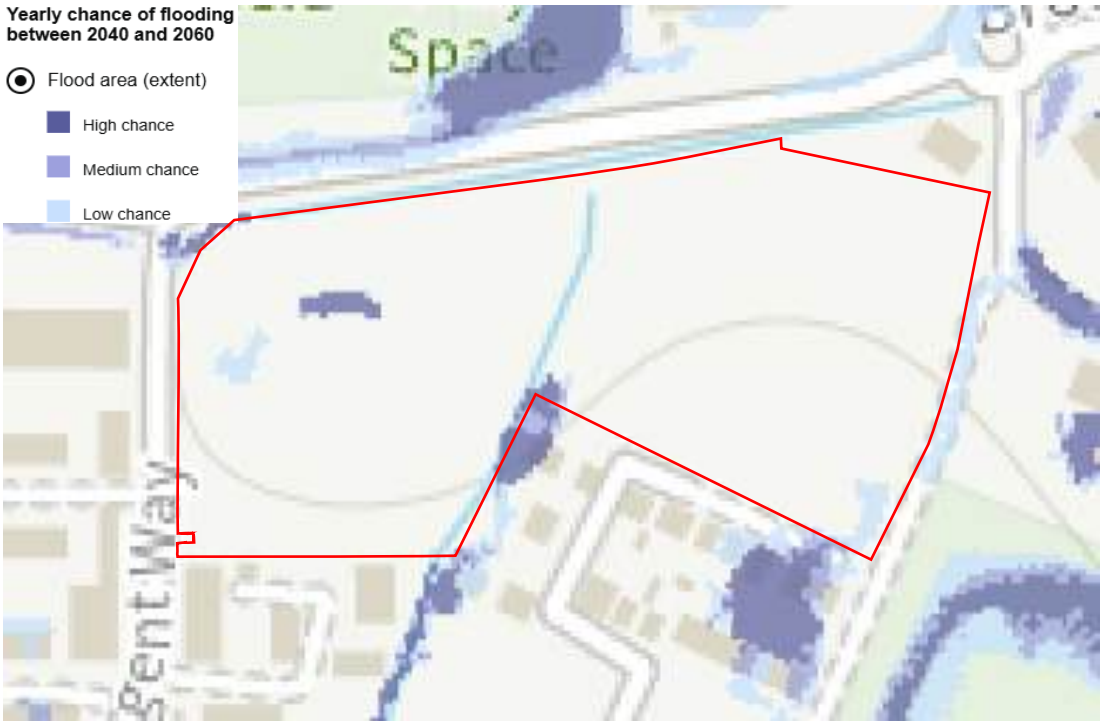
5.3.4 On the eastern parcel, there is an area of low risk at the southeast corner as well as an area of low to high-risk to the southwest corner, adjacent to the ordinary watercourse.

5.3.5 In the 2040 – 2060 epoch, the majority of the site remains at a very low risk of surface water flooding, with some localised areas of flooding on both the western and eastern parcels ranging from low to high. Very low risk means that each year, the area has a likelihood of flooding of less than 0.1%, while an area of low risk has an annual probability of flooding between 0.1% and 1%. An area of medium risk has a likelihood of flooding of between 1% and 3.3% while an area of high risk has an annual probability of flooding greater than 3.3%. Refer to **Figures 5.5 and 5.6** below:

Figure 5.5 EA Flood Map (Surface Water)

Source: EA

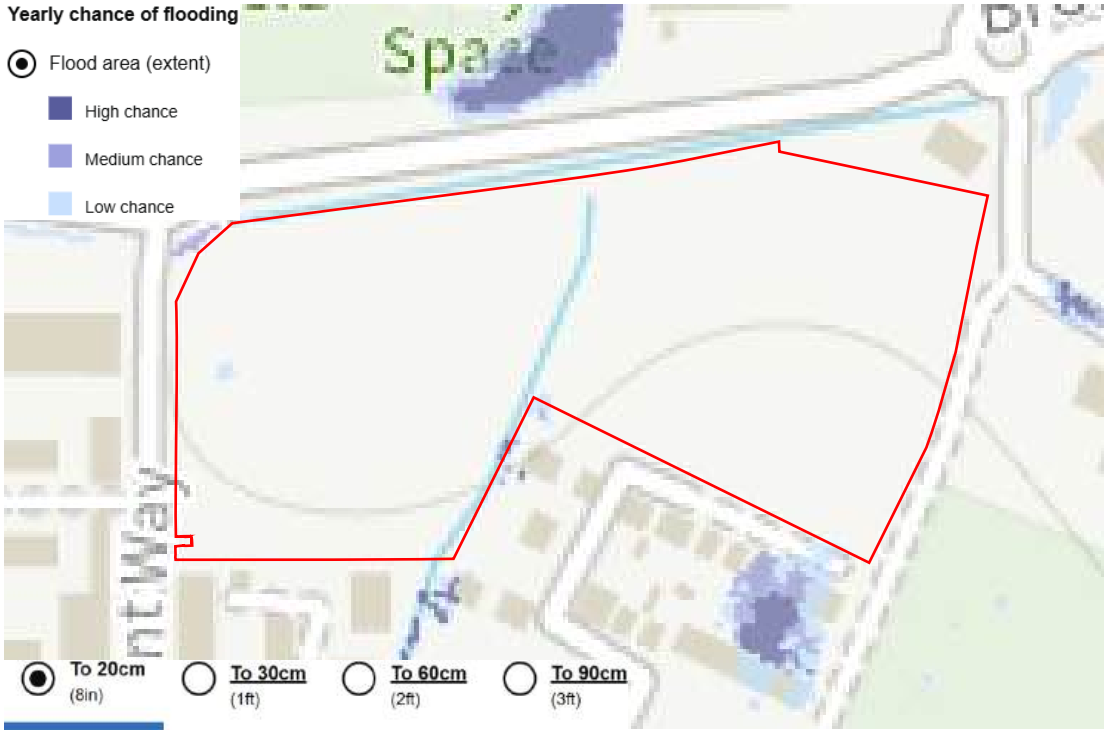
Figure 5.6 EA Flood Map (Surface Water) (2040 – 2060)



Source: EA

5.3.6 Additional EA mapping for the depth of surface water flooding shows that there is generally a very low to low risk of flood depths reaching 200mm or greater during both the present and 2040 – 2060 epochs. Refer to **Figures 5.7 and 5.8** below:

Figure 5.7 EA Flood Map (Surface Water Depth)



Source: EA

Figure 5.8 EA Flood Map (Surface Water Depth) (2040 – 2060)

Source: EA

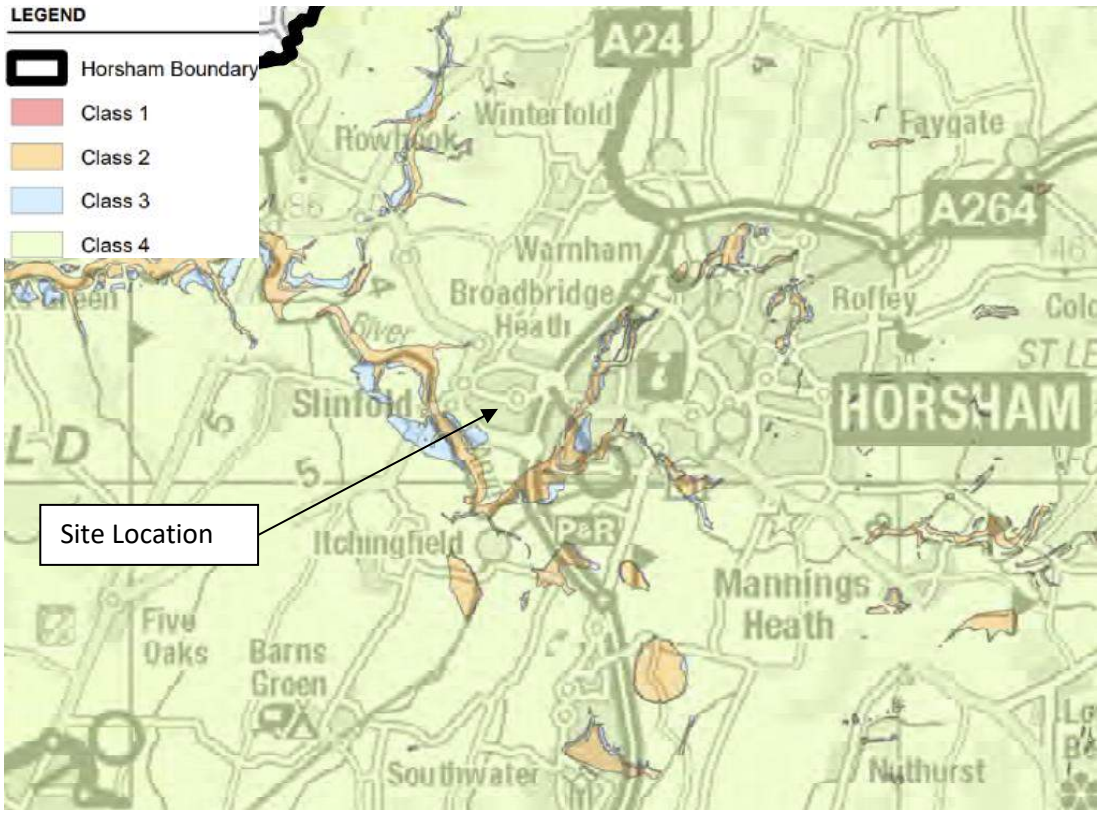
5.4 Flooding from Groundwater

5.4.1 Groundwater flooding occurs because of a rising water table from an underlying aquifer or from water flowing from springs, tending to occur after long periods of sustained heavy rainfall. High groundwater levels may not always lead to widespread groundwater flooding but have the potential to exacerbate the risk of surface water flooding.

5.4.2 As part of the HDC SFRA, BGS Groundwater Flooding data was not available. Instead, GeoSmart's 2019 national groundwater flood risk data was used to assess the groundwater flood risk in the district. Mapping included within the HDC SFRA shows that the site is situated within Class 4, where there is a negligible risk of groundwater flooding. Class 4 with an annual probability of groundwater flood of less than 1%.

5.4.3 Refer to **Figure 5.9** below for the susceptibility to groundwater flooding map.

Figure 5.9 Susceptibility to Groundwater Flooding Map



Source: Horsham District Council SFRA

5.4.4 This is further supported by the EA's Long-Term Flood Risk Service which states that *"flooding from groundwater is unlikely in this area."*

5.5 Flooding from Public Sewers or Highway Drains

5.5.1 As part of the HDC SFRA, historical records of sewer flooding incidents were provided by Southern Water via their DG5 register. However, due to data protection regulations, the data cannot be provided at an individual level. The register instead shows the number of sewer flooding incidents within 3 and 4-digit postcode areas between 2014 – 2024.

5.5.2 As the DG5 register only includes flooding incidents reported to Southern Water, it may not include all instances of sewer flooding. Additionally, as this data is used by Southern Water to identify regions requiring maintenance and improvements, areas that have experiences flooding may no longer be at the greatest risk in the future.

5.5.3 For the RH12 postcode area, there have been between 41 – 120 instances of sewer flooding between 2014 – 2024.

5.5.4 However, given the location of the proposed development, it is unlikely that there would be any sewers situated on site.

5.5.5 Therefore, the risk of flooding from public sewers or highway drains is assessed as low.

5.6 Flooding from Artificial Sources

5.6.1 The EA's Long-Term Flood Risk Map shows that the site is not at risk from reservoir flooding.

5.7 Summary of Flood Risk

5.7.1 Please see **Table 5.1** below for a summary of the risk of flooding from all sources. The risk post-development is based on taking the mitigation and SuDS measures into account. Refer to Section 6 onwards for further information.

Table 5.1 Summary of Flood Risk Sources

Flood Risk Source	Risk pre-development	Risk post-development
Rivers and the Sea	Very low	Very low
Surface water	Low to High	Low
Groundwater	Very low	Very low
Sewers	Low	Low
Artificial sources	Very low	Very low

5.8 Application of Sequential and Exception Tests

5.8.1 The NPPF requires that the Sequential Test is carried out to ensure that development is steered towards areas at the lowest risk of flooding, taking into account the current and future impacts of climate change in order to ensure that flood risk is not increased elsewhere. The Sequential Test should demonstrate that it has been applied in line with the NPPF. This requires that development is steered toward areas at the lowest risk of flooding, whether existing or future.

5.8.2 As outlined in paragraph 2.1.3, paragraph 175 of the NPPF states that the Sequential Test should be applied *"in areas known to be at risk now or in the future from any form of flooding"* except where *"no built development within the site boundary, including access or escape routes, land raising or other potentially vulnerable elements, would be located on an area that would be at risk of flooding from any source, now and in the future"*.

5.8.3 Where this is not possible, the Sequential Test is required and where the Sequential Test is not passed, the Exception Test may be required to demonstrate that the development provides wider sustainability benefits to the community and that the flood risk can be managed, without increasing flood risk elsewhere. Additionally, SuDS must be considered and implemented as part of the development to mitigate flood risk and surface water effectively.

5.8.4 The development is identified within HDC's Core Policy 7 (CP7) site allocation.). The original site allocation was for a school; however, the current proposals are for residential houses. Both developments have the same vulnerability classification of 'More Vulnerable' in Table 2 of the Technical Guidance to the NPPF.

5.8.5 As the site is allocated within HDC's CP7, the Sequential test will already have been applied, and passed, as part of this process. Although the proposed development is for a different land use, as the vulnerability classification remains the same, it is assumed that the result of the previous Sequential Test is still valid and does not need to be carried out again..

5.8.6 Furthermore, in relation to the Exception Test, the application site is located within Flood Zone 1, therefore, in accordance with Table 3 of the Technical Guidance to the NPPF, the development is appropriate and the Exception Test is not required..

5.8.7 Although the Exception Test is not required, the proposed drainage strategy will mitigate flood risk from the increased impermeable areas and provide a site safe from flood risk for the residents, therefore demonstrating that 'the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall' as per the requirements of the Exception Test.

6. Surface Water Management

6.1 Pre-development Surface Water Run-off Conditions

6.1.1 The development site consists of greenfield land with no existing drainage networks.

6.1.2 Based on the topographical survey, surface water run-off from both parcels flow towards the centre where an ordinary watercourse intersects the site.

6.1.3 In accordance with the West Sussex LLFA Policy for the Management of Surface Water, the LLFA does not accept discharge rates being limited to Qbar. Instead, surface water run-off from a development should be restricted to the greenfield 1 in 1-year runoff rate during all events up to and including the 1 in 100-year rainfall event, including climate change. The greenfield run-off rate for the site has been calculated using the IH124 method (please refer to **Appendix C** of this report for the detailed calculations) and see **Table 6.1** below for a summary.

Table 6.1 Greenfield Run-off Rates

	Q_{bar}	1 year (l/s)	30 year (l/s)	100 year (l/s)
Greenfield run-off rate	13.20	11.20	30.30	42.00

6.2 Permeable and Impermeable Areas:

6.2.1 The proposed development will have an impact on the existing permeable and impermeable areas of the site: This is summarised in **Table 6.2** below:

Table 6.2 Permeable and Impermeable Areas

	Existing	Proposed
Permeable Area (ha)	2.422	1.118
Impermeable area (ha)	0	1.304
Total	2.422	2.422

6.2.2 The existing site is 100% permeable whereas the proposed site is 46.16% permeable, representing a reduction in permeable area of 53.84%. Refer to **Appendix D** for a drawing showing the existing and proposed permeable areas.

6.3 Climate Change Allowance

6.3.1 Climate change allowances increase resilience to flooding and are based on predictions of change due to climate change. In accordance with the EA's climate change guidance and having reviewed the DEFRA Peak Rainfall Allowances Map, a climate change allowance of 45% for the 1% annual exceedance probability rainfall event (1 in 100-year storm) and an allowance of 40% for the 3.3% annual exceedance probability (1 in 30-year storm) are required for the proposed surface water drainage design for this development.

6.3.2 These allowances are based on the upper end estimates for the 2070s, as recommended by the DEFRA.

6.4 Urban Creep

6.4.1 An 10% allowance for urban creep increases resilience to flooding by providing additional attenuation within the surface water drainage design to account for future increases in non-permeable areas within private areas, such as extensions or additional parking areas.

6.5 Proposed Surface Water Run-Off and Attenuation

6.5.1 As noted in paragraph 6.1.3 above, the West Sussex LLFA Policy for the Management of Surface Water states:

6.5.2 "In all cases, including on brownfield sites, runoff should where possible be restricted to the greenfield 1 in 1 year runoff rate during all events up to and including the 1 in 100-year rainfall event with climate change."

6.5.3 The document also states:

"West Sussex LLFA expects developers to demonstrate that the first 5mm of any rainfall event can be accommodated and disposed of on-site, rather than being discharged to any receiving watercourse or surface water sewer. This can frequently be achieved through the inclusion of sustainable drainage measures such as infiltration systems, rain gardens, bioretention systems, swales, and permeable pavement."

6.5.4 There were discussions held with the LPA prior to submission who requested an increase in dwelling density on the site, whereas the LLFA requested an increase in SuDS. The increased density directly impacts the SuDS opportunities available, however, attenuation has been provided to storage for the design storm event in a range sustainable systems. Source control SuDS in the form of permeable paving and infiltration trenches have been preferred with additional systems used to achieve the required attenuation volumes.

6.5.5 A pre-application meeting was held with the LLFA in January 2025. The guidance and requirements discussed in the meeting have been referenced in this report and in the strategy. The opportunities for SuDS have been optimised in order to maximise the sustainable solutions for the surface water run-off and provide the most efficient scheme. This is explored further in Section 6.7.

6.5.6 The proposals also require the existing watercourse to be culverted where roads and cycleways are proposed. These proposals are subject to detailed design and ordinary watercourse consent from the LLFA.

6.6 Proposed Surface Water Discharge Method

6.6.1 In accordance with the NPPF and PPG, the West Sussex, LLFA Policy for the Management of Surface Water requires developments to discharge surface water run-off in line with the drainage hierarchy. SuDS Policy 1 of the policy statement provides the following hierarchy:

- To ground
- To a surface water body
- To a surface water sewer, highway drain, or another drainage system, or
- To a combined sewer

6.6.2 An assessment of the feasibility and suitability of each method follows:

To ground

6.6.3 As discussed in Section 3.4, the site is underlain by a Bedrock Geology of Weald Clay Formation (mudstone).

6.6.4 Weald Clay Formation consists primarily of shale and mudstones, with minor layers of siltstone, sandstone, shelly limestone and clay ironstones. Due to the presence of shale and mudstone, which is comprised of silt and clay particles, low porosity and permeability is expected, and infiltration is unlikely to be feasible.

To a surface water body

6.6.5 An ordinary watercourse is present within the development site boundary. The watercourse runs north to south through the centre of the site, with both the western and eastern parcels of the site falling towards it. Therefore, it is proposed to drain the site via a gravity network via a below ground surface water sewer network and to discharge at the 1 in 1-year run-off rate into the watercourse. This discharge may be subject to Ordinary Watercourse Consent.

To a surface water sewer

6.6.6 There are no existing surface water sewers recorded by Southern Water on site, with the nearest surface water sewer running along Broadbridge Way from the east to the west. As alternative options are available, connecting to surface water sewers is not required. For Southern Water sewer records, refer to **Appendix E**.

6.6.7 There are sewers on Sargent Way and Carter Drive which are currently undergoing the S104 adoption process so will be in use in the future.

To a combined sewer

6.6.8 As other options are available, this option is not required.

6.7 Sustainable Drainage Systems (SuDS)

6.7.1 As per the CIRIA SuDS Manual, the main principle of SuDS is that 'surface water run-off should be managed for maximum benefit'. In-order to achieve maximum benefit, the following design criteria should be considered within a SuDS scheme:

- Water Quantity
- Water Quality
- Amenity
- Biodiversity

6.7.2 The opportunities and constraints for the use of SuDS within the site are assessed in Table 6.3 below. The assessment is based on the SuDS component delivery of design criteria (Table 7.1) in The CIRIA SuDS Manual.

Table 6.3 SuDS Assessment

Component	Description	Design Criteria Met	Comment	Suitability
Rainwater harvesting systems	Systems that collect run-off from the roof of a building or other paved surface for use	• Water Quantity • Amenity	Not currently proposed as part of the development, may be considered at detailed design stage following consultation with architect. Water butts could be provided	✓
Green roofs	Planted soil layers on the roof of buildings that slow and store run-off	• Water Quantity • Water Quality • Amenity • Biodiversity	Not currently proposed as it does not fit with currently style and roof type as well as maintenance concerns	✗
Infiltration systems	Systems that collect and store run-off, allowing it to infiltrate into the ground	• Water Quantity • Water Quality • Amenity • Biodiversity	Not suitable due to poor draining soil (Weald Clay Formation)	✗
Proprietary treatment systems	Subsurface structures designed to provide treatment of run-off	• Water Quality	Can provide additional level of treatment if required	✓
Filter strips	Grass strips that promote sedimentation and filtration as run-off is conveyed over the surface	• Water Quantity • Water Quality	Potential for getting clogged without pre-treatment, plus use of filter strips not suitable due to space constraints	✗
Filter drains/ Infiltration trenches	Shallow stone-filled trenches that provide attenuation,	• Water Quantity	Can be utilised to improve water quantity and quality	✓

	conveyance and treatment of run-off	• Water Quality		
Swales	Vegetated channels sometimes planted & used to convey and treat run-off	• Water Quantity • Water Quality • Amenity • Biodiversity	Not suitable due to space constraints	✗
Bioretention systems	Shallow landscaped depressions that allow run-off to pond temporarily on the surface, before filtering through vegetation and underlying soils	• Water Quantity • Water Quality • Amenity • Biodiversity	Not suitable due to poor draining soil and space constraints	✗
Trees	Trees within soil-filled tree pits, tree planters or structural soils used to collect, store and treat run-off	• Water Quantity • Water Quality • Amenity • Biodiversity	Not required due to infiltration trenches being utilised around proposed trees.	✗
Pervious pavements	Structural paving through which run-off can soak and subsequently be stored in the subbase beneath, and/or allowed to infiltrate into the ground below	• Water Quantity • Water Quality	Paving areas to provide required attenuation and treatment to surface water run-off.	✓
Attenuation storage tanks	Large, below-ground voided spaces used to temporarily store run-off before infiltration, controlled release or use	• Water Quantity	Utilised to achieve required attenuation volumes.	✓
Detention basins	Vegetated depressions that store and treat run-off	• Water Quantity • Water Quality • Amenity • Biodiversity	Not suitable due to space constraints	✗
Ponds and wetlands	Permanent pools of water used to facilitate treatment of run-off – run-off can also be stored in an attenuation zone above the pool	• Water Quantity • Water Quality • Amenity • Biodiversity	Not suitable due to space constraints	✗

Source: Based on Table 7.1 from the CIRIA SuDS Manual

6.7.3 Based on the above assessment, the outline drainage strategy for the development could include some, or all of the following SuDS components (subject to detailed design and agreement with the LPA, LLFA and the EA). The use of these components will ensure the drainage strategy meets the design criteria relating to water quantity, water quality and amenity:

- Filter drains/infiltration trenches
- Pervious pavements
- Attenuation tanks
- Proprietary Treatment System

6.7.4 Although rainwater harvesting has not been included in the proposed drainage strategy, the use of water butts will be recommended. Although these are not strictly a rainwater harvesting method, they do provide an element of source control and allow some reuse of rainwater.

6.7.5 Refer to **Appendix F** for a SuDS Maintenance and Management Plan.

6.8 Surface Water Discharge Quality

6.8.1 To control the quality of surface water discharged from the proposed site, surface water run-off will be treated as part of the proposed SuDS strategy.

6.8.2 Based on Table 26.2 from the CIRIA SuDS Manual, the proposed site comprises the following pollution hazard indices based on land use:

Table 6.4 Pollution Hazard Indices

Land Use	Pollution hazard level	Total suspended solids (TSS)	Metals	Hydrocarbons
Residential roofs	Very low	0.2	0.2	0.05
Individual property driveways	Low	0.5	0.4	0.4

Source: Table extract from the CIRIA SuDS Manual, Table 26.2

6.8.3 No all surface water run-off will pass through the proposed SuDS, therefore, a proprietary treatment chamber will be utilised on both outfalls to achieve mitigation indices and protect the receiving watercourse.

6.8.4 Based on the proposed SuDS components identified for use in the proposed development in section 6.7, the following pollution mitigation will be provided:

SuDS Component	Mitigation Indices[1]		
	TSS	Metals	Hydrocarbons
Filter Drain/ Infiltration Trench	0.4	0.4	0.4
Permeable Pavement	0.7	0.6	0.7
Proprietary treatment systems	These must demonstrate that they can address each of the contaminant types to acceptable levels for frequent events up to approximately the 1 in 1 year return period event, for inflow concentrations relevant to the contributing drainage area.		
1 – SuDS components only deliver these indices if they follow design guidance with respect to hydraulics and treatment set out in the relevant technical component chapters **2 As per the SuDS Manual (CIRIA C753) section 26.7, where two SuDS components are used in a series a factor of 0.5 should be used to account for the reduced performance of secondary or tertiary components.**			

6.8.5 The proposed SuDS mitigate the pollution from the land use sufficiently, therefore the water quality requirement in The SuDS Manual has been met.

6.9 Proposed Surface Water Drainage Strategy

6.9.1 Based on the development proposals, the high-level drainage strategy is to intercept surface water as close to its source as possible via the use of SuDS where possible and to convey it via gravity in below ground pipework to the watercourse in the centre of the site.

6.9.2 The surface water will be attenuated in infiltration trenches, permeable paving subbases and attenuation tanks before discharging into the watercourse at two locations for each parcel of the site. The overall discharge rate is restricted to the 1 in 1-year greenfield run-off rate, 11.2l/s and this is divided between the two parcels which each have a separate outfall. The discharge rate for the eastern parcel is 6.6l/s and the western parcel is 4.6l/s.

6.9.3 The attenuation for the eastern parcel is sized prevent flooding for all storms up to and including the 1 in 100-year event, with minor flooding allowed in the 1 in 100-year storm event plus 45% allowance for climate change and urban creep. The calculated volume of flooding is 6m^3 flooding which will be contained within the minimum 100mm upstand kerbs of the carriageway and will result in approximately 22m of water in the peak event.

6.9.4 The attenuation for the western parcel is sized to prevent flooding for all storms up to and including the 1 in 100-year event with a 45% allowance for climate change and urban creep.

6.9.5 At the detailed design stage, the drainage strategy will be developed to more accurately represent rainwater pipe and manhole locations, but a high-level strategy has been prepared for the purposes of this report and can be found in **Appendix F** with the hydraulic calculations in **Appendix G**.

6.9.6 The proposed surface water drainage strategy will reduce the risk of flooding both to the development and the surrounding area by providing a positive drainage network and provides a sustainable approach to managing surface water run-off.

6.10 Exceedance Flows

6.10.1 A residual risk remains that an event exceeding the design parameters may occur, or part of the drainage system may fail due to blockage.

6.10.2 The finished floor levels of the new buildings should be set at least 150mm above the lowest surrounding ground level. This design ensures that exceedance flows are directed away from building thresholds, reducing the risk of water ingress.

6.10.3 In the event of exceedance flows, external ground levels will be designed to direct water towards the proposed soft landscaped areas and the existing watercourse where it will be safely managed. The water will also be directed to the carriageways where the water will be contained within the upstand kerbs.

6.10.4 Refer to Error! Reference source not found.**H** for the Exceedance Flows drawing.

7. Foul Water Drainage

7.1 Pre-development Foul Water Management

7.1.1 The current site does not have an existing foul water connection.

7.2 Proposed Foul Water Drainage Strategy

7.2.1 Southern Water sewer records did not indicate the presence of a foul sewer in the surrounding roads due to the sewers not yet being formally adopted under a S104. This is in process of being approved, therefore, the proposed foul water connects to the future adopted sewers in Sargent Way and Carter Drive.

7.2.2 The foul water drainage system has been designed to accommodate the anticipated flow from the proposed residential development.

7.2.3 This approach will facilitate the management of foul water, ensuring that the system operates within capacity limits and minimising the risk of overflow.

7.2.4 A maintenance and management plan will be provided in accordance with the UK Water Industry's Sewers for Adoption guidance for all pipework and chambers.

7.2.5 Refer to Appendix F for the Proposed Drainage Strategy drawing.

8. Conclusion

8.1.1 The site is situated within Flood Zone 1, indicating a low risk of flooding from rivers and the sea. Given that the proposed residential development exceeds 1 hectare, as well as being at risk of surface water flooding, a flood risk assessment has been undertaken.

8.1.2 The pre-development flood risk to the proposed development from all sources has been assessed and it has been determined that the risk of flooding to the site is low to very for all sources with the exception of surface water, which has a risk of low to high. Following mitigation, the post-development flood risk to the proposed development from all sources has been assessed as low to very low.

8.1.3 Due to the risk of flooding from surface water, the Sequential Test is not required due to the previous site allocation.

8.1.4 The underlying geology of the site is Weald Clay Formation (bedrock) which is expected to have low porosity and permeability due to shale, silt and clay particles; therefore, infiltration is not considered feasible. Therefore, following the drainage discharge hierarchy, surface water run-off from the site is proposed to discharge into an ordinary watercourse that runs through the centre of the site from north to south.

8.1.5 WSCC do not accept discharge rates limited to Qbar rates, therefore, surface water runoff from the site is restricted to the 1 in 1-year runoff rate of 11.20 l/s. This total is split between the two parcels which each have a separate discharge location. The eastern parcel is restricted to 6.6l/s and the western parcel to 4.6l/s.

8.1.6 The attenuation will be sited in below ground attenuation tanks, infiltration trenches and permeable paving subbases.

8.1.7 The surface water drainage network for the eastern parcel is designed prevent flooding for the 1 in 100 year event with minor flooding for the climate change event being contained within the carriageway kerbs.

8.1.8 The surface water network for the western parcel is designed to prevent flooding for the 1 in 100 year event with an allowance for climate change.

8.1.9 The proposed drainage strategy meets the design criteria set out in the CIRIA SuDS Manual including in relation to pollution mitigation.

8.1.10 In conclusion, this report demonstrates that the proposals are in line with the relevant National, Regional and Local Policies and guidance, ensuring that the surface water drainage system will effectively manage flows. The risk of flooding to the site is considered acceptable and surface water run-off can be adequately managed without increasing the risk of flooding on-site or elsewhere.

APPENDIX A – TOPOGRAPHICAL SURVEY

PAS 128:2022 Quality Level Guide

Quality Level		Description	Accuracy
QB4	(QL-B4)	A utility is expected to exist but cannot be detected - (AR), (R), (VI)	Undefined
QB3 QB3P	(QL-B3) (QL-B3P)	Horizontal location only using one geophysical technique. No depth information - NDI.	+/- 500mm Horizontal Undefined Vertical
QB2 QB2P	(QL-B2) (QL-B2P)	Horizontal and vertical location only using one geophysical technique.	+/- 250mm or +/- 40% of depth whichever is greater
QB1 QB1P	(QL-B1) (QB-1P)	Horizontal and vertical location only using two geophysical techniques.	+/- 150mm or +/- 15% of depth whichever is greater
QA	(QL-A)	Service verified in an open excavation, inside an inspection chamber / draw pit, or at the point the service enters / exits the ground.	+/- 50mm Horizontal +/- 50mm Vertical

Desktop Utility Records

Utility Type	Provider Details	Date Acquired
Drainage	Southern Water	10/10/2024
Water	Southern Water	10/10/2024
Gas	ESP	22/10/2024
Gas	SGN	10/10/2024
Electricity	ESP	10/10/2024
Electricity	UK Power Networks	10/10/2024
Telecom	Openreach	10/10/2024
CATV	Virgin Media	10/10/2024
Communications	BSkyB Telecommunications	10/10/2024
Communications	Neos Networks	10/10/2024
Communications	Vodafone Ltd	10/10/2024
Tunnels & Pipelines	LinesearchbeforeUdig	10/10/2024

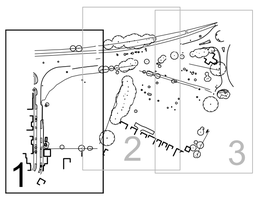
Coordinate Table

Station	Description	Easting	Northing	Level
S1	PEG	514802.535	130947.577	40.582
S2	ROAD NAIL	514758.536	130978.948	40.220
S3	HILTI NAIL	514784.643	131037.532	39.445
S4	HILTI NAIL	514865.497	131038.502	39.851
S5	HILTI NAIL	514956.883	131056.233	41.050
S6	ROAD NAIL	515026.254	131080.813	42.229
S7	ROAD NAIL	515034.336	131021.172	41.640
S8	ROAD NAIL	515019.498	130980.197	40.194
S9	ROAD NAIL	514975.536	130993.398	40.543
S10	PEG	514968.382	130951.507	39.624
S11	ROAD NAIL	514916.477	130931.106	39.084
S12	PEG	514855.699	130976.966	39.478
S20	HILTI NAIL	514758.782	130918.328	40.255
S80	ROAD NAIL	514998.328	130926.852	39.352

Equipment Information

Equipment	Manufacturer	Model	Serial Number	MKS REF	Date of Calibration
EML Tx Transmitter	SPX Radiodetection	RD8100	10/TX-3-15652	RD4	02/10/2024
EML Rx Receiver	SPX Radiodetection	RD8200	10/82-GB-628	RD27	02/10/2024
GPR	IDS Georadar	OPERA DUO	SN 010-17-000374	GPR10	07/11/2024
GPS	Leica Geosystems	CS20/GS14	2420301	GNSS 26	N/A

Sheet Layout: (Not to Scale)



514750 E

514800 E

514850 E

131050 N

131000 N

130950 N

130900 N

130850 N

Notes :

1. GRID AND LEVELS BASED ON ORDNANCE DATUM, DERIVED FROM THE NATIONAL GNSS NETWORK. LOCAL SCALE FACTOR 0.99976 APPLIED.
2. DRAINAGE INFORMATION HAS BEEN DETERMINED WITHOUT MAN ENTRY INTO CHAMBERS AND WHILST EVERY EFFORT HAS BEEN MADE TO CORRECTLY IDENTIFY THIS INFORMATION, IT SHOULD ALWAYS BE CHECKED IN AREAS THAT ARE CRITICAL TO THE FUTURE PROPOSAL.
3. ALL SEWERS ARE PRESUMED TO BE STRAIGHT BETWEEN CHAMBERS, WITH ROUTES CONNECTIVITY OBTAINED USING ACOUSTIC METHODS ONLY. THESE ARE TO BE CONSIDERED ASSUMED AND SHOULD BE INVESTIGATED FURTHER IN CRITICAL AREAS.
4. TREE AND HEDGE SPECIES HAVE BEEN IDENTIFIED AS ACCURATELY AS POSSIBLE BUT SHOULD BE CROSS CHECKED IN CRITICAL AREAS.
5. THIS SURVEY SHOULD ALWAYS BE READ IN CONJUNCTION WITH THE DESKTOP UTILITY REPORT, THAT WAS CARRIED OUT AS A PREREQUISITE TO THIS DETECTION SURVEY.

KEY

TOPOGRAPHICAL KEY

SURVEY STATION 5 · BANKING (TOP / BOTTOM) · HEDGE SPREADS · WOODLAND CANOPY · ARROW ON STEPS / RAMPS INDICATES DIRECTION UPWARDS · TREES (SPREAD & GIRTH SHOWN TO SCALE) · GATE · KERB CHANNEL · ROAD UNKERBED

FENCE · WALL · BUILDING · OPEN SIDED BUILDING · OVERHANG / CANOPY · GLASSHOUSE · CONTOUR 25.50 · SPOT LEVEL + 127.13 · SONAR LEVEL O 127.13 · BORE HOLE BH · TRIAL HOLE TH · FOOTPATH · CHANGE IN SURFACE

GENERAL

Av.	AVERAGE
COW	CABLE ON WALL
CW	COMBINED WATER
DIS	DISUSED
DK	DROP KERB
EML	ELECTROMAGNETIC LOCATOR
EOT	END OF TRACE
FO	FIBRE OPTIC
FP	FOOTPATH
FW	FOUL WATER
GP	GATE POST
GPR	GROUND PENETRATING RADAR
HB	HARD BED
H/P	HIGH PRESSURE
HV	HIGH VOLTAGE
KV	KILO VOLT
I/P	INTERMEDIATE PRESSURE
L/P	LOW PRESSURE
LV	LOW VOLTAGE
M/P	MEDIUM PRESSURE
NDI	NO DEPTH INFORMATION
NFI	NO FURTHER INFORMATION
NDV	NO DUCTS VISIBLE
NPV	NO PIPES VISIBLE
OSBM	ORDNANCE SURVEY BENCHMARK
POW	PIPE ON WALL
P BOX	POST BOX
RED	REDUNDANT SERVICE
RW	RETAINING WALL
SB	SOFT BED
SNP	STREET NAME PLATE
SW	SURFACE WATER
TAC	TACTILE PAVING
TOW	TOP OF WALL
TW	TRADE EFFLUENT WATER
UTL	UNABLE TO LOCATE
UTR	UNABLE TO RAISE
UTS	UNABLE TO SURVEY

APPARATUS

ACU	AIR CONDITIONING UNIT
AV	AIR VALVE
BB	BELISHA BEACON
BO	BOLLARD
BOL	BOLLARD LIGHT
BS	BUS STOP
CATV	CABLE TELEVISION
CB	CONTROL BOX
CCB	CROSSING CONTROL BUTTON
CP	CATCH PIT
CR	CABLE RISER
DCH	DRAINAGE CHANNEL
EB	ELECTRIC CONTROL BOX
EP	ELECTRIC POLE
ER	EARTH ROD
FD	FILTER DRAIN
FFP	FUEL TANK FILL POINT
FH	FIRE HYDRANT
GR	GAS RISER
GV	GAS VALVE
GY	GULLY
IC	INSPECTION COVER
INT	INTERCEPTOR
IT	INLET
KO	KERB OUTLET
LD	LOOP DETECTOR
LH	LAMP HOLE
LP	LAMP POST
MH	MANHOLE
MK	MARKER POST / PLATE
MT	METER
MW	MONITORING WELL
OL	OUTLET
OU	OUTFALL
PO	POST
PTG	PIPE TO GROUND
PTS	PIPE TO SURFACE
PU	PUMP
RE	RODDING EYE
RS	ROAD SIGN
RM	RISING MAIN
RWP	RAIN WATER PIPE
SC	STOP COCK
SO	SOAKAWAY
SP	SOIL PIPE
ST	STAY CABLE
SV	STOP / SLUICE VALVE
SVP	SOIL VENT PIPE
TCB	TELEPHONE CALL BOX
TEL	TELECOM INSPECTION COVER
TL	TRAFFIC LIGHT
TLC	TRAFFIC LIGHT COVER
TM	TICKET MACHINE
TP	TELECOM POLE
VP	VENT PIPE
WM	WATER METER
WO	WASH OUT
WR	WATER RISER
WT	WATER TAP
WW	WET WELL

DEPTHS

d	ELECTRONICALLY DERIVED
Pd	PASSIVELY DERIVED
Bd	BASE DEPTH
Cd	DEPTH TO CROWN
Id	DEPTH TO INVERT
Sd	DEPTH TO SOFFIT
Std	DEPTH TO SILT

PIPE MATERIALS

AC	ASBESTOS CEMENT
ALK	ALKATHENE
BK	BRICK
CI	CAST IRON
CO	CONCRETE
DI	DUCTILE IRON
HDPE	HIGH DENSITY PE
MDPE	MEDIUM DENSITY PE
PE	POLYETHYLENE
PF	PITCH FIBRE
PP	POLYPROPYLENE
PVC	POLYVINYL CHLORIDE
PVC-U	ULTRA RIB (PVC)
SI	SPUN IRON
ST	STEEL
VC	VITRIFIED CLAY

FENCES

B/W	BARBED WIRE FENCE
C/B	CLOSED BOARDED FENCE
CPL	CONCRETE PANEL FENCE
C/I	CORRUGATED IRON FENCE
CNP	CHESTNUT PAILING
C/L	CHAIN LINK FENCE
I/R	IRON RAILINGS
L/L	LARCH LAP FENCE
P/R	POST AND RAIL FENCE
P/W	POST AND WIRE FENCE
W/M	WIRE MESH FENCE

LEVELS

BD	BACKDROP LEVEL
BL	BASE LEVEL
CL	COVER LEVEL
CWL	CROWN LEVEL
DPC	DAMP PROOF COURSE
FL	FLOOR LEVEL
IL	INVERT LEVEL
PT	P TRAP LEVEL
RL	ROOF LEVEL
SL	SILT LEVEL
SOF	SOFFIT LEVEL
THL	THRESHOLD LEVEL
WL	WATER LEVEL

LINESTYLE

INTERNAL METER (MT) · POT ENDED SERVICE · SEWER CAPPED RUN · SURVEY ABANDONED · INTERNAL VALVE · UNKNOWN UNDERGROUND ANOMALY (OA) · UNDERGROUND CHAMBERS · VERIFICATION TRIAL HOLE/EXCAVATION · ABOVE GROUND (AG) · ASSUMED ROUTE QB4(AR) · EMPTY DUCTS (E) · OVERHEAD (OH) · BACK DROP · P TRAP · UTILITY CROSSOVER · SURVEY BOUNDARY · VERBAL INFORMATION QB4(VI) · RECORD INFORMATION QB4(R) · REDUNDANT SERVICE · RISING MAIN

CCTV SECTION 4 AND 5 FAULTS ARE SHOWN IN RED

SERVICE TYPE

CATV / DATA · ELECTRICITY (HV) · ELECTRICITY (LV) · FUEL · GAS · HEATING · OVERHEAD ELECTRIC · OVERHEAD TELECOM · COMBINED SEWER · FOUL SEWER · SURFACE SEWER · TRADE EFFLUENT · UNIDENTIFIED SEWER · TELECOM · UNKNOWN SERVICE · WATER

SERVICES SURVEY WARNING

CAUTIONARY NOTES

1. EML techniques have been used in the detection of underground utilities as outlined in Table 2 of PAS 128:2022, the results are not infallible and trial excavations must be carried out in order to confirm identification, position and in particular depth of the utility.
2. GPR techniques has been used in the detection of non-metallic utilities as outlined in Table 2 of PAS 128:2022. The interpretation of these results is not infallible and success will depend on a number of factors including soil type, ground water levels and surface conditions, hence trial excavations must be carried out in order to confirm identification, position and in particular depth of the utility.
3. Depths derived via EML are taken to the centre of the conductor (cable, metallic pipe) and those derived via GPR are usually to the crown of the utility unless otherwise indicated.
4. Where cables cannot be detected individually an average depth has been obtained and trial excavations are recommended to confirm number and depths of cables banded together.
5. 'Pot-ended' cables are often difficult to detect and although we have made all reasonable efforts to locate or transpose this information from records, we cannot guarantee that all 'pot-ended' cables have been located.
6. Fibre optic cables are often difficult to detect, and commonly access chambers can be locked and thereby made inaccessible by the utility provider. All reasonable efforts have been made to locate these ducts using GPR. Cables not located have been transposed from records.
7. Within close proximity of electric substations and similar structures results using EML may become distorted. All reasonable efforts have been made to verify our results using GPR wherever conditions permitted.
8. Underneath overhead power lines results using EML may become distorted. All reasonable efforts have been made to verify our results using GPR wherever conditions permitted.
9. Drainage information has been obtained without man entry into the chamber.
10. Wherever possible we have attempted to locate the route of the sewer. Issues such as blockages, surcharging, flooding, sedimentation, sewer collapse, root ingress, excessive depth, obstructions or heavy traffic flow may have affected our ability to obtain meaningful results. In these cases recommendations have been made for further survey or maintenance work.
11. Pipe / duct sizes have been recorded from surface inspection or taken from record information. Pipe sizes have been recorded in millimetres and depths in metres, except in instances where sizes are indicated in imperial units on the record information.
12. Water and Gas utilities to individual properties are often of a size that cannot be detected using EML or GPR investigation, whenever possible the route has been added from surface evidence (pipe risers, valves, etc), but this should be viewed as a guide only.
13. All utilities detected by MK Surveys should be considered live unless confirmed otherwise by client or service provider.
14. MK Surveys cannot confirm when utilities are redundant unless there is visual or record evidence to indicate this. In addition MK Surveys cannot guarantee being able to detect all redundant utilities.
15. Wherever available the results of our investigations have been cross referenced with record information. If a utility shown on the records cannot be detected on site, the information has been added to the drawing and indicated as QB4 (R). However it should be noted that the completeness and accuracy of the records cannot be guaranteed.
16. The utility information has been obtained from non-intrusive survey techniques; it always remains possible that there are additional utilities within the survey boundary that we have not been able to detect. We recommend that care is taken on site and that all utility records are used in conjunction with this survey.
17. The responsibility for avoiding damage to assets and utilities on site shall be that of the persons proposing to excavate within the surveyed area, who shall be liable to the asset owner and any third party who may be affected in any way for any loss or damage.

ALWAYS EXERCISE CAUTION WHEN EXCAVATING.

SEE CAUTIONARY NOTES WITHIN THE UTILITY KEY

DETECTION SURVEY REPORT

GENERAL

This survey was carried out in accordance with PAS 128:2022 (Publicly Available Specification from BSI) by an experienced surveyor/surveyors, qualified to a minimum of QCF Level 3. After a pre-survey consultation with the client it was agreed to carry out the detection survey using methodology M1 as per Table 2 of the PAS 128:2022. The survey boundary has been shown on the drawing; please see linestyle section of the key for reference.

DESKTOP UTILITY REPORT

Prior to the survey commencing record information was gathered and compiled in a separate desktop utility report. This report should be read in conjunction with the information contained in this utility detection survey. Record information was at the time of the survey the most recent available in accordance with the requirements of the PAS 128:2022. For a full list of the providers searched, records received and the dates the information was obtained, please refer to the attachments page of the desktop utility report.

DETECTION SURVEY

DRAINAGE

Drainage was lifted with pipe sizes and invert levels recorded from surface level, no allowance has been made for confined space entry unless otherwise stated. Wherever possible the chamber sizes have been recorded and positioned on the drawing. All connections from gullies, external rainwater pipes and external soil stacks have been proven wherever possible into manholes and sewer runs by radio sonde location and/or GPR. Where a saddle connection is present the position is assumed only until proven to QB2 or above. In instances where other detection methods were unsuccessful connections between manholes have been assumed to be straight and labelled as QB4. All drainage should be cross checked in critical areas by CCTV survey or verification survey type A.

WATER

Water utilities were located using GPR methodologies. Where water utilities were unable to be located, record information has been added to the drawing to a quality level of QB4. Recommend trial excavations to confirm depth and position in critical areas.

GAS

Gas utilities were unable to be located with EML or GPR methodologies. Record information has been added to the drawing to a quality level of QB4. Recommend trial excavations to confirm depth and position in critical areas.

ELECTRICITY

Electric cables within the survey area have been located using EML methods with electronically derived depths recorded.Where GPR results confirmed EML findings the quality level has been increased to QB1. Where electric cables were unable to be detected, record information has been added to the drawing to a quality level of QB4. Recommend trial excavations to confirm depth and position in critical areas.

TELECOM

Telecom ducts have been located using EML methodologies to a quality level of QB2.Where GPR confirms position the quality level has been improved to QB1. Where telecom ducts were unable to be located, record information has been added to the drawing to a quality level of QB4. Due to laws protecting British Telecom apparatus all ducts have been located using remote detection techniques only and compared with record information. Chamber sizes have been recorded using GPR techniques wherever possible. For further information regarding BT apparatus please contact Openreach directly.

DATA

Data ducts within the survey area have been located using EML methods with electronically derived depths recorded.Where GPR results confirmed EML findings the quality level has been increased to QB1. Where data ducts were unable to be detected, record information has been added to the drawing to a quality level of QB4. Recommend trial excavations to confirm depth and position in critical areas.

UNKNOWNS

Some unknown targets identified on the drawing using GPR are classified as "non-linear targets". These are not consistent with what we expect to see when identifying a buried utility, and appear on the drawing as single targets with depths (i.e. not linking two or more depth readings). This does not mean they are not utilities, we are just unable to positively identify them as a utility. We would strongly recommend that further verification surveys (PAS 128:2022 survey type A) are carried out to identify these targets in critical areas.

Survey Information

Fieldwork dates	06/11	07/11	08/11							
Weather conditions										
Ground conditions	Dry	Dry	Dry							

Revision	Description	Surv. by	Check by	Appr. by	Date

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

Topographical and PAS 128:2022 Utility Survey

Vistry Group

Carter Drive
Broadbridge Heath
West Sussex

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

Project Number:	Rev:	Surveyed by:	Checked by:	Approved by:
34921	-	TC/MK	AG/AC	CP/NF

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

PAS 128:2022 Quality Level Guide

Quality Level		Description	Accuracy
QB4	(QL-B4)	A utility is expected to exist but cannot be detected - (AR), (R), (VI)	Undefined
QB3 QB3P	(QL-B3) (QL-B3P)	Horizontal location only using one geophysical technique. No depth information - NDI.	+/- 500mm Horizontal Undefined Vertical
QB2 QB2P	(QL-B2) (QL-B2P)	Horizontal and vertical location only using one geophysical technique.	+/- 250mm or +/- 40% of depth whichever is greater
QB1 QB1P	(QL-B1) (QB-1P)	Horizontal and vertical location only using two geophysical techniques.	+/- 150mm or +/- 15% of depth whichever is greater
QA	(QL-A)	Service verified in an open excavation, inside an inspection chamber / draw pit, or at the point the service enters / exits the ground.	+/- 50mm Horizontal +/- 50mm Vertical

Desktop Utility Records

Utility Type	Provider Details	Date Acquired
Drainage	Southern Water	10/10/2024
Water	Southern Water	10/10/2024
Gas	ESP	22/10/2024
Gas	SGN	10/10/2024
Electricity	ESP	10/10/2024
Electricity	UK Power Networks	10/10/2024
Telecom	Openreach	10/10/2024
CATV	Virgin Media	10/10/2024
Communications	BSkyB Telecommunications	10/10/2024
Communications	Neos Networks	10/10/2024
Communications	Vodafone Ltd	10/10/2024
Tunnels & Pipelines	LinesearchbeforeUdig	10/10/2024

Coordinate Table

Station	Description	Easting	Northing	Level
S1	PEG	514802.535	130947.577	40.582
S2	ROAD NAIL	514758.536	130978.948	40.220
S3	HILTI NAIL	514784.643	131037.532	39.445
S4	HILTI NAIL	514865.497	131038.502	39.851
S5	HILTI NAIL	514956.883	131056.233	41.050
S6	ROAD NAIL	515026.254	131080.813	42.229
S7	ROAD NAIL	515034.336	131021.172	41.640
S8	ROAD NAIL	515019.498	130980.197	40.194
S9	ROAD NAIL	514975.536	130993.398	40.543
S10	PEG	514968.382	130951.507	39.624
S11	ROAD NAIL	514916.477	130931.106	39.084
S12	PEG	514855.699	130976.966	39.478
S20	HILTI NAIL	514758.782	130918.328	40.255
S80	ROAD NAIL	514998.328	130926.852	39.352

Equipment Information

Equipment	Manufacturer	Model	Serial Number	MKS REF	Date of Calibration
EML Tx Transmitter	SPX Radiodetection	RD8100	10/TX-3-15652	RD4	02/10/2024
EML Rx Receiver	SPX Radiodetection	RD8200	10/82-GB-628	RD27	02/10/2024
GPR	IDS Georadar	OPERA DUO	SN 010-17-000374	GPR10	07/11/2024
GPS	Leica Geosystems	CS20/GS14	2420301	GNSS 26	N/A

Sheet Layout: (Not to Scale)

Notes :

1. GRID AND LEVELS BASED ON ORDNANCE DATUM, DERIVED FROM THE NATIONAL GNSS NETWORK. LOCAL SCALE FACTOR 0.99976 APPLIED.
2. DRAINAGE INFORMATION HAS BEEN DETERMINED WITHOUT MAN ENTRY INTO CHAMBERS AND WHILST EVERY EFFORT HAS BEEN MADE TO CORRECTLY IDENTIFY THIS INFORMATION, IT SHOULD ALWAYS BE CHECKED IN AREAS THAT ARE CRITICAL TO THE FUTURE PROPOSAL.
3. ALL SEWERS ARE PRESUMED TO BE STRAIGHT BETWEEN CHAMBERS, WITH ROUTES CONNECTIVITY OBTAINED USING ACOUSTIC METHODS ONLY. THESE ARE TO BE CONSIDERED ASSUMED AND SHOULD BE INVESTIGATED FURTHER IN CRITICAL AREAS.
4. TREE AND HEDGE SPECIES HAVE BEEN IDENTIFIED AS ACCURATELY AS POSSIBLE BUT SHOULD BE CROSS CHECKED IN CRITICAL AREAS.
5. THIS SURVEY SHOULD ALWAYS BE READ IN CONJUNCTION WITH THE DESKTOP UTILITY REPORT, THAT WAS CARRIED OUT AS A PREREQUISITE TO THIS DETECTION SURVEY.

KEY

TOPOGRAPHICAL KEY

SURVEY STATION 5 · BANKING (TOP / BOTTOM) · HEDGE SPREADS · WOODLAND CANOPY · ARROW ON STEPS / RAMPS INDICATES DIRECTION UPWARDS · TREES (SPREAD & GIRTH SHOWN TO SCALE) · GATE · KERB CHANNEL · ROAD UNKERBED

FENCE · WALL · BUILDING · OPEN SIDED BUILDING · OVERHANG / CANOPY · GLASSHOUSE · CONTOUR 25.50 · SPOT LEVEL + 127.13 · SONAR LEVEL ○ 127.13 · BORE HOLE BH · TRIAL HOLE TH · FOOTPATH · CHANGE IN SURFACE

GENERAL

Av.	AVERAGE
COW	CABLE ON WALL
CW	COMBINED WATER
DIS	DISUSED
DK	DROP KERB
EML	ELECTROMAGNETIC LOCATOR
EOT	END OF TRACE
FO	FIBRE OPTIC
FP	FOOTPATH
FW	FOUL WATER
GP	GATE POST
GPR	GROUND PENETRATING RADAR
HB	HARD BED
HP	HIGH PRESSURE
HV	HIGH VOLTAGE
KV	KILO VOLT
IP	INTERMEDIATE PRESSURE
LP	LOW PRESSURE
LV	LOW VOLTAGE
MP	MEDIUM PRESSURE
NDI	NO DEPTH INFORMATION
NFI	NO FURTHER INFORMATION
NDV	NO DUCTS VISIBLE
NPV	NO PIPES VISIBLE
OSBM	ORDNANCE SURVEY BENCHMARK
POW	PIPE ON WALL
P BOX	POST BOX
RED	REDUNDANT SERVICE
RW	RETAINING WALL
SB	SOFT BED
SNP	STREET NAME PLATE
SW	SURFACE WATER
TAC	TACTILE PAVING
TOW	TOP OF WALL
TW	TRADE EFFLUENT WATER
UTL	UNABLE TO LOCATE
UTR	UNABLE TO RAISE
UTS	UNABLE TO SURVEY

APPARATUS

ACU	AIR CONDITIONING UNIT
AV	AIR VALVE
BB	BELISHA BEACON
BO	BOLLARD
BOL	BOLLARD LIGHT
BS	BUS STOP
CATV	CABLE TELEVISION
CB	CONTROL BOX
CCB	CROSSING CONTROL BUTTON
CP	CATCH PIT
CR	CABLE RISER
DCH	DRAINAGE CHANNEL
EB	ELECTRIC CONTROL BOX
EP	ELECTRIC POLE
ER	EARTH ROD
FD	FILTER DRAIN
FFP	FUEL TANK FILL POINT
FH	FIRE HYDRANT
GR	GAS RISER
GV	GAS VALVE
GY	GULLY
IC	INSPECTION COVER
INT	INTERCEPTOR
IT	INLET
KO	KERB OUTLET
LD	LOOP DETECTOR
LH	LAMP HOLE
LP	LAMP POST
MH	MANHOLE
MK	MARKER POST / PLATE
MT	METER
MW	MONITORING WELL
OL	OUTLET
OU	OUTFALL
PO	POST
PTG	PIPE TO GROUND
PTS	PIPE TO SURFACE
PU	PUMP
RE	RODDING EYE
RS	ROAD SIGN
RM	RISING MAIN
RWP	RAIN WATER PIPE
SC	STOP COCK
SO	SOAKAWAY
SP	SOIL PIPE
ST	STAY CABLE
SV	STOP / SLUICE VALVE
SVP	SOIL VENT PIPE
TCB	TELEPHONE CALL BOX
TEL	TELECOM INSPECTION COVER
TL	TRAFFIC LIGHT
TLC	TRAFFIC LIGHT COVER
TM	TICKET MACHINE
TP	TELECOM POLE
VP	VENT PIPE
WM	WATER METER
WO	WASH OUT
WR	WATER RISER
WT	WATER TAP
WW	WET WELL

DEPTHS

d	ELECTRONICALLY DERIVED
Pd	PASSIVELY DERIVED
Bd	BASE DEPTH
Cd	DEPTH TO CROWN
Id	DEPTH TO INVERT
Sd	DEPTH TO SOFFIT
STd	DEPTH TO SILT

PIPE MATERIALS

AC	ASBESTOS CEMENT
ALK	ALKATHENE
BK	BRICK
CI	CAST IRON
CO	CONCRETE
DI	DUCTILE IRON
HDPE	HIGH DENSITY PE
MDPE	MEDIUM DENSITY PE
PE	POLYETHYLENE
PF	PITCH FIBRE
PP	POLYPROPYLENE
PVC	POLYVINYL CHLORIDE
PVC-U	ULTRA RIB (PVC)
SI	SPUN IRON
ST	STEEL
VC	VITRIFIED CLAY

FENCES

B/W	BARBED WIRE FENCE
C/B	CLOSED BOARDED FENCE
CPL	CONCRETE PANEL FENCE
C/I	CORRUGATED IRON FENCE
CNP	CHESTNUT PAILING
C/L	CHAIN LINK FENCE
I/R	IRON RAILINGS
L/L	LARCH LAP FENCE
P/R	POST AND RAIL FENCE
P/W	POST AND WIRE FENCE
W/M	WIRE MESH FENCE

LEVELS

BD	BACKDROP LEVEL
BL	BASE LEVEL
CL	COVER LEVEL
CWL	CROWN LEVEL
DPC	DAMP PROOF COURSE
FL	FLOOR LEVEL
IL	INVERT LEVEL
PT	P TRAP LEVEL
RL	ROOF LEVEL
SL	SILT LEVEL
SOF	SOFFIT LEVEL
THL	THRESHOLD LEVEL
WL	WATER LEVEL

LINESTYLE

INTERNAL METER (MT) · POT ENDED SERVICE · SEWER CAPPED RUN · SURVEY ABANDONED · INTERNAL VALVE · UNKNOWN UNDERGROUND ANOMALY (QB2) · UNDERGROUND CHAMBERS · VERIFICATION TRIAL HOLE/EXCAVATION · ABOVE GROUND (AG) · ASSUMED ROUTE QB4(AR) · EMPTY DUCTS (E) · OVERHEAD (OH) · BACK DROP · P TRAP · UTILITY CROSSOVER · SURVEY BOUNDARY · VERBAL INFORMATION QB4(VI) · RECORD INFORMATION QB4(R) · REDUNDANT SERVICE · RISING MAIN

CCTV SECTION 4 AND 5 FAULTS ARE SHOWN IN RED

SERVICE TYPE

CATV / DATA · ELECTRICITY (HV) · ELECTRICITY (LV) · FUEL · GAS · HEATING · OVERHEAD ELECTRIC · OVERHEAD TELECOM · COMBINED SEWER · FOUL SEWER · SURFACE SEWER · TRADE EFFLUENT · UNIDENTIFIED SEWER · TELECOM · UNKNOWN SERVICE · WATER

SERVICES SURVEY WARNING ⚠

CAUTIONARY NOTES

1. EML techniques have been used in the detection of underground utilities as outlined in Table 2 of PAS 128:2022, the results are not infallible and trial excavations must be carried out in order to confirm identification, position and in particular depth of the utility.
2. GPR techniques has been used in the detection of non-metallic utilities as outlined in Table 2 of PAS 128:2022. The interpretation of these results is not infallible and success will depend on a number of factors including soil type, ground water levels and surface conditions, hence trial excavations must be carried out in order to confirm identification, position and in particular depth of the utility.
3. Depths derived via EML are taken to the centre of the conductor (cable, metallic pipe) and those derived via GPR are usually to the crown of the utility unless otherwise indicated.
4. Where cables cannot be detected individually an average depth has been obtained and trial excavations are recommended to confirm number and depths of cables banded together.
5. "Pot-ended" cables are often difficult to detect and although we have made all reasonable efforts to locate or transpose this information from records, we cannot guarantee that all 'pot-ended' cables have been located.
6. Fibre optic cables are often difficult to detect, and commonly access chambers can be locked and thereby made inaccessible by the utility provider. All reasonable efforts have been made to locate these ducts using GPR. Cables not located have been transposed from records.
7. Within close proximity of electric substations and similar structures results using EML may become distorted. All reasonable efforts have been made to verify our results using GPR wherever conditions permitted.
8. Underneath overhead power lines results using EML may become distorted. All reasonable efforts have been made to verify our results using GPR wherever conditions permitted.
9. Drainage information has been obtained without man entry into the chamber.
10. Wherever possible we have attempted to locate the route of the sewer. Issues such as blockages, surcharging, flooding, sedimentation, sewer collapse, root ingress, excessive depth, obstructions or heavy traffic flow may have affected our ability to obtain meaningful results. In these cases recommendations have been made for further survey or maintenance work.
11. Pipe / duct sizes have been recorded from surface inspection or taken from record information. Pipe sizes have been recorded in millimetres and depths in metres, except in instances where sizes are indicated in imperial units on the record information.
12. Water and Gas utilities to individual properties are often of a size that cannot be detected using EML or GPR investigation, whenever possible the route has been added from surface evidence (pipe risers, valves, etc), but this should be viewed as a guide only.
13. All utilities detected by MK Surveys should be considered live unless confirmed otherwise by client or service provider.
14. MK Surveys cannot confirm when utilities are redundant unless there is visual or record evidence to indicate this. In addition MK Surveys cannot guarantee being able to detect all redundant utilities.
15. Wherever available the results of our investigations have been cross referenced with record information. If a utility shown on the records cannot be detected on site, the information has been added to the drawing and indicated as QB4 (R). However it should be noted that the completeness and accuracy of the records cannot be guaranteed.
16. The utility information has been obtained from non-intrusive survey techniques; it always remains possible that there are additional utilities within the survey boundary that we have not been able to detect. We recommend that care is taken on site and that all utility records are used in conjunction with this survey.
17. The responsibility for avoiding damage to assets and utilities on site shall be that of the persons proposing to excavate within the surveyed area, who shall be liable to the asset owner and any third party who may be affected in any way for any loss or damage.

ALWAYS EXERCISE CAUTION WHEN EXCAVATING.

DETECTION SURVEY REPORT

GENERAL
This survey was carried out in accordance with PAS 128:2022 (Publicly Available Specification from BSI) by an experienced surveyor/surveyors, qualified to a minimum of QCF Level 3. After a pre-survey consultation with the client it was agreed to carry out the detection survey using methodology M1 as per Table 2 of the PAS 128:2022. The survey boundary has been shown on the drawing; please see linestyle section of the key for reference.

DESKTOP UTILITY REPORT
Prior to the survey commencing record information was gathered and compiled in a separate desktop utility report. This report should be read in conjunction with the information contained in this utility detection survey. Record information was at the time of the survey the most recent available in accordance with the requirements of the PAS 128:2022. For a full list of the providers searched, records received and the dates the information was obtained, please refer to the attachments page of the desktop utility report.

DETECTION SURVEY
DRAINAGE
Drainage was lifted with pipe sizes and invert levels recorded from surface level, no allowance has been made for confined space entry unless otherwise stated. Wherever possible the chamber sizes have been recorded and positioned on the drawing. All connections from gullies, external rainwater pipes and external soil stacks have been proven wherever possible into manholes and sewer runs by radio sonde location and/or GPR. Where a saddle connection is present the position is assumed only until proven to QB2 or above. In instances where other detection methods were unsuccessful connections between manholes have been assumed to be straight and labelled as QB4. All drainage should be cross checked in critical areas by CCTV survey or verification survey type A.

WATER
Water utilities were located using GPR methodologies. Where water utilities were unable to be located, record information has been added to the drawing to a quality level of QB4. Recommend trial excavations to confirm depth and position in critical areas.

GAS
Gas utilities were unable to be located with EML or GPR methodologies. Record information has been added to the drawing to a quality level of QB4. Recommend trial excavations to confirm depth and position in critical areas.

ELECTRICITY
Electric cables within the survey area have been located using EML methods with electronically derived depths recorded.Where GPR results confirmed EML findings the quality level has been increased to QB1. Where electric cables were unable to be detected, record information has been added to the drawing to a quality level of QB4. Recommend trial excavations to confirm depth and position in critical areas.

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Some unknown targets identified on the drawing using GPR are classified as "non-linear targets". These are not consistent with what we expect to see when identifying a buried utility, and appear on the drawing as single targets with depths (i.e. not linking two or more depth readings). This does not mean they are not utilities, we are just unable to positively identify them as a utility. We would strongly recommend that further verification surveys (PAS 128:2022 survey type A) are carried out to identify these targets in critical areas.

SEE CAUTIONARY NOTES WITHIN THE UTILITY KEY

Survey Information

Fieldwork dates	06/11	07/11	08/11							
Weather conditions	◔	◔	◔							
Ground conditions	Dry	Dry	Dry							

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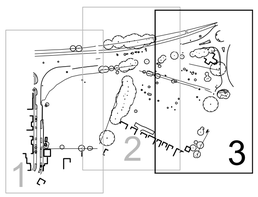
Sheet Layout: (Not to Scale)



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KEY

TOPOGRAPHICAL KEY

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CP	CATCH PIT
CR	CABLE RISER
DCH	DRAINAGE CHANNEL
EB	ELECTRIC CONTROL BOX
EP	ELECTRIC POLE
ER	EARTH ROD
FD	FILTER DRAIN
FFP	FUEL TANK FILL POINT
FH	FIRE HYDRANT
GR	GAS RISER
GV	GAS VALVE
GY	GULLY
IC	INSPECTION COVER
INT	INTERCEPTOR
IT	INLET
KO	KERB OUTLET
LD	LOOP DETECTOR
LH	LAMP HOLE
LP	LAMP POST
MH	MANHOLE
MK	MARKER POST / PLATE
MT	METER
MW	MONITORING WELL
OL	OUTLET
OU	OUTFALL
PO	POST
PTG	PIPE TO GROUND
PTS	PIPE TO SURFACE
PU	PUMP
RE	RODDING EYE
RS	ROAD SIGN
RM	RISING MAIN
RWP	RAIN WATER PIPE
SC	STOP COCK
SO	SOAKAWAY
SP	SOIL PIPE
ST	STAY CABLE
SV	STOP / SLUICE VALVE
SVP	SOIL VENT PIPE
TCB	TELEPHONE CALL BOX
TEL	TELECOM INSPECTION COVER
TL	TRAFFIC LIGHT
TLC	TRAFFIC LIGHT COVER
TM	TICKET MACHINE
TP	TELECOM POLE
VP	VENT PIPE
WM	WATER METER
WO	WASH OUT
WR	WATER RISER
WT	WATER TAP
WW	WET WELL

DEPTHS

d	ELECTRONICALLY DERIVED
Pd	PASSIVELY DERIVED
Bd	BASE DEPTH
Cd	DEPTH TO CROWN
Id	DEPTH TO INVERT
Sd	DEPTH TO SOFFIT
STd	DEPTH TO SILT

PIPE MATERIALS

AC	ASBESTOS CEMENT
ALK	ALKATHENE
BK	BRICK
CI	CAST IRON
CO	CONCRETE
DI	DUCTILE IRON
HDPE	HIGH DENSITY PE
MDPE	MEDIUM DENSITY PE
PE	POLYETHYLENE
PF	PITCH FIBRE
PP	POLYPROPYLENE
PVC	POLYVINYL CHLORIDE
PVC-U	ULTRA RIB (PVC)
SI	SPUN IRON
ST	STEEL
VC	VITRIFIED CLAY

FENCES

B/W	BARBED WIRE FENCE
C/B	CLOSED BOARDED FENCE
CPL	CONCRETE PANEL FENCE
C/I	CORRUGATED IRON FENCE
CNP	CHESTNUT PAILING
C/L	CHAIN LINK FENCE
I/R	IRON RAILINGS
L/L	LARCH LAP FENCE
P/R	POST AND RAIL FENCE
P/W	POST AND WIRE FENCE
W/M	WIRE MESH FENCE

LEVELS

BD	BACKDROP LEVEL
BL	BASE LEVEL
CL	COVER LEVEL
CWL	CROWN LEVEL
DPC	DAMP PROOF COURSE
FL	FLOOR LEVEL
IL	INVERT LEVEL
PT	P TRAP LEVEL
RL	ROOF LEVEL
SL	SILT LEVEL
SOF	SOFFIT LEVEL
THL	THRESHOLD LEVEL
WL	WATER LEVEL

LINESTYLE

INTERNAL METER (MT), POT ENDED SERVICE, SEWER CAPPED RUN, SURVEY ABANDONED, INTERNAL VALVE, UNKNOWN UNDERGROUND ANOMALY (CCTV), UNDERGROUND CHAMBERS, VERIFICATION TRIAL HOLE/EXCAVATION, ABOVE GROUND (AG), ASSUMED ROUTE (QB4(AR)), EMPTY DUCTS (E), OVERHEAD (OH), BACK DROP, P TRAP, UTILITY CROSSOVER, SURVEY BOUNDARY, VERBAL INFORMATION (QB4(VI)), RECORD INFORMATION (QB4(R)), REDUNDANT SERVICE, RISING MAIN, CCTV SECTION 4 AND 5 FAULTS ARE SHOWN IN RED

SERVICE TYPE

CATV / DATA, ELECTRICITY (HV), ELECTRICITY (LV), FUEL, GAS, HEATING, OVERHEAD ELECTRIC, OVERHEAD TELECOM, COMBINED SEWER, FOUL SEWER, SURFACE SEWER, TRADE EFFLUENT, UNIDENTIFIED SEWER, TELECOM, UNKNOWN SERVICE, WATER

SERVICES SURVEY WARNING

CAUTIONARY NOTES

1. EML techniques have been used in the detection of underground utilities as outlined in Table 2 of PAS 128:2022. the results are not infallible and trial excavations must be carried out in order to confirm identification, position and in particular depth of the utility.
2. GPR techniques has been used in the detection of non-metallic utilities as outlined in Table 2 of PAS 128:2022. The interpretation of these results is not infallible and success will depend on a number of factors including soil type, ground water levels and surface conditions, hence trial excavations must be carried out in order to confirm identification, position and in particular depth of the utility.
3. Depths derived via EML are taken to the centre of the conductor (cable, metallic pipe) and those derived via GPR are usually to the crown of the utility unless otherwise indicated.
4. Where cables cannot be detected individually an average depth has been obtained and trial excavations are recommended to confirm number and depths of cables banded together.
5. 'Pot-ended' cables are often difficult to detect and although we have made all reasonable efforts to locate or transpose this information from records, we cannot guarantee that all 'pot-ended' cables have been located.
6. Fibre optic cables are often difficult to detect, and commonly access chambers can be locked and thereby made inaccessible by the utility provider. All reasonable efforts have been made to locate these ducts using GPR. Cables not located have been transposed from records.
7. Within close proximity of electric substations and similar structures results using EML may become distorted. All reasonable efforts have been made to verify our results using GPR wherever conditions permitted.
8. Underneath overhead power lines results using EML may become distorted. All reasonable efforts have been made to verify our results using GPR wherever conditions permitted.
9. Drainage information has been obtained without man entry into the chamber.
10. Wherever possible we have attempted to locate the route of the sewer. Issues such as blockages, surcharging, flooding, sedimentation, sewer collapse, root ingress, excessive depth, obstructions or heavy traffic flow may have affected our ability to obtain meaningful results. In these cases recommendations have been made for further survey or maintenance work.
11. Pipe / duct sizes have been recorded from surface inspection or taken from record information. Pipe sizes have been recorded in millimetres and depths in metres, except in instances where sizes are indicated in imperial units on the record information.
12. Water and Gas utilities to individual properties are often of a size that cannot be detected using EML or GPR investigation, whenever possible the route has been added from surface evidence (pipe risers, valves, etc), but this should be viewed as a guide only.
13. All utilities detected by MK Surveys should be considered live unless confirmed otherwise by client or service provider.
14. MK Surveys cannot confirm when utilities are redundant unless there is visual or record evidence to indicate this. In addition MK Surveys cannot guarantee being able to detect all redundant utilities.
15. Wherever available the results of our investigations have been cross referenced with record information. If a utility shown on the records cannot be detected on site, the information has been added to the drawing and indicated as QB4 (R). However it should be noted that the completeness and accuracy of the records cannot be guaranteed.
16. The utility information has been obtained from non-intrusive survey techniques; it always remains possible that there are additional utilities within the survey boundary that we have not been able to detect. We recommend that care is taken on site and that all utility records are used in conjunction with this survey.
17. The responsibility for avoiding damage to assets and utilities on site shall be that of the persons proposing to excavate within the surveyed area, who shall be liable to the asset owner and any third party who may be affected in any way for any loss or damage.

ALWAYS EXERCISE CAUTION WHEN EXCAVATING.

DETECTION SURVEY REPORT

GENERAL
This survey was carried out in accordance with PAS 128:2022 (Publicly Available Specification from BSI) by an experienced surveyor/surveyors, qualified to a minimum of QCF Level 3. After a pre-survey consultation with the client it was agreed to carry out the detection survey using methodology M1 as per Table 2 of the PAS 128:2022. The survey boundary has been shown on the drawing; please see linestyle section of the key for reference.

DESKTOP UTILITY REPORT
Prior to the survey commencing record information was gathered and compiled in a separate desktop utility report. This report should be read in conjunction with the information contained in this utility detection survey. Record information was at the time of the survey the most recent available in accordance with the requirements of the PAS 128:2022. For a full list of the providers searched, records received and the dates the information was obtained, please refer to the attachments page of the desktop utility report.

DETECTION SURVEY
DRAINAGE
Drainage was lifted with pipe sizes and invert levels recorded from surface level, no allowance has been made for confined space entry unless otherwise stated. Wherever possible the chamber sizes have been recorded and positioned on the drawing. All connections from gullies, external rainwater pipes and external soil stacks have been proven wherever possible into manholes and sewer runs by radio sonde location and/or GPR. Where a saddle connection is present the position is assumed only until proven to QB2 or above. In instances where other detection methods were unsuccessful connections between manholes have been assumed to be straight and labelled as QB4. All drainage should be cross checked in critical areas by CCTV survey or verification survey type A.

WATER
Water utilities were located using GPR methodologies. Where water utilities were unable to be located, record information has been added to the drawing to a quality level of QB4. Recommend trial excavations to confirm depth and position in critical areas.

GAS
Gas utilities were unable to be located with EML or GPR methodologies. Record information has been added to the drawing to a quality level of QB4. Recommend trial excavations to confirm depth and position in critical areas.

ELECTRICITY
Electric cables within the survey area have been located using EML methods with electronically derived depths recorded.Where GPR results confirmed EML findings the quality level has been increased to QB1. Where electric cables were unable to be detected, record information has been added to the drawing to a quality level of QB4. Recommend trial excavations to confirm depth and position in critical areas.

TELECOM
Telecom ducts have been located using EML methodologies to a quality level of QB2.Where GPR confirms position the quality level has been improved to QB1. Where telecom ducts were unable to be located, record information has been added to the drawing to a quality level of QB4. Due to laws protecting British Telecom apparatus all ducts have been located using remote detection techniques only and compared with record information. Chamber sizes have been recorded using GPR techniques wherever possible. For further information regarding BT apparatus please contact Openreach directly.

DATA
Data ducts within the survey area have been located using EML methods with electronically derived depths recorded.Where GPR results confirmed EML findings the quality level has been increased to QB1. Where data ducts were unable to be detected, record information has been added to the drawing to a quality level of QB4. Recommend trial excavations to confirm depth and position in critical areas.

UNKNOWNS
Some unknown targets identified on the drawing using GPR are classified as "non-linear targets". These are not consistent with what we expect to see when identifying a buried utility, and appear on the drawing as single targets with depths (i.e. not linking two or more depth readings). This does not mean they are not utilities, we are just unable to positively identify them as a utility. We would strongly recommend that further verification surveys (PAS 128:2022 survey type A) are carried out to identify these targets in critical areas.

SEE CAUTIONARY NOTES WITHIN THE UTILITY KEY

Survey Information

Fieldwork dates	06/11	07/11	08/11							
Weather conditions										
Ground conditions	Dry	Dry	Dry							

Revision	Description	Surv. by	Check. by	Appr. by	Date

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

Topographical and PAS 128:2022 Utility Survey

Vistry Group

Carter Drive
Broadbridge Heath
West Sussex

Scale:	Sheet Size:	Sheet Number:	Date:
1:200	A0	3	October 2024

Project Number:	Rev:	Surveyed by:	Checked by:	Approved by:
34921	-	TC/MK	AG/AC	CP/NF

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

APPENDIX B – PROPOSED SITE LAYOUT

WICKHURST GREEN, BROADBRIDGE HEATH
PROPOSED SITE LAYOUT

Playing Field

Play Area

Drain

Open Space

CLOSE

L Twr

SITE BOUNDARY

AFFORDABLE HOUSING

0 5 10 20 30 40 50m

SCALE 1:500

Rev	Date	Amendment	Initials
T	15-04-25	Flatblock footprints updated. Minor tweaks	CH
S	04-04-25	Minor Tweaks, Balconies & Garages removed	CH
R	31-03-25	HT swaps to accommodate new SW easement	CH
Q	20-03-25	Technical and tracking comments picked up. Northern Footpath upgraded to 3m cycleway. M4(3) parking added.	CH
P	03-03-25	Added unit, affordable mix and visitor parking adjusted	CH
N	25-02-25	Pump station removed, added unit, visitor parking increased.	CH
M	17-02-25	Increased unit, plot swaps to plots 48-50	CH
L	17-02-25	Flatblocks expanded to provide 2b4p flats.	CH
K	03-02-25	M4(3) marks removed, flatblocks named, entrances to flatblocks marked, path added.	CH
J	28-01-25	M4(3) Units Marked	CH
H	24-01-25	Eastern field reverted to Rev F. Density increased on Western field including additional flats and larger units.	SF/CH
G	19-12-24	Density increased.	ZA
F	04-11-24	Layout revised to suit CB comments.	SF
E	01-11-24	Layout revised to suit design team comments.	SF/CH
D	23-10-24	Reworked Site Layout to comments	SF/CH
C	09-10-24	Reworked Site Layout to comments	PL
B	-	-	
A	05-07-24	Reworked Site Layout to comments	SF

Project:
WICKHURST GREEN
BROADBRIDGE HEATH

Client:
VISTRY MAJOR PROJECTS

Drawing:
PROPOSED SITE LAYOUT

PLANNING

Drawing no: 24.1945.1000 **Rev:** T

Scale@A1: 1:500 **Date:** JUNE' 24 **Drawn:** CH **Checked:** SF

FINC Architects Ltd
61-63 New London Road | Chelmsford | Essex | CM2 0ND
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W: www.fincarchitects.com
E: company@fincarchitects.com

WICKHURST GREEN, BROADBRIDGE HEATH
PROPOSED SITE LAYOUT

0 5 10 20 30 40 50m

SCALE 1:500

SITE BOUNDARY

AFFORDABLE HOUSING

Rev	Date	Amendment	Initials
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A	05-07-24	Reworked Site Layout to comments	SF

Project:
WICKHURST GREEN
BROADBRIDGE HEATH

Client:
VISTRY MAJOR PROJECTS

Drawing:
PROPOSED SITE LAYOUT

PLANNING

Drawing no: 24.1945.1000 **Rev:** T

Scale@A1: 1:500 **Date:** JUNE' 24 **Drawn:** CH **Checked:** SF

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APPENDIX C – GREENFIELD RUN-OFF CALCULATIONS

Greenfield runoff rate estimation tool

www.uksuds.com | Greenfield runoff rate estimation tool (https://www.uksuds.com/)

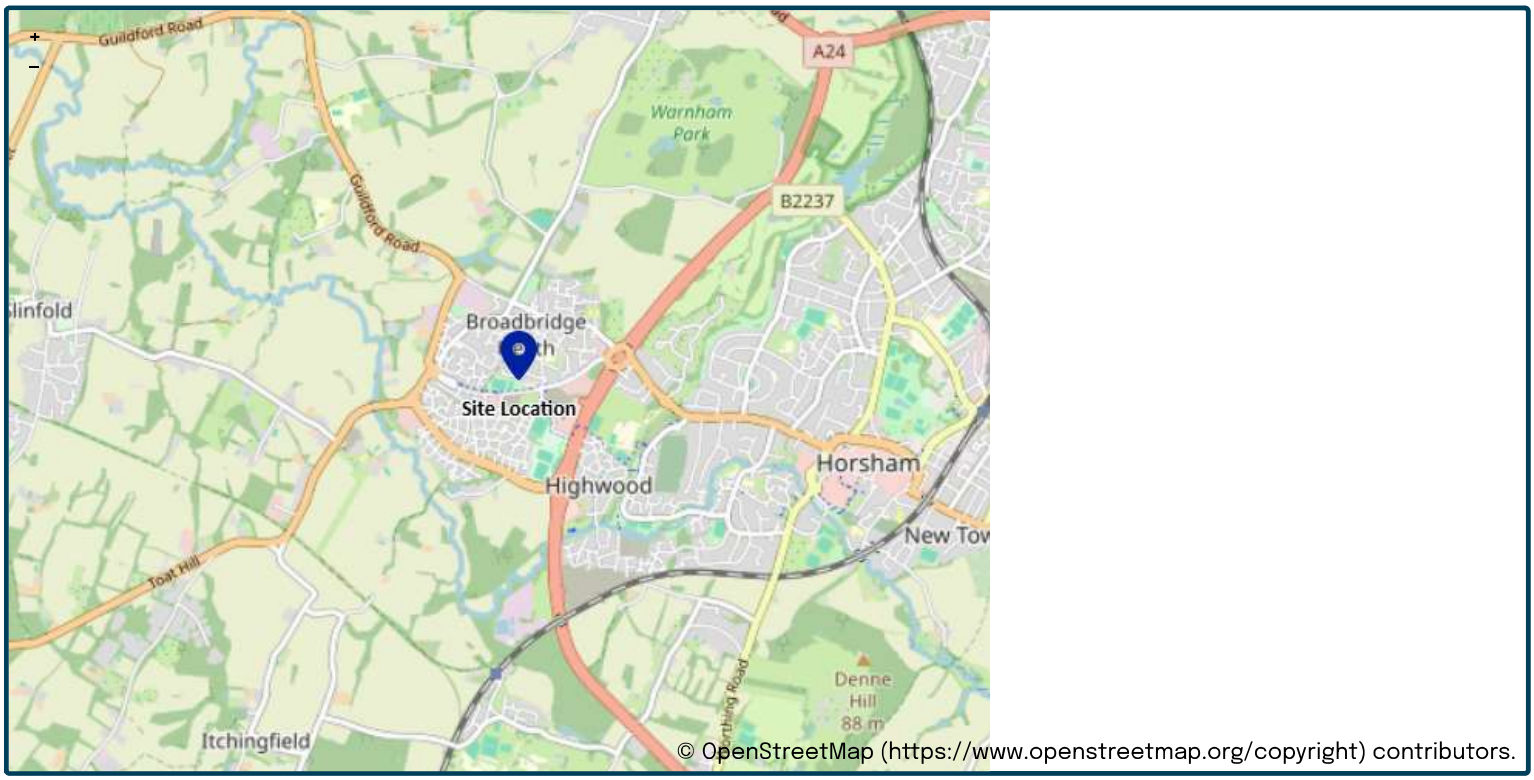
This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance “Rainfall runoff management for developments”, SC030219 (2013), the SuDS Manual C753 (CIRIA, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Project details

Date	15/04/2025
Calculated by	OT
Reference	
Model version	0.6.5

Location

Site name	Wickhurst Green
Site location	Wickhurst Green, Broadbridge Heath, West Sussex



Site easting	514886
Site northing	130972

Site details

Total site area (ha)	2.42 ha

Greenfield runoff

Method

Method	IH124

IH124

	My value		Map value
SAAR (mm)	776 mm		776
How should SPR be derived?	WRAP soil type		
WRAP soil type	4		4
SPR	0.47		0.47
QBar (IH124) (l/s)	13.2 l/s		

Growth curve factors

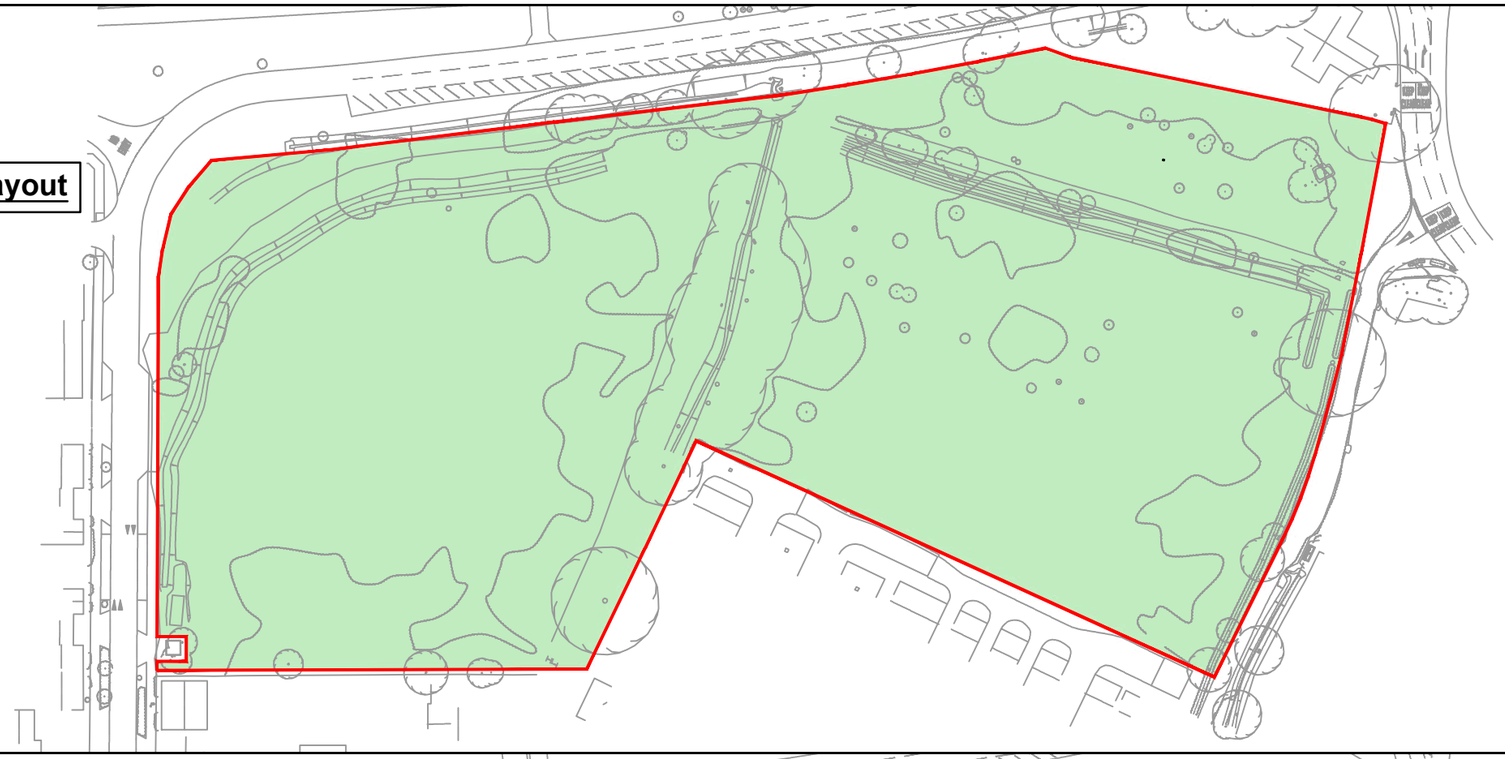
	My value		Map value
Hydrological region	7		7
1 year growth factor	0.85		
2 year growth factor	0.88		
10 year growth factor	1.62		
30 year growth factor	2.3		
100 year growth factor	3.19		
200 year growth factor	3.74		

Results

Method	IH124
Flow rate 1 year (l/s)	11.2 l/s
Flow rate 2 year (l/s)	11.6 l/s
Flow rate 10 years (l/s)	21.4 l/s
Flow rate 30 years (l/s)	30.3 l/s
Flow rate 100 years (l/s)	42 l/s
Flow rate 200 years (l/s)	49.3 l/s

APPENDIX D – PERMEABLE AND IMPERMEABLE AREAS

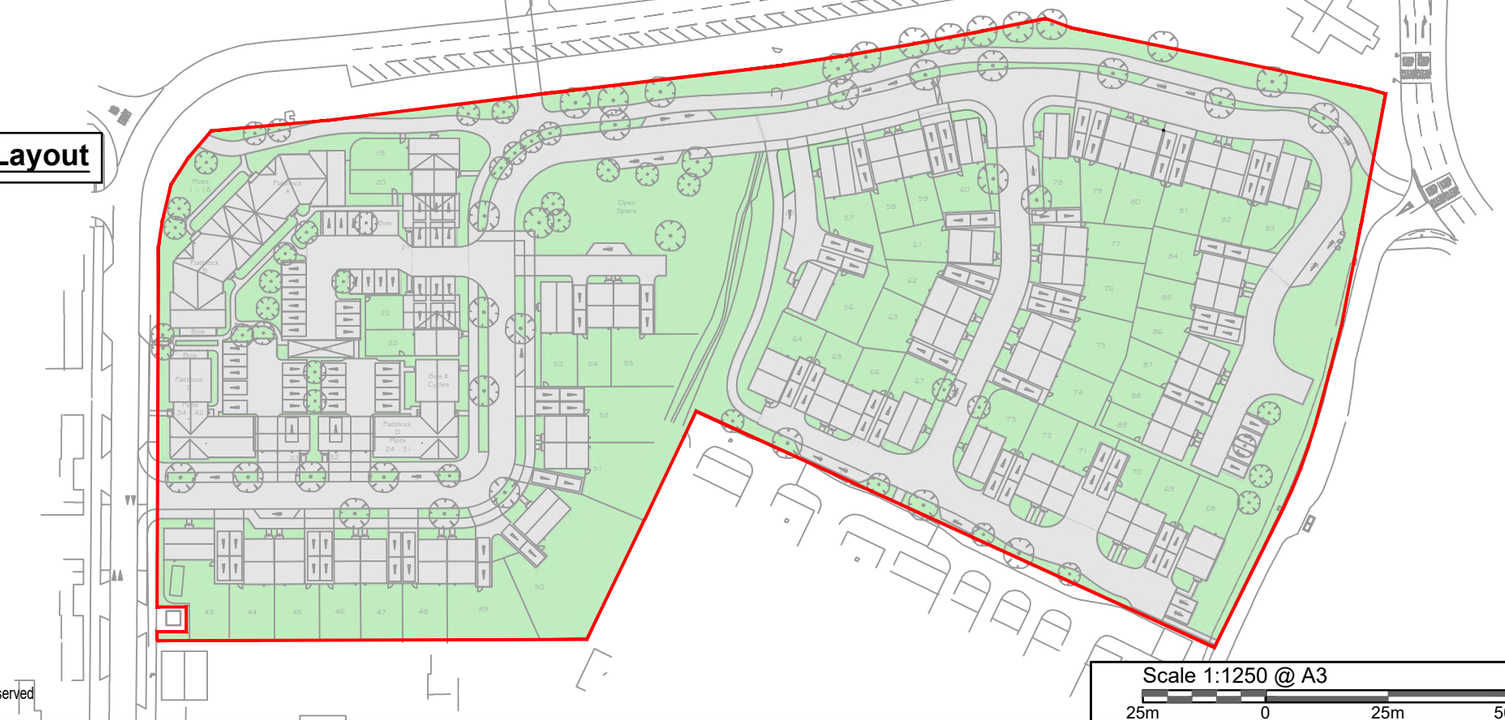
Existing Site Layout



Existing Areas:

Permeable	2.422 Ha
Impermeable	0.000 Ha

Proposed Site Layout



Proposed Areas:

Permeable	1.118 Ha
Impermeable	1.304 Ha

Scale 1:1250 @ A3

25m 0 25m 50m 75m

NOTES:

1. This drawing is not to be used for construction, it is preliminary and intended for information only. It is subject to change during the design process.
2. All dimensions in metres unless otherwise stated
3. Proposed works are based on the topographical survey provided by mksurveys, drawing 34921, dated October 2024
4. The proposed works are aligned with the architectural layout, referenced as drawing number 24.1945.1000, dated 15/04/2025
5. Site Location:
   - 5.1. Cartesian coordinates
     Easting 514884, Northing 130983
   - 5.2. Address
     Land at Wickhurst Green, Broadbridge Heath, West Sussex, RH12 3LT
   - 5.3. ///what3words
     clip.ladder.rooms

KEY:

Site Boundary

Revision History					
P01	FOR INFORMATION	OT	BB	HJ	22.04.2025

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The Bridge
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London, SE1 0NQ

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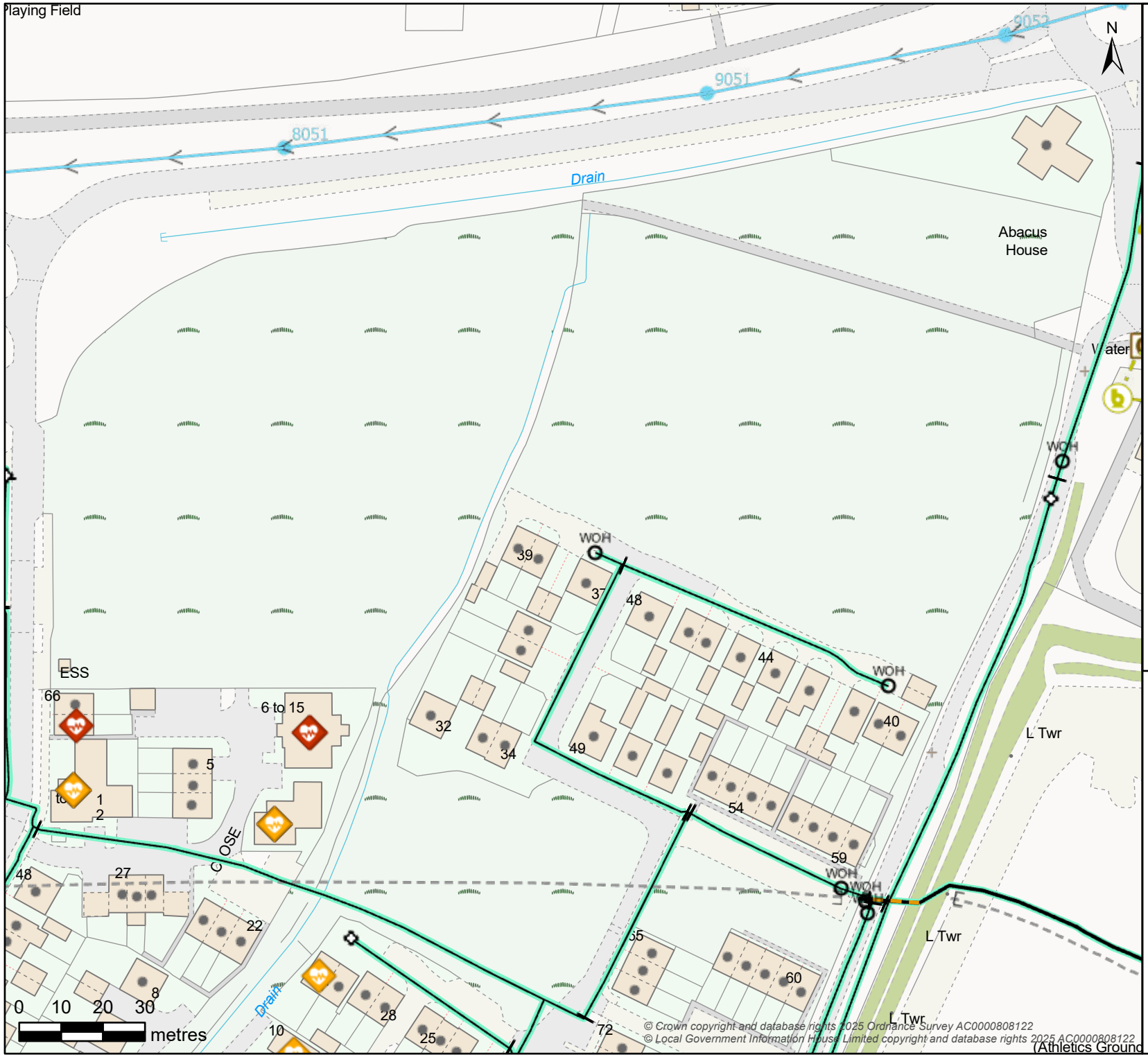
W: www.markidesassociates.co.uk

Project: WICKHURST GREEN	Status: PRELIMINARY	Scale: 1:1250 @ A3	Date: 22.04.2025
Drawing Title: PERMEABLE AND IMPERMEABLE AREAS	Client: COUNTRYSIDE PROPERTIES LTD	Drawn: OT	Checked: BB / Approved: HJ
		Job No: 24184	Drawing No: 24184-MA-XX-XX-SK-C-0002 / Rev: P01

N:\24184 - Wickhurst Green, West Sussex\06. CAD-BIM\06.01 CADA. Preliminary\24184-MA-XX-XX-SK-C-0002 - Permeable and Impermeable Areas.dwg

APPENDIX E – SOUTHERN WATER SEWER RECORDS



Controllable Valve
Damboards | Penstock | Valve

Inlet-Outfall
Inlet | Outfall

Flow Control
Anti Flood Device | Pumped Anti Flood Device | Reflux Valve

Outfall Headworks
Outfall Headworks

Manhole
BIF Bifurcation | Cascade | CP Catchpit | Head Of Public Sewer
IC Interceptor Chamber | Manhole | S Soakaway | WO Washout

Overflow Chamber
CSO Combined Sewer Overflow | EMO Emergency Overflow

Pipe Bridge
Pipe Bridge

Pumping Station
Micro Pumping Station | Pumping Station

Sewer Level Monitor
Sewer Level Monitor

Storage
Storm Tank | Tidal Storage Tank

Treatment Works
Treatment Works

Weir
Weir

Wastewater Site
Wastewater Site

Developer Services
Build Over Agreement | Section 104

Wastewater Pipe
Culverted Water Course | Drain | Outfall | Overflow | Rising Main | Sewer
Syphon | Tank Sewer | Trunk Sewer | Vacuum Main | Decommissioned Pipe

Wastewater Use
Foul | Combined | Sludge | Treated Effluent | Surface Water | Private

Wastewater Area
Catchment | Sub-Catchment

Map Title: SW Print

Printed By: Ruby.Bernard

Date Printed: 24/03/2025

Map Scale: 1250

WATER for LIFE from Southern Water.

APPENDIX F – PROPOSED DRAINAGE LAYOUT