RIBA Stage 2
FRA and SuDS Strategy
6 Lindfield Gardens

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Contents:

Executive Summary
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Overview

Eight Associates has been appointed to carry out a sustainable drainage systems (SuDS) strategy for the proposed development at 6 Lindfield Gardens (NW3 6PU) in the London Borough of Camden. The total site area is approximately 1,184m^2 or 0.1184 ha.

Flood risk assessment

A Flood Risk Assessment (FRA) has been undertaken on the development, in accordance with all relevant best-practice guidance, along with local planning policy guidance. The overall flood risk of the site has been confirmed as low. The flood risk has been identified as low from the following sources:

- Rivers and sea – very low flood risk;
- Pluvial (surface water) – very low flood risk;
- Groundwater – very low flood risk;
- Artificial sources – very low flood risk.

Sustainable drainage systems

A SuDS strategy has been proposed for the development in accordance with all relevant best-practice guidance and the principles of the sustainable drainage hierarchy, along with local planning policy requirements. The suitability of specific SuDS components has been evaluated based on the site and development proposals. A number of SuDS components are proposed as part of a surface water drainage strategy has been for the site, specifically:

- Pervious paving.
- Attenuation storage.
- Flow control device to limit rate of discharge from site.

Preliminary hydraulic modelling of the proposed development site has been undertaken based on a notional surface water drainage network, using the hydraulic modelling software, Flow. The preliminary hydraulic modelling demonstrates that the proposed SuDS components would be viable for the surface water drainage strategy for the site, in order to achieve the targeted discharge rates, whilst mitigating flood risk to the site and surrounding area. Targeted discharge rates are subject to change, following the review and verification by a structural/drainage engineer during the detailed design stages.

The proposed SuDS components will allow the development to meet surface water management requirements for water quantity, whilst also providing a range of additional benefits for water quality, biodiversity and ecological value, amenity value, and health and wellbeing of residents.

An outline management plan has been developed for the proposed SuDS components, providing indicative schedules of monitoring, management and maintenance activities to be implemented after handover of the development. Note that a detailed management plan will be developed during the detailed design stages. Where applicable, guidance on management and maintenance from system manufacturer's must be adhered to.

Introduction
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Introduction

Eight Associates has been appointed to develop a sustainable drainage systems (SuDS) strategy for the proposed development at 6 Lindfield Gardens The report will evaluate the suitability of the development site for incorporation of SuDS within the development proposal. Specific SuDS components will be recommended based on their suitability to manage surface water runoff within the constraints of the development.

About the scheme

The total site area is approximately 1,184m^2 or 0.1184 ha. The site is a brownfield site, with a large residential dwelling, surrounded by hard landscaping and a garden. Within the garden there is also an outbuilding.

The proposals comprise of renovating and extending the existing development to provide 9 individual flats and upgrade the existing hard landscaping. The development is located in the London Borough of Camden (NW3 6PU).

Planning Context

National Planning Policy Framework

The National Planning Policy Framework (NPPF) requires that all local planning authorities ensure that proposed developments do not increase the potential for flood risk on a site. The NPPF not only requires that flood risk is minimised, but that the development is appropriately flood resilient, giving priority to the use of sustainable drainage systems (SuDS).

As a result of this, all new developments should utilise SuDS unless there are practical reasons for not doing so. The proposed site should ensure runoff rates are sufficiently managed and not increased as a result of the development, with the aim of achieving greenfield runoff rates where feasible.

The Intend to Publish London Plan

The London Plan is the spatial development strategy, developed by the Mayor of London and the Greater London Authority (GLA), for the 32 London boroughs and the City of London. Policy SI13 relates to SuDS, this requires the below are considered:

- Development proposals should aim to achieve greenfield runoff rates and manage surface water runoff as close to its source as possible, in accordance with the sustainable drainage hierarchy.
- There should be a preference for 'green' over 'grey' features and the delivery of multi-benefits from SuDS features.
- Proposals for impermeable paving should be refused, unless they can be shown to be unavoidable (including on small areas such as front gardens and driveways).

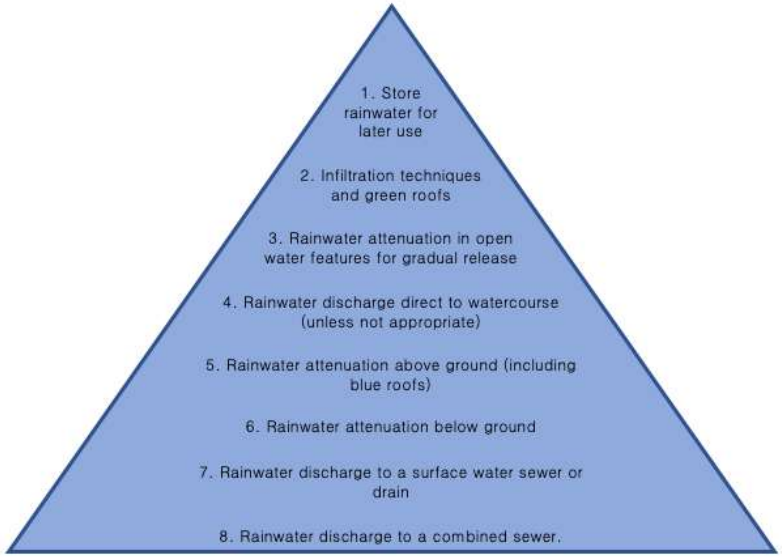

Figure 1: Sustainable drainage hierarchy

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Sustainable Design and Construction SPG 2014

This GLA document provides guidance to London boroughs and developers on design and construction measures that may be implemented to meet London Plan requirements, including guidance on the following:

- Specific conditions and consideration on flood risk to basements, along with recommended mitigation measures.
- Climate change resilience, including increased rainfall intensities and rising sea levels.
- Major developments for pre-developed sites must achieve at least 50% attenuation of pre-development surface water runoff at peak times.
- There may be situations where it is not appropriate to discharge at greenfield runoff rates (i.e. where the calculated greenfield runoff rate is extremely low and the final outfall of a piped system would be prone to blockage); in this instance an appropriate minimum discharge rate would be 5 l/s per outfall.
- Site conditions that should be considered when assessing the suitability of SuDS include potential contaminants, catchment area, local hydrology and development type.
- Infiltration SuDS proposals should consider soil permeability, ground stability, depth to water table, soil attenuation, potential contaminants and local hydrology.

Camden Local Plan

The Camden Local Plan 2017 sets out the spatial vision and plan for the future of the borough and how it will be delivered. The following policy specifically address and SuDS:

Policy CC3 Water and flooding

The Council will seek to ensure that development does not increase flood risk and reduces the risk of flooding where possible. The Council will require development to:

- Incorporate water efficiency measures;
- Avoid harm to the water environment and improve water quality;
- Consider the impact of the development in areas at risk of flooding (including drainage);
- Incorporate flood resilient measures in areas prone to flooding;
- Utilise Sustainable Drainage Systems (SuDS) in line with the drainage hierarchy to achieve a greenfield run-off rate where feasible; and
- Not locate vulnerable development in flood-prone areas.

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Site Location

The 6 Lindfield Gardens development site (NW3 6PU) is in a highly residential area and is bound on both sides by residential dwellings. (Figure 2).

The total site area is approximately 1,184m^2. The existing site is partly developed with hardstanding serving as a carpark, there is also an area of soft landscaping (Figure 2). The existing site is considered to be largely impermeable and may not be positively drained as there is currently no foul or surface water drainage network on the site and no dedicated sustainable drainage systems (SuDS).

The underlying geological characteristics of the surrounding area have been determined using the British Geological Survey's 'Geology of Britain Viewer':

- Bedrock geology – London City Formation (clay, silt and sand)
- Superficial geology – Not available

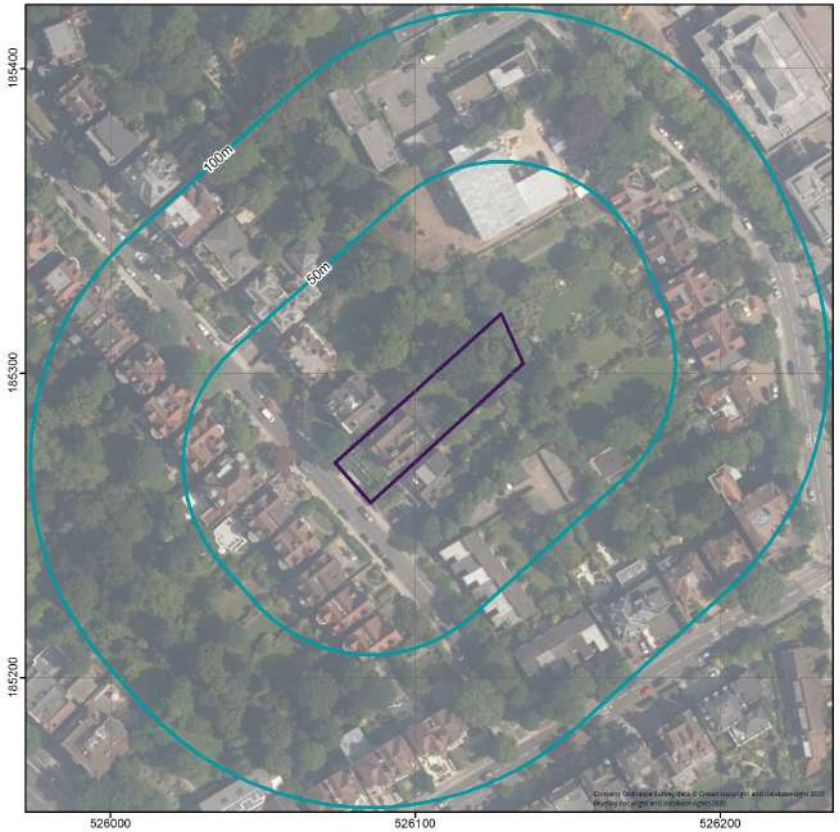

Figure 2: Map showing location of development site

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Site topography

A topographical survey of the site has been undertaken. The topographical plan in Figure 3 confirms the site is on a slope, with ground levels dropping in a south–westerly direction. The highest point of the site is towards the east and is approximately 14.390mAOD and drops steeply from the main building to the road.

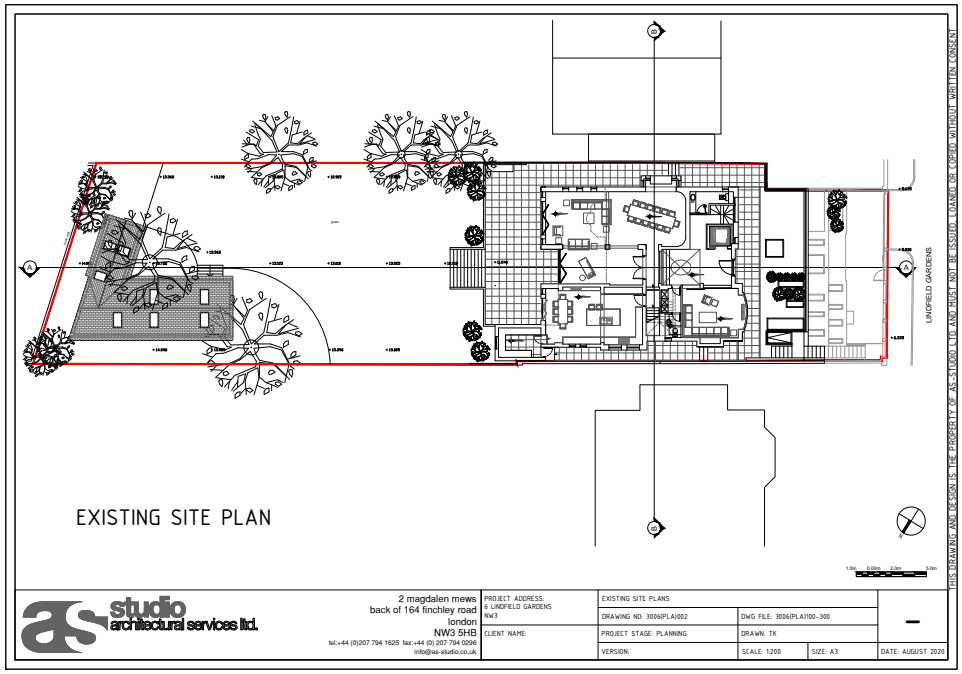

Figure 3: Topographical plan of the development site

Development proposals

The proposals comprise of renovating and extending the existing development to provide 9 individual flats and upgrade the existing hard landscaping. The development is located in the London Borough of Camden (NW3 6PU).

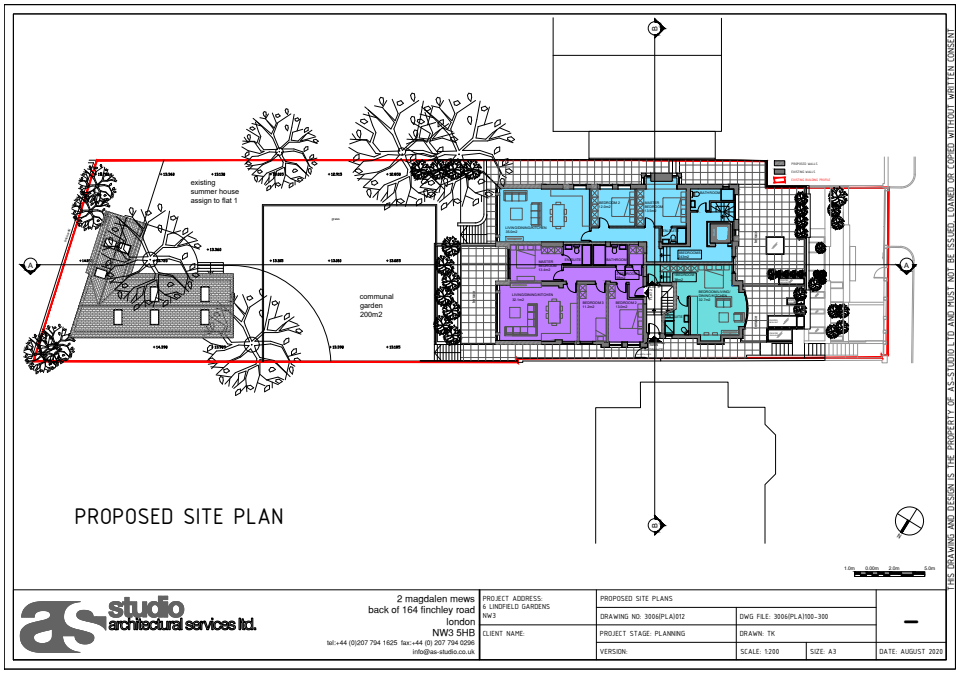

Figure 4: Proposed development site plan

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Annual probability of flooding

The Environment Agency's Flood Map for Planning confirms that the site is in flood zone 1; 'an area with a low probability of flooding' (Figure 5). Flood zone 1 comprises areas assessed as having a 1% AEP (1 in 100 years) or less annual probability of flooding from rivers and the sea. The full Environment Agency Flood Map for Planning report is given in Appendix A.

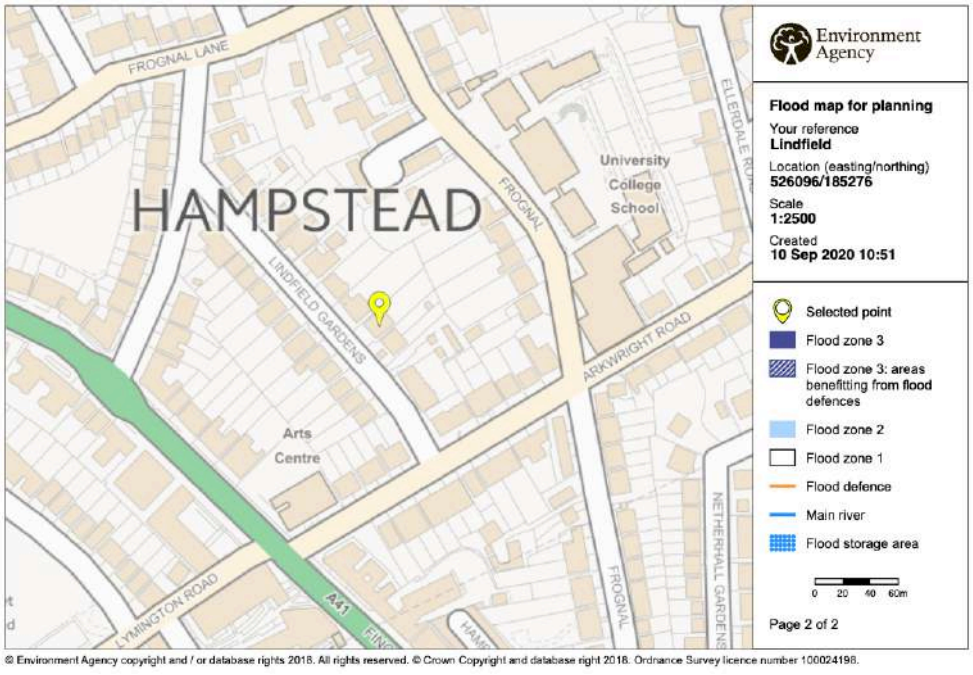

Figure 5: Environment Agency flood map for planning

Flood risk from rivers and sea

In accordance with Environment Agency's Risk of Flooding from Rivers and the Sea mapping tool, the development site has a very low risk of flooding from rivers and the sea (Figure 6). The annual probability of flooding from the rivers and the sea is less than 1 in 1,000 (<0.1% AEP).

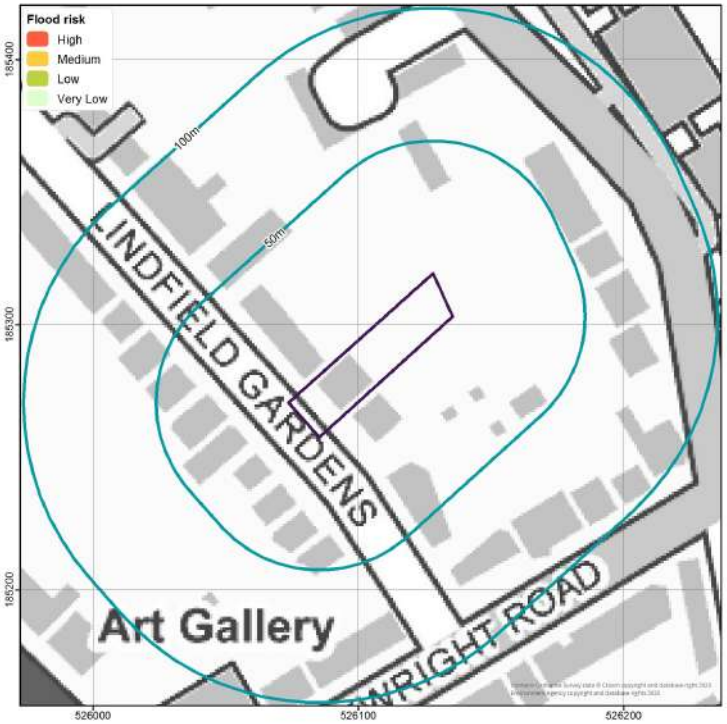

Figure 6: Environment Agency risk of flooding from rivers and the sea map

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Surface water (pluvial)

In accordance with the Environment Agency's Risk of Flooding from Surface Water mapping tool, the development site is at a very low risk of flooding from surface water (pluvial) sources (Figure 7).

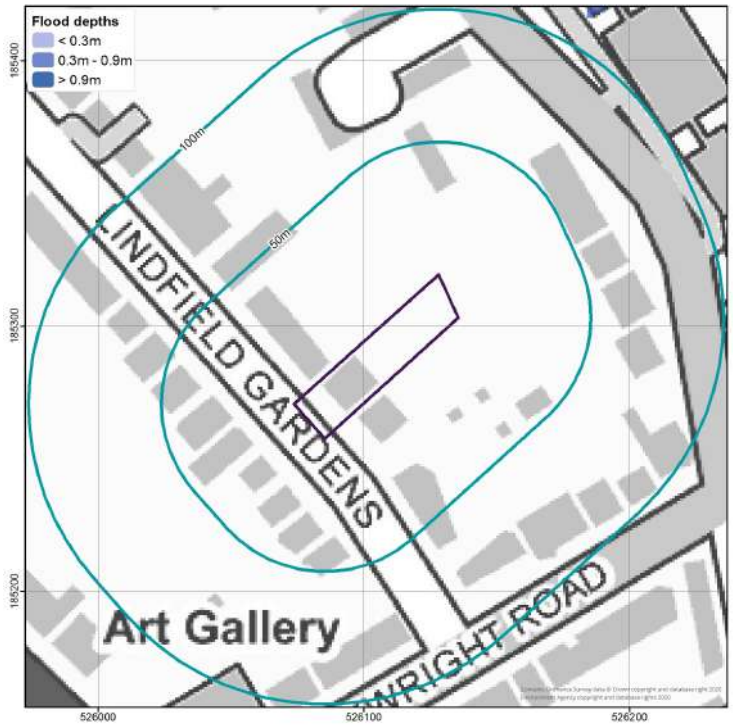

Figure 7: GeoSmart risk of flooding from surface water map

Groundwater

GeoSmart's Groundwater Flood Risk (GW5) map (Figure 8) indicates that the development site is considered to be at negligible risk of groundwater flooding. Further investigation may be required, including surveying of ground conditions at the site, to confirm the site-specific geological and groundwater conditions with respect to groundwater flood risk if infiltration SuDS are proposed.

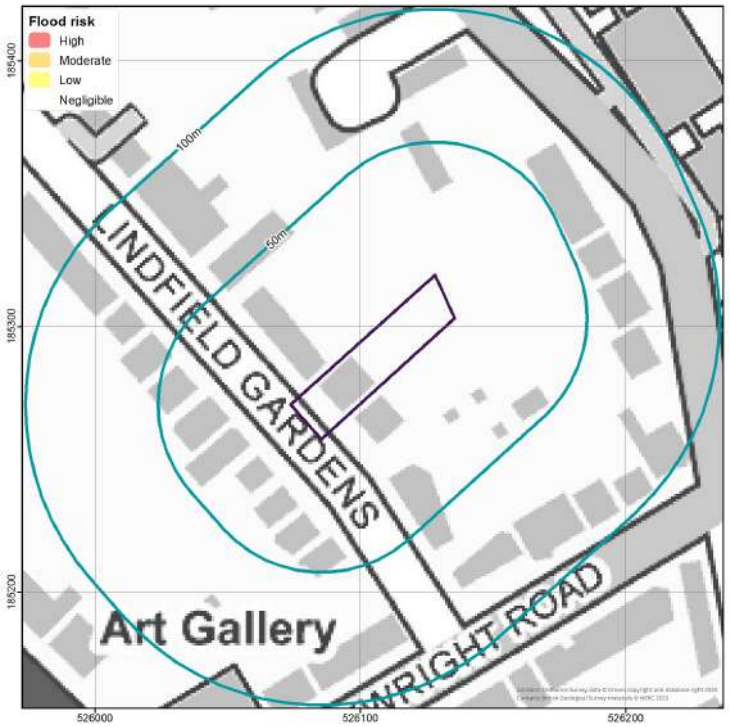

Figure 8: GeoSmart Groundwater Flood Risk (GW5) map

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Artificial sources of flooding

The flood risk from artificial sources has been assessed using the London Borough of Camden Strategic Flood Risk Assessment (SFRA) and the Government website 'Check your long-term flood risk'. The SFRA was used to determine any historic flooding from internal or external sewers, shown in Figures 9 and 10, whilst the 'Check your long-term flood risk page' was used to determine risk of flooding from reservoirs. In all instances, risk to the site was very low.

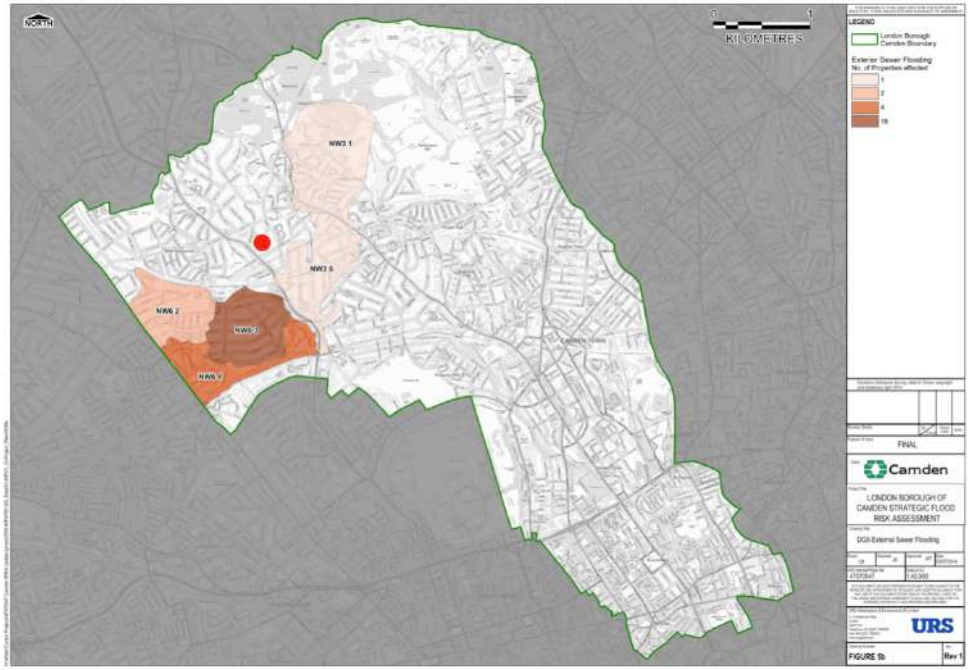

Figure 9: London Borough of Camden SFRA – External sewer flooding (site is shown by red circle)

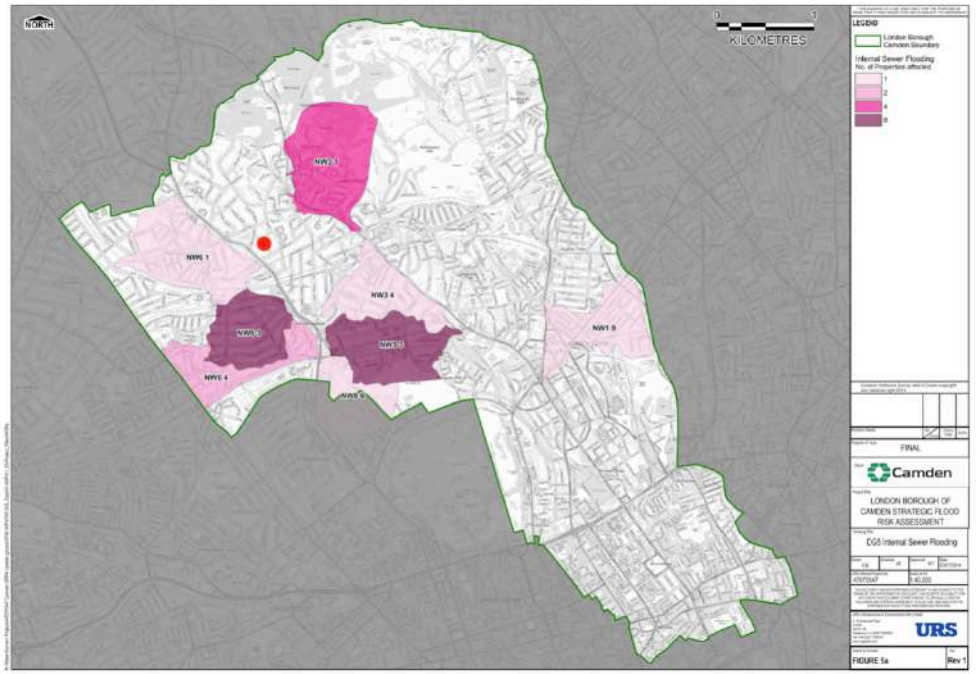

Figure 10: London Borough of Camden SFRA – Internal sewer flooding (site show by red circle)

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Site vulnerability

National and local planning policy requires that all developments should consider the vulnerability of building users when carrying out flood risk assessments. In accordance with current Environment Agency guidance and the National Planning Policy Framework (NPFF) 2019, areas of the proposed development are considered to be 'more vulnerable'.

The sequential test

Planning policy and the NPFF typically requires that new developments must undertake a sequential test, if they are located in Flood Zone 2 or 3, or if a sequential test has not already been carried out for a development of the same type at the development site. However, a development is not required to undertake a sequential test if one has already been carried out for the same type of development at the site; the development is a minor development; the development involves the change of use; or is located in Flood Zone 1 (provided there are no other flooding issues in the area).

The development is a major development and is located in Flood Zone 1, therefore a sequential test is not required.

The exception test

Planning policy requires that new developments must undertake an exception test, if they meet the specific flood risk vulnerability and Flood Zone classifications outlined in Table 1, in order to confirm that the site and its users are safe if the site is at risk of flooding.

As the site is considered 'more vulnerable' but is within Flood Zone 1, the proposed development may proceed without an exception test being carried out, see Table 1.

Table 1: Flood risk vulnerability and Flood Zone 'compatibility' for the exception test

Flood Zones	Flood risk vulnerability classification				
	Essential infrastructure	Highly vulnerable	More vulnerable	Less vulnerable	Water compatible
Flood Zone 1	✓	✓	✓	✓	✓
Flood Zone 2	✓	Exception test required	✓	✓	✓
Flood Zone 3a	Exception test required	X	Exception test required	✓	✓
Flood Zone 3b	Exception test required	X	X	X	✓

✓ Development permitted

X Development not permitted

Flood risk conclusions

The development site is located in Flood Zone 1 and therefore is not required to undertake the sequential test or exception test. The risk of flooding to the development site, from specific common sources of flooding, has been assessed. The risk from the respective sources of flooding is as follows:

- Rivers and the sea – very low risk;
- Pluvial (surface water) – very low risk;
- Groundwater – negligible risk;
- Artificial sources – very low risk.

The Camden SFRA historic flood maps have been reviewed to determine any previous flood events at the site and it is concluded that there have been no recorded floods at the site (Appendix I).

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Introduction to SuDS

Sustainable drainage systems (SuDS) are drainage systems designed to maximise the opportunities and benefits that can be secured from surface water management. SuDS are considered to be environmentally beneficial due to their ability to manage water and flood risk within the urban and built up environment, and take account of water quality by minimising water pollution, whilst also providing the opportunities for improvements in biodiversity and amenity space for the local community.

SuDS are able to replicate the natural environment, capturing rainfall and slowing down water at its source, whilst having the ability to allow water to infiltrate and provide water storage, to slow down runoff into streams and rivers.

The SuDS Manual highlights the importance of SuDS design providing a number of benefits to the sustainability of the site (see Figure 11). In addition to slowing down water runoff and reducing flood risk, SuDS can also protect the ecology and natural hydrological systems on and surrounding the site; prevent water pollution to allow the system to be resilient for future change; create biodiverse green spaces to contribute to habitat connectivity and supporting local biodiversity; and provide a social place for the local community that can enhance the visual character of a space in a safe environment.

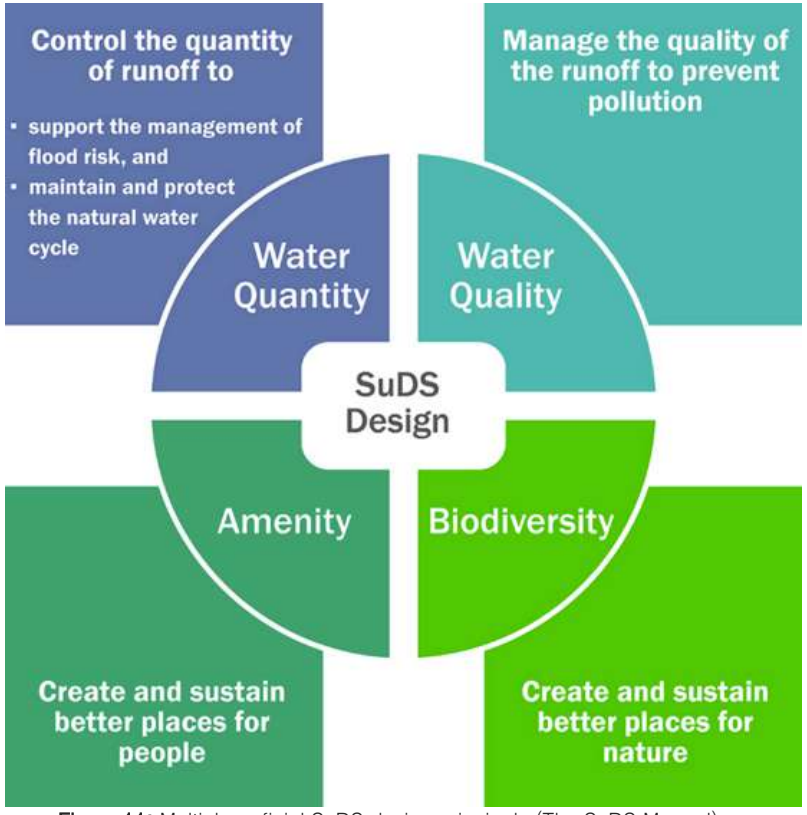

Figure 11: Multi-beneficial SuDS design principals (The SuDS Manual)

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SuDS Guidance and principles

The SuDS Manual is published guidance by CIRIA, written by a series of experts, and based on existing guidance and research in the UK and internationally. The CIRIA guidelines within the SuDS Manual, and UKSuDS tools have been used to as a guideline for the evaluation of SuDS suitability and to develop a SuDS strategy for the development.

To comply with current best practice, the drainage system should:

1. Manage runoff at or close to its source;
2. Manage runoff at the surface;
3. Be integrated with public open space areas and contribute towards meeting the objectives of the urban plan;
4. Be cost-effective to operate and maintain.

The drainage system should endeavour to ensure that, for any particular site:

1. Natural hydrological processes are protected through maintaining interception of an initial depth of rainfall and prioritising infiltration, where appropriate;
2. Flood risk is managed through the control of runoff peak flow rates and volumes discharged from the site;
3. Stormwater runoff is treated to prevent detrimental impacts to the receiving water body as a result of urban contaminants.

In addition, it is desirable to maximise the amenity and ecological benefits associated with the drainage system where there are appropriate opportunities. Many SuDS components are green infrastructure features and can provide health benefits and reduce the vulnerability of developments to the impacts of climate change.

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SuDS guidance and principles

The GeoSmart SuDS Infiltration Suitability map screens the potential for infiltration drainage at the site. The map combines information on the thickness and permeability of the underlying material. The map indicates that there is a low potential for infiltration SuDS at the site (Figure 12). Further investigations may be undertaken, including testing of infiltration rates at the site, to confirm the viability of infiltration.

Figure 12: GeoSmart SuDS infiltration suitability (SD50) map

Source Protection Zones

An assessment of the Environment Agency's groundwater Source Protection Zones (SPZs) within the vicinity of the development site has been undertaken (Figure 13). The site is not within a SPZ, therefore, if suitable, infiltration to the ground would be likely to be acceptable providing suitable mitigation measures are in place if required to prevent an impact on water quality.

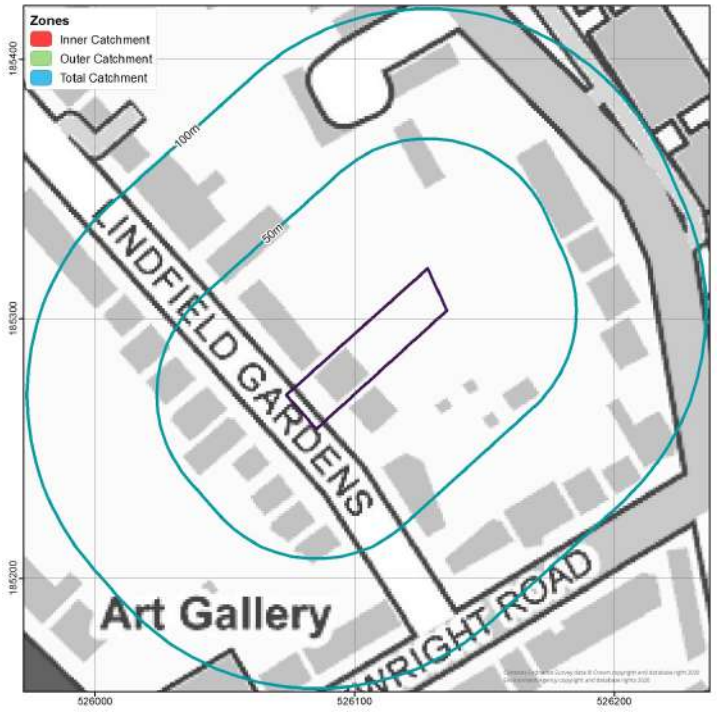

Figure 13: Source Protection Zones map

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Surface water features

The presence of potential surface water, foreshore and tidal water features in proximity to the site has been determined (Figure 14). The map shows the there are no surface water features within 100m of the development site, therefore, discharge to a surface water feature is unlikely to be appropriate.

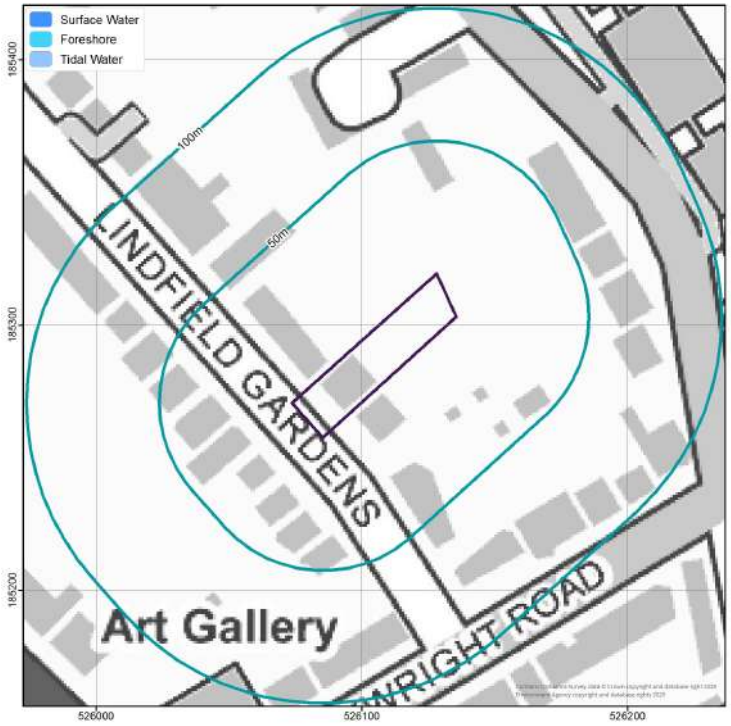

Figure 14: Surface water features map

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Sewer features

The location of sewer features in proximity to the site has been confirmed with a Regulated Drainage and Water Search (see Appendix B). The site is not within 100m of a public surface water sewer, therefore discharge from the site to the local surface water sewer is unlikely to be appropriate (see Figure 15). It has been noted that the site is within 50m of a public combined sewer within Lindfield Gardens.

Detailed analysis of the connections and condition of the public sewer systems should be undertaken by the future structural or drainage engineer, which may be confirmed by CCTV survey, and/or by consultation with the local sewerage undertaker. Confirmation of the sewer invert will be required to ensure that surface water can be discharged via gravity. Verification of the capacity of the public sewer and permission to connect and discharge to the sewer should be obtained from the local sewerage undertaker.

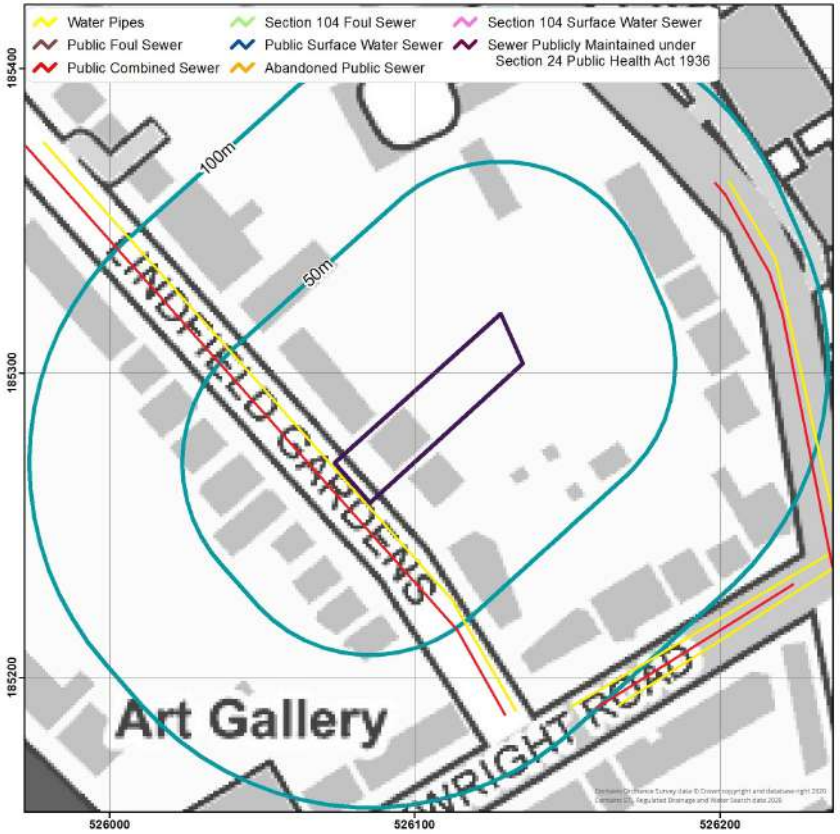

Figure 15: Map of sewer features in relation to the development site

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SuDS component feasibility

The site conditions and development proposals have been assessed for their suitability for different SuDS components. The following SuDS components are considered for the proposed development and are recommended based on their feasibility for the site.

Each SuDS component has been assessed under three broader categories. There are key criteria for each category on which the SuDS component is evaluated. The key criteria have been given a weighting based on a tick-system, an example representation of this is shown below:

✓✓✓✓✓= 3 scored out of a possible 5

The weighting of each of the criteria within the categories is shown below:

- Local area and site impact (maximum score of 10):
  - Local planning policy priority = ✓✓
  - Space required for component = ✓✓✓
  - Applicability with development design = ✓✓
  - Compatibility with geological conditions and flood risk = ✓✓✓
- Multi-beneficial design principles (maximum score of 10):
  - Water quantity = ✓✓✓✓
  - Water quality = ✓✓
  - Amenity = ✓✓
  - Biodiversity = ✓✓
- Capital cost, operation and maintenance (maximum score of 5):
  - Capital cost of component = ✓✓
  - Regular maintenance requirements = ✓✓
  - Impact of remedial actions = ✓

Key comments on each of the criteria and the corresponding score will be provided in a table (example below) for each of the SuDS components. The score for each of the criteria will be summed and each of the technologies will then be ranked. The assessment of each technology is undertaken on the following pages.

SuDS component	Local area and site impact	Multi-beneficial design principles	Capital cost, operation and maintenance
Example component	✓✓✓✓✓ ✓✓✓✓✓	✓✓✓✓✓ ✓✓✓✓✓	✓✓✓✓✓

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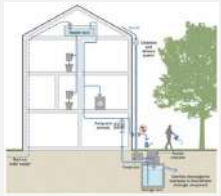
Rainwater harvesting system

A rainwater harvesting system collects and stores rainwater for use in a development. Systems range from small-scale rainwater storage butts for irrigation, to large-scale systems to serve non-potable (and in some cases, potable) uses within a building. Rainwater harvesting systems intercept surface water from roofs and can be designed to reduce the runoff volume of a development, via recycling and reuse to meet water demand on-site.

SuDS component	Local area and site impact	Multi-beneficial design principles	Capital cost, operation and maintenance
Rainwater harvesting system 	✓✓✓✓✓ ✓✓✓✓✓ Policy priority. Space required for storage tank(s). Residential use likely to meet demand. Ground/flood compatible.	✓✓✓✓✓ ✓✓✓✓✓ Control runoff volumes from roofs. Treatment for internal non-potable use. No direct amenity or biodiversity benefits.	✓✓✓✓✓ Relatively high capital cost. Regular maintenance and inspection required.

Green roof

A green roof is a roof of a building that is covered with a growing medium and vegetation, planted over a waterproofing membrane. Green roofs intercept rainfall and may facilitate flow control, attenuation and treatment of surface water. Green roofs may be particularly beneficial in high-density, urbanised areas, where there are otherwise limited opportunities for incorporating SuDS in landscaping. Green roofs provide additional benefits for biodiversity and reducing the urban heat island effect.

SuDS component	Local area and site impact	Multi-beneficial design principles	Capital cost, operation and maintenance
Green roof 	✓✓✓✓✓ ✓✓✓✓✓ Policy priority. Some roof areas may be feasible. Pitched roofs and solar PV panels proposed so traditional system types not viable. Ground/flood compatible.	✓✓✓✓✓ ✓✓✓✓✓ Runoff rate/volume control only for small rainfall events. Limited treatment functions provided. Amenity benefits provided if visible. Significant biodiversity benefits provided.	✓✓✓✓✓ Relatively low capital cost. Regular maintenance and inspection required.

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Infiltration system

Infiltration system types include:

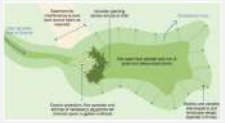
- Soakaway – sub-surface storage structure (typically rubble-filled voids beneath lawns) that stores runoff from a single house or development and allows for efficient infiltration into adjacent soil.
- infiltration trench – trench filled with permeable granular material, designed to promote infiltration of water to the ground.

Infiltration systems should be located at least 5m from all buildings and roads and at least 3m from the site boundary. The viability of infiltration should be validated with site investigations confirming groundwater levels (which should remain a minimum of 1m below the base of any infiltration systems) and infiltration rates (in accordance with BRE Digest 365).

SuDS component	Local area and site impact	Multi-beneficial design principles	Capital cost, operation and maintenance
Infiltration system 	✓✓✓✓✓ ✓✓✓✓✓ Policy priority. Must be 5m from buildings/roads. Infiltration capacity and ground water levels must be verified.	✓✓✓✓✓ ✓✓✓✓✓ Excellent runoff rate/ volume control. Limited treatment functions provided. No direct amenity or biodiversity benefits.	✓✓✓✓✓ Relatively low capital cost. Regular maintenance and inspection required. Pre-treatment sediment removal required.

Infiltration basin

An infiltration basin is a vegetated basin or depression, which is designed to promote infiltration and is typically dry, except in periods of heavy rainfall.

SuDS component	Local area and site impact	Multi-beneficial design principles	Capital cost, operation and maintenance
Infiltration basin 	✓✓✓✓✓ ✓✓✓✓✓ Policy priority. Significant space requirement. Infiltration capacity and ground water levels must be verified.	✓✓✓✓✓ ✓✓✓✓✓ Excellent runoff rate/ volume control. Limited treatment functions provided. Good amenity benefits. Good biodiversity benefits.	✓✓✓✓✓ Relatively low capital cost. Regular maintenance and inspection required.

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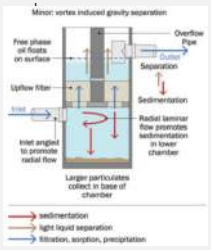
Proprietary treatment system

A proprietary treatment system is a manufactured product that removes specified pollutants from surface water runoff. They are often useful where site constraints preclude the use of other methods. System types include:

- Treatment channels.
- Hydrodynamic or vortex separators.
- Proprietary filtration systems.
- Oil separators.
- Multi-process systems.

SuDS component	Local area and site impact	Multi-beneficial design principles	Capital cost, operation and maintenance
Proprietary treatment 	✓✓✓✓✓ ✓✓✓✓✓ Small space requirement. Ground/flood compatible.	✓✓✓✓✓ ✓✓✓✓✓ Treatment functions provided. May be combined with flow rate control. No direct amenity or biodiversity benefits.	✓✓✓✓✓ Moderate capital cost. Regular maintenance and inspection required. Pre-treatment may be required.

Filter strip

Filter strips are gently sloping, vegetated strips of land that that treat runoff by filtering and promoting the settlement of pollutants, commonly installed in proximity to impermeable surfaces (for instance roads and car parks). They may be used as a pre-treatment component before swales, bioretention systems and trenches or a treatment component (where the flow path length across the strip is sufficient).

SuDS component	Local area and site impact	Multi-beneficial design principles	Capital cost, operation and maintenance
Filter strip 	✓✓✓✓✓ ✓✓✓✓✓ Significant space requirement. Best-suited for use adjacent to large impermeable surfaces.	✓✓✓✓✓ ✓✓✓✓✓ Limited runoff rate/volume control. Moderate treatment functions provided. Moderate amenity benefits. Moderate biodiversity benefits.	✓✓✓✓✓ Relatively low capital cost. Infrequent maintenance and inspection required. May provide pre-treatment function.

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Filter drain

Filter drains are shallow trenches, filled with stone or gravel, and constructed slightly below the adjacent ground surface. Filter drains are typically most effective when installed alongside impermeable areas such as roads and car parks, to attenuate water runoff in a storm event, whilst also providing a treatment function.

SuDS component	Local area and site impact	Multi-beneficial design principles	Capital cost, operation and maintenance
Filter drain	✓✓✓✓✓ ✓✓✓✓✓ Best-suited for use adjacent to large impermeable surfaces. Compatible with contaminated land/ high groundwater levels.	✓✓✓✓✓ ✓✓✓✓✓ Limited runoff rate/volume control. Good treatment functions provided. No direct amenity or biodiversity benefits.	✓✓✓✓✓ Relatively low capital cost. Regular maintenance and inspection required. Risk of blockages/ pollutant build up.

Swale

Swales are linear vegetated drainage features that convey and attenuation surface water, along with in some instances facilitating infiltration and providing pollutant control by allowing settlement. Swales intercept rainfall and may facilitate flow control and volume reduction (via infiltration, where viable), along with conveying water to the on-site drainage network. Check dams and berms can also be installed along a swale to incorporate attenuation storage, and promote settling and infiltration.

SuDS component	Local area and site impact	Multi-beneficial design principles	Capital cost, operation and maintenance
Swale 	✓✓✓✓✓ ✓✓✓✓✓ Moderate space requirement. Compatible with contaminated land/ high groundwater levels (if lined).	✓✓✓✓✓ ✓✓✓✓✓ Good runoff rate/volume control. Moderate treatment functions provided. Good amenity benefits. Good biodiversity benefits.	✓✓✓✓✓ Relatively low capital cost. Regular maintenance and inspection required. Inlets, culverts and outlets need to be cleared.

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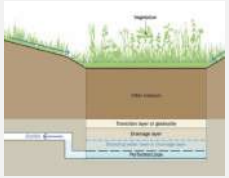
Bioretention system

Bioretention systems are shallow vegetated landscaped depressions, which are typically under drained and constructed with engineered soils. Bioretention systems are typically referred to as rain gardens, when constructed on a small scale, without engineered soils. Bioretention systems intercept rainwater (typically at least the first 5mm) and facilitate flow control and volume reduction (via infiltration, where viable) from frequent and smaller rainfall events, along with filtering sediment and pollutants from surface water. Plant species that are tolerant to inundations should be selected to optimise performance of the system.

SuDS component	Local area and site impact	Multi-beneficial design principles	Capital cost, operation and maintenance
Bioretention system 	✓✓✓✓✓ ✓✓✓✓✓ Small space requirement. Compatible with contaminated land/ high groundwater levels (if lined).	✓✓✓✓✓ ✓✓✓✓✓ Moderate runoff rate/volume control. Good treatment functions provided. Good amenity benefits. Moderate biodiversity benefits.	✓✓✓✓✓ Relatively low capital cost. Regular maintenance and inspection required.

Pervious paving

Pervious paving may be used for the construction of otherwise impermeable surfaces (i.e. roads (typically with speeds less than 30 mph), car parks, patios and pedestrian pathways), with materials that allow infiltration to a subsurface medium, from where water may be infiltrated to the ground or piped to the surface water drainage network. Pervious paving includes:

- Porous paving – paving that infiltrates water across the entire surface.
- Permeable paving – paving that infiltrates water through the gaps between solid blocks.

SuDS component	Local area and site impact	Multi-beneficial design principles	Capital cost, operation and maintenance
Pervious paving 	✓✓✓✓✓ ✓✓✓✓✓ Compatible with hard landscaping proposals. Compatible with contaminated land/ high groundwater levels (if lined).	✓✓✓✓✓ ✓✓✓✓✓ Good runoff rate/volume control. Good treatment functions provided. Low direct amenity or biodiversity benefits.	✓✓✓✓✓ Relatively low capital cost. Regular maintenance and inspection required. Risk of clogging with poor maintenance.

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Attenuation storage

Attenuation storage may be provided to temporarily store runoff volumes prior to discharge from the site. An attenuation storage structure may be located under external landscaping areas, or within a proposed building. Runoff from the roof and any other impermeable surfaces may be collected and stored in the structure. Types of storage structure include:

- Geocellular storage structure (typically modular plastic units).
- Oversized concrete, plastic or corrugated steel pipes.
- Precast or in situ concrete panel structures and tanks.
- Glass-reinforced plastic (GRP) tanks.

SuDS component	Local area and site impact	Multi-beneficial design principles	Capital cost, operation and maintenance
Attenuation storage 	✓✓✓✓✓ ✓✓✓✓✓ Large sub-surface space required (compatible beneath landscaping). May be compatible with high groundwater levels.	✓✓✓✓✓ ✓✓✓✓✓ Excellent runoff rate/volume control. No direct treatment functions provided. No direct amenity or biodiversity benefits.	✓✓✓✓✓ Relatively high capital cost. Regular maintenance and inspection required. Accessibility and maintainability key.

Detention basin

A detention basin is a surface storage basin or depression, that provides flow control through attenuation of surface water runoff. Detention basins are normally dry and in certain situations the land may also function as a recreational facility. However, basins can also be mixed, including both a permanently wet area for wildlife or treatment of the runoff and an area that is usually dry to cater for flood attenuation. They also facilitate some settling of particulate pollutants.

SuDS component	Local area and site impact	Multi-beneficial design principles	Capital cost, operation and maintenance
Detention basin 	✓✓✓✓✓ ✓✓✓✓✓ Large space required. May be compatible with high and vulnerable groundwater (if lined).	✓✓✓✓✓ ✓✓✓✓✓ Moderate runoff rate/volume control. Moderate treatment functions provided. Good amenity benefits. Moderate biodiversity benefits.	✓✓✓✓✓ Relatively low capital cost. Limited maintenance and inspection required.

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Pond/wetland

Ponds and wetlands can provide attenuation storage and treatment functions for surface water, at varying scales, along with promoting the ecological benefits of SuDS. A pond can perform the role of a retention pond or a detention pond. Wetlands comprise shallow ponds and marshy areas, covered almost entirely in aquatic vegetation. Wetlands detain flows for an extended period to allow sediments to settle, and to remove contaminates by facilitating adhesion to vegetation and aerobic decomposition. They also provide significant ecological benefits.

SuDS component	Local area and site impact	Multi-beneficial design principles	Capital cost, operation and maintenance
Pond/wetland 	✓✓✓✓✓ ✓✓✓✓✓ Policy priority when aligned with biodiversity objectives. Large space required. May be compatible with high and vulnerable groundwater (if lined).	✓✓✓✓✓ ✓✓✓✓✓ Good runoff rate/volume control. Good treatment functions provided. Excellent amenity benefits. Excellent biodiversity benefits.	✓✓✓✓✓ Relatively high capital cost due to large size. Moderate maintenance and inspection required. Vegetation management required.

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SuDS component evaluation

SuDS component	Local area and site impact	Multi-beneficial design principles	Capital cost, operation and maintenance	Total score	Proposed	Rationale
Rainwater harvesting system	✓✓✓✓✓ ✓✓✓✓✓	✓✓✓✓✓ ✓✓✓✓✓	✓✓✓✓✓	14 out of 25	No	Insufficient space for the demand
Green roof	✓✓✓✓✓ ✓✓✓✓✓	✓✓✓✓✓ ✓✓✓✓✓	✓✓✓✓✓	14 out of 25	No	Insufficient suitable roof space
Infiltration system	✓✓✓✓✓ ✓✓✓✓✓	✓✓✓✓✓ ✓✓✓✓✓	✓✓✓✓✓	13 out of 25	No	Low infiltration potential, insufficient space
Infiltration basin	✓✓✓✓✓ ✓✓✓✓✓	✓✓✓✓✓ ✓✓✓✓✓	✓✓✓✓✓	17 out of 25	No	Low infiltration potential, insufficient space
Proprietary treatment system	✓✓✓✓✓ ✓✓✓✓✓	✓✓✓✓✓ ✓✓✓✓✓	✓✓✓✓✓	13 out of 25	No	Low pollution hazard
Filter strip	✓✓✓✓✓ ✓✓✓✓✓	✓✓✓✓✓ ✓✓✓✓✓	✓✓✓✓✓	12 out of 25	No	Insufficient space
Filter drain	✓✓✓✓✓ ✓✓✓✓✓	✓✓✓✓✓ ✓✓✓✓✓	✓✓✓✓✓	13 out of 25	No	Insufficient space
Swale	✓✓✓✓✓ ✓✓✓✓✓	✓✓✓✓✓ ✓✓✓✓✓	✓✓✓✓✓	15 out of 25	No	Insufficient space

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SuDS component evaluation

SuDS component	Local area and site impact	Multi-beneficial design principles	Capital cost, operation and maintenance	Total score	Proposed	Rationale
Bioretention system	✓✓✓✓✓ ✓✓✓✓✓	✓✓✓✓✓ ✓✓✓✓✓	✓✓✓✓✓	17 out of 25	No	Insufficient space
Pervious paving	✓✓✓✓✓ ✓✓✓✓✓	✓✓✓✓✓ ✓✓✓✓✓	✓✓✓✓✓	15 out of 25	Yes	Suitable paving areas proposed
Attenuation storage	✓✓✓✓✓ ✓✓✓✓✓	✓✓✓✓✓ ✓✓✓✓✓	✓✓✓✓✓	12 out of 25	Yes	May be located under hard standing at the front of site
Detention basin	✓✓✓✓✓ ✓✓✓✓✓	✓✓✓✓✓ ✓✓✓✓✓	✓✓✓✓✓	14 out of 25	No	Insufficient space
Pond/wetland	✓✓✓✓✓ ✓✓✓✓✓	✓✓✓✓✓ ✓✓✓✓✓	✓✓✓✓✓	14 out of 25	No	Insufficient space

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SuDS Proposals

The suitability of specific SuDS components for the site has been evaluated. Based on this evaluation, and the sustainable drainage hierarchy, a number of SuDS components have been recommended, to be integrated in the site-wide SuDS design:

1. Store rainwater for later use – Not proposed: rainwater harvesting systems for the dwellings are not proposed. There is insufficient space on site to meet the demands of the development.
2. Infiltration techniques and green roofs – Not proposed: the site is in an area of low infiltration potential and there is insufficient roof space for a green roof. Most existing spaces are to be retained and used as amenity area or terraces.
3. Rainwater attenuation in open water features for gradual release – Not proposed: there is likely to be sufficient and suitable space on the site for the implementation of a retention pond.
4. Discharge rainwater direct to a watercourse – Not proposed: there are no watercourses located within 50m of the site, therefore discharge to a watercourse is not proposed.
5. Rainwater attenuation above ground (including blue roofs)– Not proposed: Available roof space is already allocated for terraces or amenity area.
6. Rainwater attenuation below ground (tanks or sealed water features for gradual release) – Proposed: there is sufficient space beneath the hardstanding at the site entrance for subsurface storage space, allowing for gradual release of water. Approximately 32m^3 of geocellular storage has been proposed.
7. Rainwater discharge to a surface water sewer or drain – Not proposed: there is no public surface water sewer within close proximity to the site, therefore discharge to a surface water sewer is not proposed.
8. Rainwater discharge to the combined sewer – Proposed: there is a public combined sewer within 50m of the site, within Lindfield Gardens. Discharge to this sewer is to be utilised.

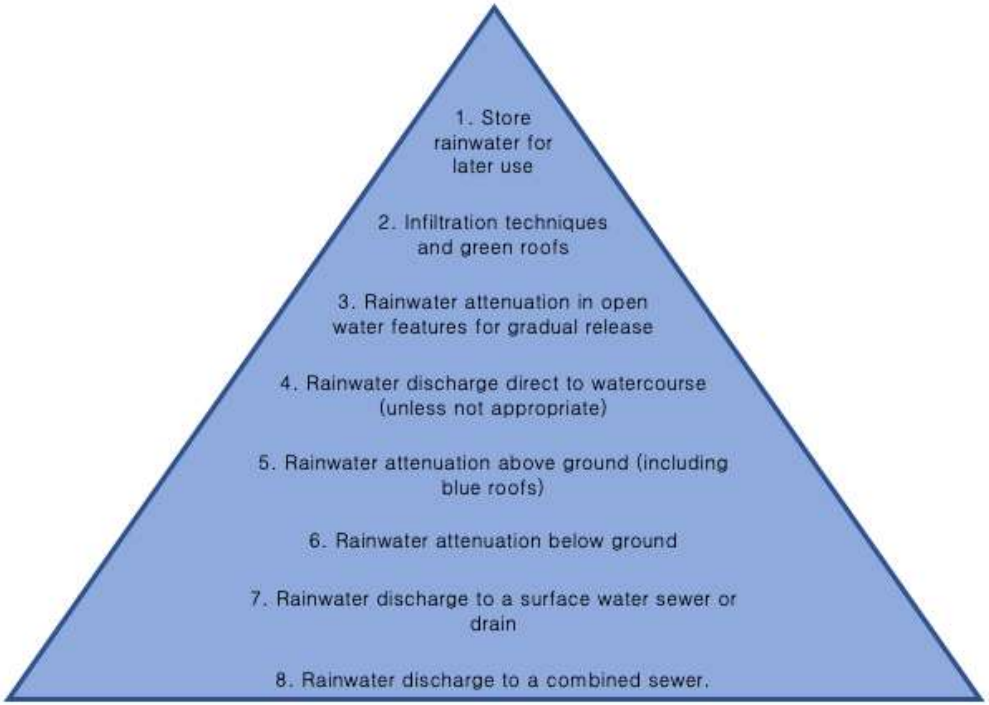

Figure 16: Sustainable drainage hierarchy

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Hydraulic design criteria

In accordance with local planning policy, the hydraulic design of the scheme will meet the following design principles:

Flood risk

The surface water drainage network will be designed so that flooding does not occur on any part of the site for a 1 in 30 year rainfall event (aside from areas specifically design to hold or convey water) and flooding does not occur in any part of a building for a 1 in 100 year event (with 40% climate change allowance).

Peak runoff flow control

The peak runoff rate for the 1 in 1 year, 1 in 30 year and 1 in 100 year rainfall events for the post-developed site will not exceed the pre-developed runoff rates from the site for the same rainfall events. A 50% betterment of the pre-developed runoff rates and rates as close as practicably possible to the greenfield runoff rates will be targeted.

Runoff volume control

The runoff volume for the 1 in 100 year (6 hour duration) rainfall event for the post-developed site will not exceed the pre-developed site runoff volume for the same event.

Water quality

All appropriate best-practice guidance for runoff pollution control will be following, to ensure that the water quality of any receiving water body will not be adversely affected by the development. As there are car parking areas proposed for the development, there is a potential pollution hazard.

Highway drainage

There will be no SuDS features proposed within existing highways or new proposed highways for adoption.

Climate change

The effects of climate change will be accounted for in calculations, with an allowance of 40% made for increased rainfall intensities for the 1 in 100 year rainfall event, in accordance with the latest guidance provided by the Environment Agency.

Urban creep

The potential future expansion within the development will be accounted for by making an allowance for urban creep of 10% within calculations.

Hydraulic modelling

Flow is a hydraulic modelling software for the design and analysis of surface water and foul water drainage networks. Flow has been used to calculate peak runoff rates and runoff volumes for the site and model a notional surface water drainage network and SuDS components. See Appendix C for the set of results reports from Flow.

Flow uses the EPA Storm Water Management Model (SWMM), which is a dynamic rainfall runoff simulation model used for single event or continuous simulation of runoff quantity and quality. SWMM conceptualises a drainage system as a series of water and material flows between major environmental compartments and a network of conveyance and storage elements. The functionality of the atmosphere, land surface and groundwater compartments are not directly accounted for in SWMM.

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Runoff rates

Greenfield and pre-development peak runoff rates have been calculated using Flow, in accordance with the best-practice estimation methods outlined in the SuDS Manual:

- Greenfield runoff rates using the Institute of Hydrology 124 (IH124) method.
- Pre-development runoff rates using the Modified Rational Method (MRM).

In accordance with local planning policy, for previously developed sites, the peak runoff rate for the 1 in 1 year, 1 in 30 year and 1 in 100 year rainfall events for the post-developed site must not exceed the pre-development runoff rates from the site for the same rainfall events and should be as close as reasonably practicable to greenfield runoff rates. It can be noted below that greenfield rates have been achieved through the proposals (Table 2). Note that the discharge rates targeted in this report are derived from preliminary hydraulic modelling, based on a notional surface water drainage network. Targeted discharge rates are subject to change, following the review and verification by a structural/drainage engineer during the detailed design stages.

Table 2: Greenfield, pre-development and post-development peak runoff rates

Return period	Greenfield peak runoff rates (l/s)	Pre-development peak runoff rates (l/s)	Post-development proposed discharge rates (l/s)	Betterment from pre-development peak runoff rates (l/s)
Q_{BAR}	0.5	–	–	–
Q1 (1 in 1 year)	0.4	0.8	0.4	50%
Q30 (1 in 30 year)	1.3	1.9	0.9	53%
Q100 (1 in 100 year)	1.7	2.4	1.2	50%
Q100 (1 in 100 year +40% cc)	–	–	1.8	25%

Runoff volumes

Greenfield and pre-development runoff volumes have been calculated using Flow, in accordance with the best-practice estimation methods outlined in the SuDS Manual:

- Greenfield runoff volumes using the Flood Studies Report (FSR) rainfall and Fixed Percentage Runoff Model (FSSR 16) method.
- Pre-development runoff volumes using the Modified Rational Method (MRM) and FSSR 16 method.

In accordance with local planning policy, for previously developed sites, the runoff volume for the 1 in 100 year (6 hour duration) rainfall event should be as close as reasonably practicable to the greenfield runoff volume for the same event, but should never exceed the runoff volume from the previously developed site. The proposed discharge volume is 35.5m^3, compared to the pre-development runoff volume of 45m^3 and 33m^3 for greenfield volume (Table 3). Note that a climate change allowance of 40% is included in the post-development discharge volume. Whilst greenfield volume has not been met, the run-off is as close as possible to greenfield volume given the constraints of the site.

Opportunities to reduce the runoff volume, via interception and evapotranspiration from new vegetated areas, have been optimised through the inclusion of green roofs. Rainwater harvesting systems and infiltration SuDS, which would further reduce the runoff volume, are not deemed to be suitable for the site, nor is there sufficient space for the provision of long-term storage.

Table 3: Greenfield, pre-development and post-development runoff volumes

Return period	Greenfield runoff volume (m^3)	Pre-development runoff volume (m^3)	Post-development proposed discharge volume (m^3)
Q100 (1 in 100 year, 6 hour duration)	33	43	35.5

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Surface water drainage model

Positively drained area

The total impermeable area of the proposed development is approximately 0.0959 ha and the total permeable area (green roof) is approximately 0.0082 ha. The total impermeable area is taken as the positively drained area for the surface water drainage model.

Drains, manholes and pipes

All drains, manholes and pipes will be designed in accordance with Building Regulations Part H and Sewers for Adoption 7th Edition. A notional series of drains, manholes and pipes has been developed to evaluate the surface water drainage potential for the proposed site.

Attenuation storage

It is estimated that a minimum storage volume of approximately 32m^3 would be required to temporarily store surface water runoff, prior to discharge from site at the allowable discharge rates. A geocellular storage structure has been proposed, subject to verification of ground suitability and system specification by a structural or drainage engineer. This attenuation storage structure should be installed after the entry point for runoff from all positively drained areas, but prior to the flow control device, limiting the final discharge rates from the site. The design of attenuation storage structures and associated infrastructure should seek to prevent a build-up of silt and other debris (e.g. by use of benching and low-flow channels) and should be designed to allow access for regular maintenance. Attenuation storage should be designed and constructed in accordance with the SuDS Manual (Chapter 21 'Attenuation Storage Tanks').

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Outline SuDS management plan

To ensure that SuDS features and components work effectively it is essential that they are adequately maintained and working to their expected capacity. A detailed site-specific SuDS management plan will be produced for the development, including responsibilities and a programme of maintenance works and inspections. An outline management plan for the proposed SuDS components is provided below. A template SuDS inspection and maintenance checklist form, which may be used to record the site inspections and management and maintenance actions undertaken, is provided in Appendix D to this report.

Management and maintenance of all surface water drainage and SuDS components within the curtilages of the properties will be the responsibility of the respective property owners, for the lifetime of the development. All surface water drainage and SuDS components outside of the property curtilages, but within the curtilages of the overall development site, will be the shared responsibility of the respective property owners and will be managed and maintained via a management agreement or similar contractual arrangement, for the lifetime of the development.

To ensure that the maintenance requirements and responsibilities for the proposed SuDS components are met, information will be made available to the first owners of each property in a clear and concise format to clarify their requirements. The developer shall be responsible for providing a framework management agreement for SuDS outside of the property curtilages, for the future property owners.

Management and maintenance requirements should be determined in accordance with all best-practice guidance and the SuDS Manual (Chapter 32: Operation and Maintenance), including:

a) Regular maintenance activities.
b) Occasional maintenance activities.
c) Remedial maintenance requirements.
d) Ongoing monitoring requirements.

All management, monitoring and maintenance activities should follow guidance from the SuDS system manufacturer, where applicable.

Drains, manholes and pipes

All drains, manholes and pipes should be constructed, operated and maintained in accordance with Building Regulations Part H, Sewers for Adoption 7th Edition and BS EN 752:2017 'Drain and sewer systems outside buildings'.

Pumping system and rising mains

The surface water pumping station system be constructed, operated and maintained in accordance with Building Regulations Part H, Sewers for Adoption 7th Edition and BS EN 16932-1:2018 'Drain and sewer systems outside buildings – Pumping systems'.

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Pervious paving

Maintenance schedule	Required action	Typical frequency
Regular maintenance	Brushing and vacuuming (standard cosmetic sweep over whole surface).	Once a year, after autumn leaf fall (or reduced frequency as required, based on site-specific observations of clogging or manufacturer's recommendations).
Occasional maintenance	Stabilise and mow contributing and adjacent areas.	As required.
	Removal of weeds or management using glyphospate applied directly into the weeds by an applicator.	As required – once per year on less frequently used pavements.
Remedial actions	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50mm of the level of the paving.	As required.
	Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users, and replace lost jointing.	As required.
	Rehabilitation of surface and upper substructure by remedial sweeping.	Every 10 to 15 years or as required (if infiltration performance is reduced due to significant clogging).

Pervious paving (continued)

Maintenance schedule	Required action	Typical frequency
Monitoring	Initial inspection.	Monthly for three months after installation.
	Inspect for evidence of poor operation and/or weed growth – if required, take remedial action.	Three-monthly, 48 hours after large storms in first six months.
	Inspect silt accumulation rates and establish appropriate brushing frequencies.	Annually.
	Monitor inspection chambers.	Annually.

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Attenuation storage structure

Maintenance schedule	Required action	Typical frequency
Regular maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action.	Monthly for 3 months, then annually.
	Remove debris from the catchment surface (where it may cause risks to performance).	Monthly.
	For systems where rainfall infiltrates into the tank from above, check surface of filter for blockage by sediment, algae or other matter; remove and replace surface infiltration medium as necessary.	Annually.
	Remove sediment from pre-treatment structures and/ or internal forebays.	Annually, or as required.
Remedial actions	Repair/rehabilitate inlets, outlet, overflows and vents.	As required.
Monitoring	Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed.	Annually.
	Survey inside of tank for sediment build-up and remove if necessary.	Every 5 years, or as required.

Flow control devices

Maintenance schedule	Required action	Typical frequency
Regular maintenance	Inspection of the device and filter for debris and sediment build-up.	Annually (and following poor performance).
	Cleaning of device inlet/outlet, chamber and sump.	Annually (and following poor performance).
Occasional maintenance	Cleaning and/or replacement of any filters.	Three monthly (or as required).
Remedial actions	Repair of flow control device.	As required.
Monitoring	Visual inspection within chamber to ensure that the device is in good condition and operating as designed.	Annually.
	Survey from inside of chamber for sediment build-up and remove if necessary.	Every 5 years, or as required.

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Flood risk

The site is located in flood zone 1 and the overall risk of flooding to the site is considered to be low. The risk from the assessed sources of flooding is as follows:

- Rivers and the sea – very low flood risk;
- Pluvial (surface water) – very low flood risk;
- Groundwater – very low flood risk;
- Artificial source – very low flood risk.

Sustainable drainage systems

A SuDS strategy has been proposed for the development in accordance with all relevant best-practice guidance and the principles of the sustainable drainage hierarchy, along with local planning policy requirements. The suitability of specific SuDS components has been evaluated based on the site and development proposals. A number of SuDS components are proposed as part of a surface water drainage strategy has been for the site, specifically:

- Pervious paving throughout;
- Geocellular attenuation storage with capacity of approximately 32m^3;
- Surface water to be discharged at controlled rate (to achieve a greenfield rates) from the site to the local public combined water sewer.

Preliminary hydraulic modelling of the proposed development site has been undertaken based on a notional surface water drainage network, using the hydraulic modelling software, Flow. The preliminary hydraulic modelling demonstrates that the proposed SuDS components would be viable for the surface water drainage strategy for the site, in order to achieve the targeted discharge rates, whilst mitigating flood risk to the site and surrounding area. Targeted discharge rates are subject to change, following the review and verification by a structural/drainage engineer during the detailed design stages.

An outline management plan has been developed for the proposed SuDS components, providing indicative schedules of monitoring, management and maintenance activities to be implemented after handover of the development. Note that a detailed management plan will be developed during the detailed design stages. Where applicable, guidance on management and maintenance from system manufacturer's must be adhered to.

Appendix A: Environment Agency Flood Map

FRA and SuDS Strategy

6 Lindfield Gardens

eight associates

+44 (0)207 0430 418

www.eightassociates.co.uk
info@eightassociates.co.uk

Flood map for planning

Your reference	Location (easting/northing)	Created
Lindfield	**526096/185276**	**10 Sep 2020 10:51**

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

This means:

- you don't need to do a flood risk assessment if your development is smaller than 1 hectare and not affected by other sources of flooding
- you may need to do a flood risk assessment if your development is larger than 1 hectare or affected by other sources of flooding or in an area with critical drainage problems

Notes

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

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

Environment Agency

Flood map for planning

Your reference
Lindfield

Location (easting/northing)
526096/185276

Scale
1:2500

Created
10 Sep 2020 10:51

- Selected point
- Flood zone 3
- Flood zone 3: areas benefitting from flood defences
- Flood zone 2
- Flood zone 1
- Flood defence
- Main river
- Flood storage area

0 20 40 60m

Appendix B: Regulated Drainage & Water Search

FRA and SuDS Strategy

6 Lindfield Gardens

eight associates

+44 (0)207 0430 418

www.eightassociates.co.uk
info@eightassociates.co.uk

Regulated Drainage & Water Search

Search Details

Prepared for: GeoSmart
Matter: 73692
Client address: Suite 9-11 Old Bank Buildings, Bellstone, Shrewsbury, SY1 1HU

Property:
6 Lindfield Gardens, London, NW3 6PU

Water Company:
Thames Water Utilities Ltd
Thames Water Plc, PO Box 286, Swindon, SN38 2RA

Date Returned:	Property type:
02/09/2020	Residential

Summary for Conveyancers

This summary identifies matters revealed which you may wish to highlight to your client or investigate further. It is intended as a snapshot of the information contained in the search, should in no way be considered legal advice, and should be taken in context with the full search information and with your client's planned use and enjoyment of the property.

Maps

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

Drainage

2.1	Does foul water from the property drain to the public sewer?	Yes
2.2	Does surface water from the property drain to the public sewer?	Yes
2.3	Is a surface water drainage charge payable?	Refer to Vendor
2.4	Does the public sewer map indicate any public sewer, disposal main or lateral drain within the boundaries of the property?	No
2.4.1	Does the public sewer map indicate any public sewage pumping station within the boundaries of the property?	No
2.5	Does the public sewer map indicate any public sewer within 30.48 metres (100 feet) of any buildings within the property?	Yes
2.5.1	Does the public sewer map indicate any public pumping station within 50 metres (164.04 feet) of any buildings within the property?	Insured
2.6	Are any sewers or lateral drains serving, or which are proposed to serve the property, the subject of an existing adoption agreement or an application for such an agreement?	No
2.7	Has any Sewerage Undertaker approved or been consulted about any plans to erect a building or extension on the property over or in the vicinity of a public sewer, disposal main or drain?	No
2.8	Is any building which is, or forms part of the property, at risk of internal flooding due to overloaded public sewers?	Insured
2.9	Please state the distance from the property to the nearest boundary of the nearest sewage treatment works	Insured

Water

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

Charging

4.1.1	Who is responsible for providing the sewerage services for the property?	Thames Water
4.1.2	Who is responsible for providing the water services for the property?	Thames Water
4.2	Who bills the property for sewerage services?	Thames Water
4.3	Who bills the property for water services?	Thames Water
4.4	What is the current basis for charging for sewerage and/or water services at the property?	See report
4.5	Will the basis for charging for sewerage and water services at the property change as a consequence of a change of occupation?	Insured

Question 1.1

Where relevant, please include a copy of an extract from the public sewer map

A copy of an extract from the public sewer map is included in which the location of the property is identified

Guidance Notes:

Pipes that are shown on the public sewer map as sewers, disposal mains or lateral drains are defined as those for which a Sewerage Undertaker holds statutory responsibility under the Water Industry Act 1991. A Sewerage Undertaker is not generally responsible for rivers, water courses, ponds, culverts or highway drains. If any of these are shown on the copy extract they are shown for information only. Sewers or lateral drains indicated on the extract of the public sewer map as being subject to an agreement under Section 104 of the Water Industry Act 1991 are not an 'as constructed' record. It is recommended that these details are checked with the developer, if any. Please note that following the private sewer transfer on 1 October 2011 there may be additional public assets other than those shown on the public sewer map.

Question 1.2

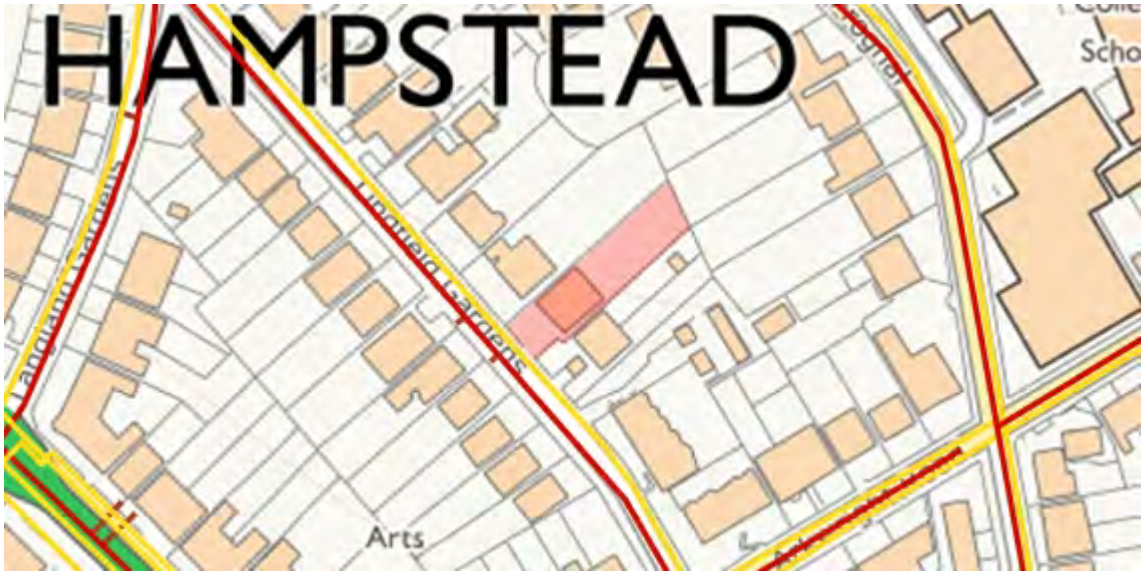
Where relevant, please include a copy of an extract from the map of waterworks

A copy of an extract from the map of waterworks is included in which the location of the property is identified

Guidance Notes:

Pipes that are shown on the map of waterworks as water mains, resource mains or discharge pipes are defined as those for which a Water Undertaker holds statutory responsibility under the Water Industry Act 1991. Water Undertakers are not responsible for private water mains or private service pipes connecting the property to the public water main and do not hold details of these. These may pass through land outside of the control of the seller, or may be shared with adjacent properties. The buyer may wish to investigate whether separate rights or easements are needed for their inspection, repair or renewal. The extract of the map of waterworks shows water mains in the vicinity of the property. It should be possible to estimate the likely length and route of any private water supply pipe connecting the property to the public water network.

Public Sewer & Water Map



- Public Combined Sewer
- Public Foul Sewer
- Public Surface Water Sewer
- Abandoned Public Sewer
- Water Pipes
- Sewer Publicly Maintained under Section 24 Public Health Act 1936
- Section 104 Surface Water Sewer
- Section 104 Foul Sewer
- Decommissioned Water
- Public Sewage Pumping Station

This map is provided by InfoTrack Ltd and must be used in conjunction with the search results attached. Please note, the boundary may have been adjusted from the plan provided so that it reflects the National Polygon dataset provided by the Land Registry. This dataset covers all registered titles (freehold and leasehold) in England and Wales and shows the indicative shape and position of each boundary. The information shown on the map is based on data obtained from various sources but the position of any water company apparatus must should be regarded as approximate. Service pipes, private sewers and drains are generally not shown. This map should not be used for detailed design of any proposed works and users of this map are strongly advised to commission their own survey of the area before carrying out any works to establish the actual position of all apparatus.

Question 2.1

Does foul water from the property drain to the public sewer?

Records indicate that foul water from the property does drain to a public sewer.

Guidance Notes:

The above answer is inferred from the proximity of a public sewer as indicated on the enclosed map. If the inference is wrong, the attached Information Accuracy Indemnity covers an adverse entry.
For confirmation, please refer to billing information, form TA6 or the Property Details Questionnaire which confirms connection to mains drainage. Sewerage Undertakers are not responsible for private drains and private sewers that connect the property to the public sewerage system, and do not hold details of these. The property owner will normally have sole responsibility for private drains serving the property and may have shared responsibility with other users if the property is served by a private sewer which also serves other properties if not connected to the public sewerage system. These may pass through land outside of the control of the seller and the buyer may wish to investigate whether separate rights or easements are needed for their inspection, repair or renewal. An extract from the public sewer map is enclosed. This will show known public sewers and lateral drains in the vicinity of the property and it should be possible to estimate the likely length and route of any private drains and/or private sewers connecting the property to the public sewerage system. If foul water does not drain to the public sewerage system the property may have private facilities in the form of a septic tank, cesspit or other type of treatment plant.

Question 2.2

Does surface water from the property drain to the public sewer?

Records indicate that surface water from the property does drain to a public sewer.

Guidance Notes:

The above answer is inferred from the proximity of a public sewer as indicated on the enclosed map. If the inference is wrong, the attached Information Accuracy Indemnity covers an adverse entry.
For confirmation, please refer to billing information, form TA6 or the Property Details Questionnaire which confirms connection to mains drainage. Sewerage Undertakers are not responsible for private drains and private sewers that connect the property to the public sewerage system, and do not hold details of these. The property owner will normally have sole responsibility for private drains serving the property and may have shared responsibility with other users if the property is served by a private sewer which also serves other properties. These may pass through land outside of the control of the seller and the buyer may wish to investigate whether separate rights or easements are needed for their inspection, repair or renewal. In some cases, Sewerage Undertaker records do not distinguish between foul and surface water connections to the public sewerage system. If on inspection the buyer finds that the property is not connected for surface water drainage, the property may be eligible for a rebate of the surface water drainage charge. Details can be obtained from the Water Company. An extract from the public sewer map is enclosed. This will show known public sewers and lateral drains in the vicinity of the property and it should be possible to estimate the likely length and route of any private drains and/or private sewers connecting the property to the public sewerage system. If surface water does not drain to a public sewer the property may have private facilities in the form of a soakaway or private connection to a watercourse. Please note, the property may drain to a Sustainable Urban Drainage System (SuDs), please refer to the Local Authority Search for further information.

Question 2.3

Is a surface water drainage charge payable?

Please refer to vendor or pre-contract documents and/or your own survey of the property

Guidance Notes:

Where surface water charges are payable but upon inspection the property owner believes that surface water does not drain to the public sewerage system, an application can be made to the Water Company to end surface water charges.

Question 2.4

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

The public sewer map indicates that there are no public sewers, disposal mains or lateral drains within the boundaries of the property. Please note, it has not always been a requirement for such public sewers, disposal mains or lateral drains to be recorded on the public sewer map. It is therefore possible for unidentified sewers, disposal mains or lateral drains to exist within the boundaries of the property. However on 1 October 2011 private sewers were transferred into public ownership. There may therefore be additional public sewers, disposal mains or lateral drains which are not recorded on the public sewer map but which may prevent or restrict development of the property.

Guidance Notes:

The approximate boundary of the property has been determined by reference to the plan provided. The presence of a public sewer, disposal main or lateral drain running within the boundary of the property may restrict further development. The Sewerage Undertaker has a statutory right of access to carry out work on its assets, subject to notice. This may result in employees of the Company or its contractors needing to enter the property to carry out work. Any private sewers or lateral drains which are indicated on the extract of the public sewer map as being subject to an agreement under Section 104 of the Water Industry Act 1991 are considered to be not an 'as constructed' record. It is recommended these details are checked with the developer.

Question 2.4.1

Does the public sewer map indicate any public sewage pumping station within the boundaries of the property?

The public sewer map included indicates that there is no public sewage pumping station within the boundaries of the property.

Guidance Notes:

The presence of a public sewage pumping station running within the boundary of the property may restrict further development. The company has a statutory right of access to carry out work on its assets subject to notice. Please note that private pumping stations built prior to 1 July 2011 which serve more than one property and pump to the existing public sewer are eligible for transfer into public ownership as of 1 October 2016. Pumping stations installed after 1 July 2011 remain the responsibility of the homeowner unless they are the subject of an adoption agreement. Please note that the Water Company may not have been made aware of all the pumping stations which meet the adoption obligation criteria and therefore there may be pumping stations not recorded on the public sewer map.

Question 2.5

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

The public sewer map indicates that there is a public sewer within 30.48 metres (100 feet) of a building within the property. On 1 October 2011 private sewers were transferred into public ownership, there may therefore be additional lateral drains and/or public sewers which are not recorded on the public sewer map but are within 30.48 metres (100 feet) of a building within the property.

Guidance Notes:

Any private sewers or lateral drains which are indicated on the extract of the public sewer map as being subject to an agreement under Section 104 of the Water Industry Act 1991 are not an 'as constructed' record. It is recommended these details be checked with the developer. The presence of a public sewer within 30.48 metres (100 feet) of any buildings within the property can result in the Local Authority requiring a property to be connected to the public sewer. The measure is estimated using the map provided and the water company records, between the building(s) within the boundary of the property and the nearest public sewer.

Question 2.5.1

Does the public sewer map indicate any public pumping station within 50 metres (164.04 feet) of any buildings within the property?

Not answered - This information is not available, if an answer had been available which was adverse at the date of this report the Information Accuracy Indemnity attached would apply.

Guidance Notes:

The presence of a public sewage pumping station running within the boundary of the property may restrict further development. The company has a statutory right of access to carry out work on its assets subject to notice. Please note that private pumping stations built prior to 1 July 2011 which serve more than one property and pump to the existing public sewer are eligible for transfer into public ownership as of 1 October 2016. Pumping stations installed after 1 July 2011 will remain the responsibility of the homeowner unless they are the subject of an adoption agreement. Please note that the Water Company may not have been made aware of all the pumping stations which meet the adoption obligation criteria and therefore there may be pumping stations not recorded on the public sewer map.

Question 2.6

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

Records indicate that sewers serving the property are not the subject of an existing adoption agreement or an application for such an agreement.

Guidance Notes:

On 1 October 2011 all foul Section 104 sewers laid before 1 July 2011 were transferred into public ownership, excluding those that discharge to a privately owned sewage treatment or collection facility. All surface Section 104 sewers that do not discharge to a public watercourse were also transferred. Water Companies' mapping records are currently being reviewed and updated and may not yet reflect this change, therefore there may be additional public sewers, disposal mains or lateral drains which are not yet recorded on the public sewer map or public sewers that still show as Section 104 sewers.

Question 2.7

Has any Sewerage Undertaker approved or been consulted about any plans to erect a building or extension on the property over or in the vicinity of a public sewer, disposal main or drain?

There are no records in relation to any approval or consultation about plans to erect a building or extension on the property over or in the vicinity of a public sewer, disposal main or drain. However please note the sewerage undertaker might not be aware of a building or extension on the property over or in the vicinity of a public sewer, disposal main or drain. The attached Information Accuracy Indemnity covers adverse entries at the date of this report where data is not available.

Guidance Notes:

Buildings or extensions erected over a public sewer, disposal main or lateral drain in contravention of building controls or which conflict with the provisions of the Water Industry Act 1991 may have to be removed or altered. On 1 October 2011 the majority of private sewers, disposal mains and lateral drains, connected to the public network as of 1 July 2011, transferred to public ownership. Therefore there may be formerly private sewers and lateral drains that have been built over, however the sewerage undertaker may not have approved or been consulted about any plans to erect a building or extension on the property or in the vicinity of these. Please also refer to vendor or pre-contract documents and/or your own survey of the property.

Question 2.8

Is any building which is, or forms part of the property, at risk of internal flooding due to overloaded public sewers?

Not answered - If an answer had been available which was adverse at the date of this report the Information Accuracy Indemnity attached would apply.

Guidance Notes:

A sewer is 'overloaded' when the flow from a storm is unable to pass through it due to a permanent problem (eg. flat gradient, small diameter). Flooding as a result of temporary problems such as blockage, siltation, collapses and equipment or operational failures are excluded. 'Internal flooding' from public sewers is defined as flooding which enters a building or passes below a suspended floor. For reporting purposes, buildings are restricted to those normally occupied and used for residential, public, commercial, business or industrial purposes. 'At Risk' properties are those that the Water Company is required to include in the Regulatory Register that is reported annually to the Director General of Water Services. These are defined as properties that have suffered, or are likely to suffer, internal flooding from public foul, combined or surface water sewers due to overloading of the sewerage system more frequently than the relevant reference period (either once or twice in ten years) as determined by the Company's reporting procedure. Flooding as a result of storm events proven to be exceptional and beyond the reference period of one in ten years are not included on the At Risk register. Properties may be at risk of flooding but not included on the Register where flooding incidents have not been reported to the Company. Public sewers are defined as those for which the company holds statutory responsibility under the Water Industry Act 1991. It should be noted that flooding can occur from private sewers and drains which are not the responsibility of the Company and therefore would be excluded from the report.

Question 2.9

Please state the distance from the property to the nearest boundary of the nearest sewage treatment works

Not answered - If an answer had been available which was adverse at the date of this report the Information Accuracy Indemnity attached would apply.

Guidance Notes:

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

Question 3.1

Is the property connected to mains water supply?

Records indicate that the property is connected to the mains water supply.

Guidance Notes:

The above answer is inferred from the proximity of a public water main as indicated on the enclosed map. If the inference is wrong, the attached Information Accuracy Indemnity covers an adverse entry.
For confirmation, please refer to billing information, form TA6 or the Property Details Questionnaire which confirms connection to mains water, and information regarding whether a water meter is installed. Details of private supplies are not kept by the Water Undertaker. We recommend the situation is checked with the current owner of the property.

Question 3.2

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

The map of waterworks does not indicate any water mains, resource mains or discharge pipes within the boundaries of the property.

Guidance Notes:

The approximate boundary of the property has been determined by reference to the plan provided. The presence of public water main, resource main or discharge pipe within the boundary of the property may restrict further development within it. Water Undertakers have a statutory right of access to carry out work on their assets, subject to notice. This may result in employees of the Company or its contractors needing to enter the property to carry out work.

Question 3.3

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

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

Guidance Notes:

Where the property is part of a very recent or ongoing development and the water mains and service pipes are not the subject of an adoption application, buyers should consult with the developer to confirm that the Water Undertaker will be asked to provide a water supply to the development or to ascertain the extent of any private water supply system for which they will hold maintenance and renewal liabilities.

Question 3.4

Is this property at risk of receiving low water pressure or flow?

Not answered - If an answer had been available which was adverse at the date of this report the Information Accuracy Indemnity attached would apply.

Guidance Notes:

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

Question 3.5

What is the classification of the water supply for the property?

To check the average water hardness of water supplied to the property please visit https://www.thameswater.co.uk/help-and-advice/water-quality/Check-the-water-quality-in-your-area

Guidance Notes:

The hardness of water depends on the amount of calcium in it - the more it contains the harder the water is. There is no UK or European standard set for the hardness of drinking water. More information on water hardness can be found on the Drinking Water Inspectorates' website: http://www.dwi.gov.uk
If the property is in a hard water area, you may wish to refer to the vendor or pre-contract documents and/or your own survey of the property to establish if a water softener has been installed.

Question 3.6

Please include details of the location of any water meter serving the property

Please refer to vendor or pre-contract documents and / or your own survey of the property. For further information regarding the water meter serving this property please contact:

Thames Water Utilities Limited
Clearwater Court
Reading
RG1 8DB
Tel: 0845 9200 888
www.thameswater.co.uk

Question 4.1.1

Who is responsible for providing the sewerage services for the property?

Please refer to vendor or pre-contract documents and / or your own survey of the property. The Sewerage Undertakers for the area are:

Thames Water Utilities Limited
Clearwater Court
Reading
RG1 8DB
Tel: 0845 9200 888
www.thameswater.co.uk

Question 4.1.2

Who is responsible for providing the water services for the property?

Please refer to vendor or pre-contract documents and / or your own survey of the property. The Water Undertakers for the area are:

Thames Water Utilities Limited
Clearwater Court
Reading
RG1 8DB
Tel: 0845 9200 888
www.thameswater.co.uk

Question 4.2

Who bills the property for sewerage services?

Thames Water Utilities Limited
Clearwater Court
Reading
RG1 8DB
Tel: 0845 9200 888
www.thameswater.co.uk

Question 4.3

Who bills the property for water services?

Thames Water Utilities Limited
Clearwater Court
Reading
RG1 8DB
Tel: 0845 9200 888
www.thameswater.co.uk

Question 4.4

What is the current basis for charging for sewerage and/or water services at the property?

Water and sewerage companies' full charges are set out in their charges schemes which are available from the company free of charge upon request.

Guidance Notes:

The Water Industry Act 1991 Section 150, The Water Resale Order 2001 provides protection for people who buy their water or sewerage services from a person or company instead of directly from a water or sewerage company.

The average household bill is, by definition, an average across all customers. Readings taken from a water meter are used to calculate metered sewerage charges, the volume charge for sewerage services is usually based on a percentage of total water supplied. To view the above information in full please visit the Office of Water Services (OFWAT) Website: http://www.ofwat.gov.uk Water and Sewerage Companies full charges are set out in their charges schemes which are available from the Company free of charge upon request.

Question 4.5

Will the basis for charging for sewerage and water services at the property change as a consequence of a change of occupation?

Not answered - If an answer had been available which was adverse at the date of this report the Information Accuracy Indemnity attached would apply.

Guidance Notes:

The Company may install a meter at the premises where a buyer makes a change of use of the property or where the occupier uses water for watering the garden, other than by hand (this includes the use of sprinklers) or automatically replenishing a pond or swimming pool with a capacity greater than 10,000 litres.

Glossary

'the 1991 Act' means the Water Industry Act 1991[61]

'the 2000 Regulations' means the Water Supply (Water Quality) Regulations 2000[62]

'adoption agreement' means an agreement made or to be made under Section 51A(1) or 104(1) of the 1991 Act[64]

'discharge pipe' means a pipe which discharges are made or are to be made under Section 165(1) of the 1991 Act

'disposal main' means (subject to section 219(2) of the 1991 Act) any outfall pipe or other pipe which - (a) is a pipe for the conveyance of effluent to or from any sewage disposal works, whether of a Sewerage Undertaker or of any other person; and (b) is not a public sewer

'drain' means (subject to Section 219(2) of the 1991 Act) a drain used for the drainage of one building or of any buildings or yards appurtenant to buildings within the same curtilage

'lateral drain' means - (a) that part of a drain which runs from the curtilage of a building (or buildings or yards within the same curtilage) to the sewer with which the drain communicates or is to communicate; or (b) (if different and the context so requires) the part of a drain identified in a declaration of vesting made under Section 102 of the 1991 Act or in an agreement made under Section 104 of that Act[65]

'map of waterworks' means the map made available under Section 198(3) of the 1991 Act[67] in relation to the information specified in subsection (1A)

'private sewer' means a pipe or pipes which drain foul or surface water, or both, from premises, and are not vested in a Sewerage Undertaker

'public sewer' means, subject to Section 106(1A) of the 1991 Act[68], a sewer for the time being vested in a Sewerage Undertaker in its capacity as such, whether vested in that Undertaker - (a) by virtue of a scheme under Schedule 2 to the Water Act 1989[69]; (b) by virtue of a scheme under Schedule 2 to the 1991 Act[70]; (c) under Section 179 of the 1991 Act[71]; or (d) otherwise; 'public sewer map' means the map made available under Section 199(5) of the 1991 Act[72]

'resource main' means (subject to Section 219(2) of the 1991 Act) any pipe, not being a trunk main, which is or is to be used for the purpose of - (a) conveying water from one source of supply to another, from a source of supply to a regulating reservoir or from a regulating reservoir to a source of supply; or (b) giving or taking a supply of water in bulk

'sewerage services' includes the collection and disposal of foul and surface water and any other services which are required to be provided by a Sewerage Undertaker for the purpose of carrying out its functions

'Sewerage Undertaker' means the company appointed to be the Sewerage Undertaker under Section 6(1) of the 1991 Act for the area in which the property is or will be situated

'surface water' includes water from roofs and other impermeable surfaces within the curtilage of the property

'water main' means (subject to Section 219(2) of the 1991 Act) any pipe, not being a pipe for the time being vested in a person other than the Water Undertaker, which is used or to be used by a Water Undertaker or licensed water supplier for the purpose of making a general supply of water available to customers or potential customers of the Undertaker or supplier, as distinct from for the purpose of providing a supply to particular customers

'water meter' means any apparatus for measuring or showing the volume of water supplied to, or of effluent discharged from any premises

'water supplier' means the company supplying water in the water supply zone, whether a Water Undertaker or licensed water supplier

'water supply zone' in relation to a calendar year, means the names and areas designated by a Water Undertaker within its area of supply that are to be its water supply zones for that year

'Water Undertaker' means the company appointed to be the Water Undertaker under Section 6(1) of the 1991 Act for the area in which the property is or will be situated. In this Report, references to a pipe, including references to a main, a drain or a sewer, shall include references to a tunnel or conduit which serves or is to serve as the pipe in question and to any accessories for the pipe.

Information for Buyers

This section is a guide to the content of the regulated drainage and water search result. It should be read in association with the main report. This information should not be considered as legal advice and you should check with your conveyancer if you have any concerns about the search results.

Map of Public Sewers/Waterworks

What is a Map of Public Sewers or Map of Waterworks?	Water companies maintain maps of sewers and water pipes for which they are responsible. Most but not all sewer and water pipes within an individual property boundary are the property owner's responsibility.

Sewer & Water Maintenance

Are all Sewer & Water Pipes publicly maintained?	Sewer & Water Pipes can be either publicly or privately maintained. If they are publicly maintained, the local Sewerage or Water undertaker is responsible for repairs and maintenance. As from 1 October 2011 most lateral drains (see glossary) are now owned and maintained by the sewerage undertaker. Sewerage Undertakers are not responsible for any private drains and private sewers that connect the property to the public sewerage system, and do not hold details of these. The property owner will normally have sole responsibility for private drains and water pipes serving the property.

Sewers

What is a Foul Water Sewer?	Foul sewers/drains take foul sewage (waste from toilets, bathrooms and kitchens etc) away from your property.
What is a Surface Water Sewer?	Surface water sewers/drains take surface water (rainwater) away from your property (includes water from roofs and other impermeable surfaces within the curtilage of the property). In some cases, Sewerage Undertaker records do not distinguish between foul and surface water connections to the public sewerage system. If on inspection the buyer finds that the property is not connected for surface water drainage, the property may be eligible for a rebate of the surface water drainage charge. Details can be obtained from the Water Company.
What is a Combined Sewer?	Combined sewers carry both foul sewage and surface water away from your property.

Adoption Agreement

What does it mean if a sewer is subject to a Section 104 adoption agreement?	With new developments, the developer will typically lay new sewers which are 'subject to adoption'. Purchasers of new homes will want to know whether or not the property will eventually be connected to a public sewer. The adoption of private sewers and drains by the Sewerage Undertaker is subject to the developer complying with the terms of the adoption agreement made under the provisions of Section 104 of the Water Industry Act 1991. For newly built properties, where the property is part of a very recent or on-going development and the sewers are not the subject of an adoption application, buyers should consult with the developers to ascertain the extent of private drains & sewers for which they will hold maintenance & renewal liabilities.
Why do I need to know if there is a public foul sewer within 30.48 metres (100 feet) of any buildings within the property?	If foul water from the property does not drain to a public sewer, the presence of a public foul sewer within 30.48 metres (100 feet) of any buildings within the property can result in the local authority requiring the property to be connected to a public sewer if the existing arrangements are unsatisfactory.

Water Pipes

What are Water Pipes?	Water pipes (water mains, resource mains or discharge pipes) supply clean water to a property. The pipework can be either publicly or privately maintained. Water Undertakers are not responsible for private water mains or private service pipes connecting the property to the public water main and do not hold details of these. These may pass through land outside of the control of the seller, or may be shared with adjacent properties. The buyer may wish to investigate whether separate rights or easements are needed for their inspection, repair or renewal. If the property is not connected to mains water supply we recommend the situation is checked with the current owner of the property. Details of private supplies are not kept by the Water Undertaker.
What does it mean if there are public water pipes or public sewers within the boundary of the property?	The presence of public water pipes or public sewers within the boundary of the property may restrict further development. The Water and/or Sewerage Undertaker also has a statutory right of access to carry out work on its assets, subject to notice. This may result in employees of the Water Company or Sewer Undertaker or its contractors needing to enter the property to carry out work. The approximate boundary of the property has been determined by reference to the plan provided.

Information

What is meant by the Private Sewer Transfer?	On 1 October 2011, the responsibility for many private sewers and lateral drains, which drain to a public sewer and may be located both within and beyond the property boundary, transferred to the water and sewerage companies. The water and sewerage companies are currently undertaking an exercise to map these new public sewers and lateral drains. In the meantime however there may be additional public assets not shown on the public sewer map enclosed herein. For further information visit:

http://www.ofwat.gov.uk/households/supply-and-standards/supply-pipes/

The following diagram illustrate an example of the impact of the new drainage arrangements:

Sustainable Urban Drainage System (SuDS)

What are Sustainable Urban Drainage Systems (SuDS)?	Sustainable Urban Drainage System (SuDs) are designed to drain surface water from a property or site in a natural more sustainable way, than through conventional networks of pipes and sewers, to local watercourses. SuDS slow down surface water run-off and reduce the risk of flooding, particularly during heavy rain. They also improve water quality and reduce the risk of pollution that can happen when foul sewers are overwhelmed by surface water, leading to dirty water being released into rivers.

Unanswered Questions

Why are certain questions not answered within this report?	This report is compiled using publicly available information (as defined by the Water Industry Act 1991). Where data is not publicly available, we provide an insurance policy (see attached). Where we infer certain answers (Q2.1, 2.2 and 3.1) we refer you to alternative sources of information, including billing information, form TA6 or the Property Details Questionnaire which confirms connection to mains drainage, if a septic tank is installed, and information regarding whether a water meter is installed. If both our inference and the form TA6, the Property Details Questionnaire or billing information are incorrect, then our insurance policy would apply.

stewart title

REGULATED DRAINAGE AND WATER SEARCH INFORMATION ACCURACY POLICY INSURANCE PRODUCT INFORMATION DOCUMENT

Company: Stewart Title Limited

Stewart Title Limited is a title insurance company authorised by the Prudential Regulation Authority and regulated by the Financial Conduct Authority and the Prudential Regulation Authority. Registered in England and Wales No 270166. Registered office address: 11 Haymarket, London SW1V 4BP

Complete pre-contractual and contractual information on this policy is provided in other documents

WHAT IS THIS TYPE OF INSURANCE?

Regulated Drainage and Water Search Information Accuracy Policy

WHAT IS INSURED?

- ✓ The defect as described in the Defects section of the Policy Schedule and which arises from your use and ownership of the property as described in the Policy Schedule.
- ✓ In the event of a Regulated Drainage and Water Search provided by the Organisation containing an Adverse Entry which materially affects the market value of the Property then we will, subject to your compliance with the terms and conditions of this policy, pay under this policy for those losses and costs which are set out in the Cover section of the Policy Schedule.

WHAT IS NOT INSURED?

- × Any amount higher than the Limit of Indemnity under the Policy Schedule.
- × All matters set out under the Exclusions section of the Policy Schedule.
- × Any claim made either by you and/or a third party against you which is not set out in the Cover section of the Policy Schedule.

ARE THERE ANY RESTRICTIONS ON COVER?

- ! In deciding to accept this policy in exchange for the premium and in setting the terms and premium, we have relied on the information given by you (or anyone acting on your behalf). You must ensure that, when answering any questions asked by us, any information provided is accurate and complete.
- ! If you deliberately or recklessly provide us with false or misleading information, we may treat this policy as if it never existed and decline all claims. If you provide us with false or misleading information carelessly, we may:
    - treat this Policy as if it had never existed, and refuse to pay all claims and return the premium paid. However, we may only do so if we would not otherwise have provided you with insurance cover at all;
    - amend the terms of this policy, and apply the amended terms as if they were already in place, if a Claim has been adversely affected by your carelessness;
    - reduce the amount we will pay on a Claim in the proportion the premium you paid bears to the premium we would have charged for this policy; or
    - take a similar proportionate action.
- ! We, or anyone acting on our behalf, will write to you if we intend to treat this policy as if it had never existed, or amend the terms of this policy.
- ! If you become aware that the information given to us is inaccurate, you must inform us as soon as practicable.

WHERE AM I COVERED?

This policy covers you for the UK property specified in the Policy Schedule.

WHAT ARE MY OBLIGATIONS?

- You, or anyone acting on your behalf, must not:
  - disclose the existence of this policy to any third party other than prospective purchasers, lenders, lessees and their legal advisers without our prior written consent
  - take or fail to take action which results in a Claim as this may prejudice your position and void this policy
  - take any steps to settle a Claim without our prior written consent.
- On becoming aware of any potential or actual Claim, you will:
  - provide written notice and details to us at our registered office address immediately of all known facts including all communications, correspondence and all court documents.
  - not admit any liability whatsoever or take steps to compromise or settle the Claim, without our written consent.
  - provide all information and assistance that we and/or any party professional or otherwise acting on our behalf requires at your own expense doing everything reasonably practicable with our prior written consent to minimise any loss.
- You will not make any
  - admission, promise of payment or indemnity
  - application to a court, Upper Tribunal (Land Chamber) or the Land Registry without our written consent

WHEN AND HOW DO I PAY?

You do not make any payments to us directly. Your professional advisors who arranged and recommended the cover to you will tell you how and when to pay.

WHEN DOES THE COVER START AND END?

Your cover will begin on the Policy Date which is set out in the Policy Schedule. The dates of cover are specified on the Policy Schedule.

HOW DO I CANCEL THE CONTRACT?

This policy can be cancelled by contacting us within 14 days of the Policy Date, provided all interested parties (such as lenders holding a mortgage or charge on the Property) consent to cancellation. If you wish to cancel this policy, please write (quoting your policy number) to 'The Underwriting Manager' at our registered address or email to STLEnquiry@stewart.com.

We may at our discretion charge you for the time that you have been on cover including Insurance Premium Tax.

Any refund of premium will be made to the party who paid the premium.

BASIS OF COVER

The Insured has paid or agreed to pay the Premium for this indemnity cover.

The Insured agrees to comply with the terms and conditions of the policy. Failure by the Insured to comply can lead to invalidation of the policy in whole or in part or reduce the amount of any Claim subsequently made.

Signed for and on behalf of Stewart Title Limited

Steven Lessack
CEO, Stewart Title Limited

Authorised Signatory

stewart title

POLICY SCHEDULE

POLICY NUMBER 155853	PROPERTY Each property which is noted on the bordereau
POLICY DATE As referred to on the bordereau per Property	LIMIT OF INDEMNITY See Additional Policy Clause(s) section below
POLICY TERM In Perpetuity from the Policy Date	PREMIUM See Additional Policy Clause(s) section below

THE INSURED

The party purchasing the Property at the Policy Date and any bank, building society or other similar lending institution holding a mortgage or charge on the Property('the Lender') whether as a result of the purchase or as the result of the owner of the Property remortgaging it to the Lender

THE INSURER

STEWART TITLE LIMITED - (Company Reg 2770166), 11 Haymarket, London SW1Y 4BP

THE DEFECT

The Insured has been provided with a Regulated Drainage and Water Search ('the Search') by the Organisation which may contain an Adverse Entry which materially affects the market value of the Property.

INSURED USE

Continued use of the Property for residential or commercial uses as in existence at the Policy Date

EXCLUSION(S)

Any Claim arising from or relating to:

(i) any matter revealed in any other searches made available to the Insured or anyone acting on the Insured's behalf prior to the Policy Date

(ii) any matter otherwise known to the Insured or anyone acting on the Insured's behalf prior to the Policy Date

(iii) consequential loss

(iv) environmental or contamination matters (including but not limited to the Environmental Protection Act 1990

(v) any matter where the Insured or their legal advisors have not followed or acted upon the guidance notes provided in the Search

ADDITIONAL POLICY CLAUSE(S)

Definitions:-

Adverse Entry - Any matter or matters which would have been disclosed in the Search and which were in existence on or before the Policy Date which adversely affect the market value of the Property but which were not disclosed in the Search due to:-

(i) the absence in the Search of answers to questions 2.5.1,2.7,2.8,2.9,3.3,3.4 and 4.5 and/or

(ii) incorrect information being given to the Organisation by the statutory authority or authorities responsible for maintaining the registers forming the subject matter of the Search and/or

(iii) incorrect information being given by the Organisation to the Insured in respect of Questions 2.1,2.2,2.4.1 and 3.1.where the Organisation has interpreted data obtained from the statutory authority or authorities responsible for maintaining the registers but that interpretation is incorrect due to the negligence of, or an error by, the Organisation.

Organisation - STL Group PLC

Regulated Search - A search requested by or on behalf of the Insured in the course of a purchase or remortgage transaction relating to the Property in response to which the Organisation in accordance with the Council of Property Search Organisations' search code has undertaken enquiries and provided a report upon which the Insured relies.

LIMIT OF INDEMNITY	PREMIUM
(Up to £ per Property)	(£ inclusive of I.P.T)
£ 2,000,000.00	£ 0.75

MEMORANDUM OF ENDORSEMENT For Seller Cover

Definitions

The definitions referred to below shall be read as being in addition to those given or where repeated for the purpose of the cover provided to the seller under this Policy as an alternative to those in the Policy

Seller: the Seller of the Property who has requested and paid for the Regulated Search in order to enable the sale of the Property to the Buyer

Buyer: The person(s), corporate or incorporate body, named as Buyer in the exchanged contract for the purchase of the

Property on whose behalf a Regulated Search has been undertaken or who relies upon a Regulated Search carried out on behalf of the seller of the Property by the Organisation and who has subsequently purchased the Property following receipt of the Regulated Search.

Completion Date: the date upon which the sale of the Property to the Buyer completed

Offer Price: the lower of (i) the price agreed between the Seller and the Buyer for the sale of the Property prior to the Completion Date (ii) the highest valuation of the Property obtained by the Seller from an estate agent prior to marketing the property with the estate agent.

Sale Price: the price actually paid by the Buyer to the Seller for the Property on the Completion Date as detailed in the exchanged contract.

Seller Cover

The cover under this Policy will be extended to provide the following additional cover::-

The Seller shall have cover starting on the Completion Date for the matters referred to in sub paragraph (ii) under the definition of Adverse Entry in this policy by revealing an Adverse Entry which should not have been revealed ('the Error') and which is the sole and direct cause of the Buyer renegotiating the Offer Price of the Property to the Sale Price and as a result of which renegotiation the Seller has suffered loss.

Exclusions

The Company shall be not liable to indemnify the Seller for any Error :

(i) not disclosed in the Search

(ii) in respect of any matter of which the Seller or his legal representative had Knowledge as at the date that contracts are exchanged with the Buyer for the purchase of the Property.

(iii) Any Adverse Entry which arises after the Effective Date

(iv) The cover for the Seller shall not apply where the transaction is a remortgage or the Property is used for commercial purposes

Conditions

All conditions referred to in the Policy shall apply

GENERAL PROVISIONS

a. Any act or omission by the Insured, or anyone acting on the Insured's behalf, which in whole or in part induces a Claim under the policy may prejudice the Insured's position and could invalidate the policy in whole or in part or reduce the amount of any Claim.
b. The Insurers liability under this policy will not exceed the Limit of Indemnity (as increased by the Inflation Provision if applicable).
c. This policy shall be governed by and construed in accordance with the law of England and Wales and is subject to the jurisdiction of the courts of England and Wales.
d. The policy and any endorsement issued in respect of it are one contract and shall be read together.
e. The insured will not be entitled to abandon the Property to the Insurer.
f. Your information may be used for the purposes of insurance administration by the Insurer, its associated companies, by reinsurers and your intermediary. It may be disclosed to regulatory bodies for the purposes of monitoring and/or enforcing the Insurer's compliance with any regulatory rules/codes.
g. Your information may also be used for offering renewal, research and statistical purposes and crime prevention. It may be transferred to any country, including countries outside the European Economic Area for any of these purposes and for systems administration. Where this happens, we will ensure that anyone to whom we pass your information agrees to treat your information with the same level of protection as if we were dealing with it.
h. If you give us information about another person, in doing so you confirm that they have given you permission to provide it to us to be able to process their personal data (including any sensitive personal data) and also that you have told them who we are and what we will use their data for, as set out in this notice.
i. In the case of personal data, with limited exceptions, and on payment of the appropriate fee, you have the right to access and if necessary rectify information held about you.
j. The Insurer and the Organisation agree that this version of this Policy will be effective for all Properties entered on a bordereau on or after 1 December 2018.

NON INVALIDATION

The interest in this policy of any Insured will not be invalidated by a breach of the policy terms or conditions by any other party, unless

a. Such party acted on the Insured's behalf or with the Insured's knowledge and consent
b. Where the Insured is a successor in title, they had knowledge of a breach of the policy terms or conditions or of previous non-disclosure or misrepresentation to the Insurer.

IMPORTANT CONDITIONS

In respect of each Property:-

a. In deciding to accept this policy in exchange for the Premium and in setting the terms and premium, the Insurer has relied on the assumptions made being correct and any information given by the Insured (or anyone acting on the Insured's behalf). The Insured must ensure that, when answering any questions asked by the Insurer, any information provided is accurate and complete and the Insurer is informed of any assumptions which cannot be met.
b. If the Insured deliberately or recklessly provides the Insurer with false or misleading information, the Insurer may treat this policy as if it never existed and decline all claims.
c. If the Insured provides the Insurer with false or misleading information carelessly, the Insurer may:
    a. treat this policy as if it had never existed, and refuse to pay all claims and return the premium paid. However, the Insurer may only do so if it would not otherwise have provided the Insured with insurance cover at all;
    b. amend the terms of this insurance, and apply the amended terms as if they were already in place, if a claim has been adversely affected by the Insured's carelessness;
    c. reduce the amount the Insurer will pay on a claim in the proportion the premium the Insured has paid bears to the premium the Insurer would have charged for the policy; or
    d. take a similar proportionate action.
    The Insurer, or anyone acting on the Insurer's behalf, will write to the Insured if the Insurer intends to treat this policy as if it had never existed, or amend the terms of the policy.
d. If the Insured becomes aware that the information given to the Insurer is inaccurate, the Insured must inform the Insurer as soon as practicable.
e. The Insured (or anyone acting on the Insured's behalf) shall not at any time disclose the existence of this policy to any third party other than bona fide prospective purchasers, their lenders, lessees and respective legal advisers without the Insurers written consent
f. The Insured shall not discuss the Defect with any party without the Insurer's written consent, who, it is reasonable to believe can as a result of the discussion make a Claim.
g. A bordereau is provided to the Insurer by the Policyholder in Excel format setting out the address of the Property, the Limit of Indemnity (being the purchase price of the Property) and the Policy Date (being the date of exchange of contracts for the purchase of the Property by the Insured) and that the bordereau is sent to the Insurer at the Insurer's Address within 14 days of the month end following the Policy Date and payment for all properties listed on the bordereau paid either by cheque payable to Stewart Title Limited or by BACS to HSBC Bank Plc, 60 Queen Victoria Street, London EC4N 4TR Account Name: Stewart Title Premium Collection Account, Sort Code 40-05-30, Account Number: 94573269 Reference: «PolicyNumber»

In respect of Conditions e, f and g above where the Insured fails to comply with these conditions the Insurer's liability under this policy may be limited to the extent the Insurer is compromised by any breach of these conditions

COMPLAINTS PROCEDURE

Any complaint should be raised in the first instance with our General Counsel by

- Writing to the General Counsel at the Insurer's Address
- Telephoning 0207 010 7820

Details of our complaints handling procedure are available by contacting our General Counsel.

If we are unable to resolve your complaint to your satisfaction, you may have the right to refer your complaint to the Financial Ombudsman Service at Exchange Tower, London E14 9SR. The Financial Ombudsman Service website is http://www.financial-ombudsman.org.uk/.

The existence, and your use of, this complaints process is without prejudice to your other rights under this policy and your rights in law.

RIGHT TO CANCEL POLICY

This Policy can be cancelled by contacting us within 14 days of the policy date, provided all interested parties (such as lenders holding a mortgage or charge on the Property) consent to cancellation. If you wish to cancel this policy, please write (quoting your policy number) to 'The Underwriting Manager' at the Insurer's Address.

We may at our discretion charge you for the time that you have been on cover including Insurance Premium Tax.

Any refund of premium will be made to the party who paid the premium.

CLAIMS CONDITIONS

On becoming aware of any potential or actual Claim, the Insured will:

a. provide written notice and details to the Insurer at the Insurer's Address immediately of all known facts including all communications, correspondence and all court documents.
b. not admit any liability whatsoever or take steps to compromise or settle the Claim, without the written consent of the Insurer.
c. provide all information and assistance that the Insurer and/or any party professional or otherwise acting on the Insurer's behalf require at the Insured's own expense doing everything reasonably practicable with the Insurer's prior written consent to minimise any loss.

The Insured will not make any

a. admission, promise of payment or indemnity
b. application to a court, Upper Tribunal (Land Chamber) or the Land Registry without the written consent of the Insurer

DEALING WITH THE CLAIM

a. In dealing with the Claim the Insurer will at its discretion and cost be entitled to (whether or not the Insurer is liable under this policy):-
    i. take or defend proceedings in any court or tribunal in the name of the Insured in any proceedings including the right to abandon or submit to judgment
    ii. exercise, in the name of the Insured, any rights or remedies available to the Insured in any proceedings including the right to abandon or submit to judgment
    iii. compromise, settle or compound the Claim and deal in such manner as it thinks fit
    iv. pay at any time to the Insured the amount of the Limit of Indemnity (as increased by the Inflation Provision if applicable) or any lesser amount for which the Claim can be settled and then relinquish control of and have no further involvement with the Claim.
b. The Insurer shall be under no obligation to pay the proceeds of any Claim paid under this Policy to any party other than the Insured and that the proceeds of any Claim shall be incapable of assignment.
c. If, at the time of the Claim, there is other insurance (whether incepted by the Insured or any other party) under which the Insured may be entitled to make a Claim, either wholly or partly in respect of the same interest or risk covered by this policy, the Insurer will not be liable to pay or contribute more than their rateable proportion of the Claim.
d. If the Insured shall make any Claim knowing the same to be false or fraudulent, as regards amount or otherwise, this policy shall become void and the Claim shall be forfeited.
e. The Insurer will be entitled to all rights and defences it may have in respect of a Claim notified by any Insured against any successor to that Insured.
f. Where the Insurer and the Insured cannot agree to the amount to be paid under this policy the matter shall be referred to an arbitrator to be appointed by the parties (or in default of agreement, in accordance with the law in force at the time). The making of an award by the arbitrator shall be a condition precedent to any right of action against the Insurer. The Insured will afford to the Insurer every reasonable assistance in this respect.
g. If the Insurer agrees or is obliged to make any payment to or on behalf of an Insured because of the risk insured by this policy the Insurer will immediately be subrogated to any rights which the Insured may have in relation to that risk.

THE FINANCIAL SERVICES COMPENSATION SCHEME (FSCS)

We are covered by the FSCS. You may be entitled to compensation from the scheme if we cannot meet our obligations. This will depend on the type of business and the circumstances of the Claim.

Further information about the compensation scheme arrangements is available from the FSCS who can be contacted at Financial Services Compensation Scheme, 10th Floor, Beaufort House, 15 St Botolph Street, EC3A 7QU. The FSCS website may be viewed at www.fscs.org.uk.

Important Consumer Protection Information

This search has been produced by InfoTrack Ltd, Level 11, 91 Waterloo Road, London, SE1 8RT (Tel: 0207 186 8090, Email: helpdesk@infotrack.co.uk or visit www.infotrack.co.uk) which is registered with the Property Codes Compliance Board (PCCB) as a subscriber to the Search Code. The PCCB independently monitors how registered search firms maintain compliance with the Code.

The Search Code

- provides protection for homebuyers, sellers, estate agents, conveyancers and mortgage lenders who rely on the information included in property search reports undertaken by subscribers on residential and commercial property within the UK
- sets out minimum standards which firms compiling and selling search reports have to meet
- promotes the best practice and quality standards within the industry for the benefit of consumers and property professionals
- enables consumers and property professionals to have confidence in firms which subscribe to the code, their products and services. By giving you this information, the search firm is confirming that they keep to the principles of the Code. This provides important protection for you

The Code's core principles

Firms which subscribe to the Search Code will:

- display the Code logo prominently on their search reports
- act with integrity and carry out work with due skill, care and diligence
- at all times maintain adequate and appropriate insurance to protect consumers
- conduct business in an honest, fair and professional manner
- handle complaints speedily and fairly
- ensure that all search services comply with the law, registration rules and standards
- monitor their compliance with the Code

Complaints

If you have a query or complaint about your search, you should raise it directly with the search firm, and if appropriate ask for any complaint to be considered under their formal internal complaints procedure. If you remain dissatisfied with the firm's final response, after your complaint has been formally considered, or if the firm has exceeded the response timescales, you may refer your complaint for consideration under The Property Ombudsman scheme (TPOs). The Ombudsman can award compensation of up to £5,000 to you if he finds that you have suffered actual financial loss and/or aggravation, distress or inconvenience as a result of your search provider failing to keep to the Code.

Please note that all queries or complaints regarding your search should be directed to your search provider in the first instance, not to TPOs or to the PCCB.

TPOs Contact Details:
The Property Ombudsman scheme
Milford House
43-55 Milford Street
Salisbury
Wiltshire
SP1 2BP

Tel: 01722 333306 / Fax: 01722 332296
Web: www.tpos.co.uk / Email: admin@tpos.co.uk

You can get more information about the PCCB from www.propertycodes.org.uk

Please ask your search provider if you would like a copy of the Search Code.

Internal Complaints Procedure

InfoTrack Ltd has a formal internal complaints procedure for handling complaints speedily and fairly. If you wish to make a complaint, we will:

1. acknowledge your complaint within 5 working days of receipt
2. normally deal with it fully and provide a final response, in writing, within 20 working days of receipt
3. keep you informed by letter, telephone or email, as you prefer, if we need more time
4. provide a final response, in writing, at the latest within 40 working days of receipt
5. liaise, at your request, with anyone acting formally on your behalf

Complaints should be sent to: InfoTrack Ltd, Level 11, 91 Waterloo Road, London, SE1 8RT (Tel: 0207 186 8090, Email: helpdesk@infotrack.co.uk, www.infotrack.co.uk)

If you are not satisfied with our final response, or if we exceed the above timescales, you may refer the complaint to The Property Ombudsman scheme (TPOs) - Tel: 01722 333306 / Email : admin@tpos.co.uk. We will co-operate with TPOs during an investigation and comply with any decision the Ombudsman makes.

Revised 29 January 2019

Terms and Conditions

1 Definitions

In these Terms the following words shall have the following meanings:

1.1 "Client" means the seller, buyer, lender or lessee (or potential seller, buyer, lender or lessee) in respect of the Property who is the intended recipient of the Report.

1.2 "Code" means the Code of Practice for Search Compilers and Retailers as updated from time to time.

1.3 "Company" means a company registered at Companies House in respect of which InfoTrack Ltd has been instructed to provide a Service.

1.4 "Consumer" means any person acting for purposes other than their trade, business or profession.

1.5 "Intellectual Property Rights" means copyright, patent, design right (registered or unregistered), service or trade mark (registered or unregistered), database right, or other data right, moral right or know how or any other intellectual property right.

1.6 "Literature" means InfoTrack Ltd's brochures, price lists and advertisements in any type of media, including the content of the Website.

1.7 "Order" means the request for Services by You.

1.8 "Property" means an address or location for which InfoTrack Ltd is engaged to provide a Service.

1.9 "Report" means the report prepared by InfoTrack Ltd in respect of the Property or the Order.

1.10 "Service(s)" means the supply of services by InfoTrack Ltd to You including but not limited to property searches, reports and photographs, company searches, trade marks and domain name searches and other services from time to time and includes our instructions to a Supplier, on your behalf and the dissemination of the information subsequently provided by the Suppliers.

1.11 "Supplier" means any organisation or third party who provides data or information of any form to InfoTrack Ltd for the purposes of providing the Services.

1.12 "Terms" means these terms and conditions of business.

1.13 "VAT" means value added tax under the Value Added Tax Act 1994 and any similar replacement or additional tax.

1.14 "Website" means our website located at www.infotrack.co.uk

1.15 "We", "Us", "Our, "InfoTrack" and "InfoTrack Ltd" are references to InfoTrack Limited, a company incorporated in England and Wales with registered number 09474590 and whose registered office is situated at 10 John Street, London, United Kingdom, WC1N 2EB. VAT number GB 228530612.

1.16 "You" and "Your" are references to the individual, company, partnership or organisation who accesses the Website or places an Order.

2 Agreement

2.1 The agreement between You and InfoTrack Ltd shall come into existence when InfoTrack Ltd accepts your completed Order by either sending you written confirmation or starting to provide you with the relevant Services ("Agreement"). Please read and check your Order before it is submitted so that any errors can be identified and corrected.

2.2 These Terms may be varied from time to time. The Terms in force at the time of the Agreement, in conjunction with any relevant Supplier terms and conditions (where InfoTrack Ltd is placing orders for searches as Your agent), shall govern the Agreement to the exclusion of all other terms and conditions. You should print a copy of these Terms for future reference.

2.3 By submitting an Order, you shall be deemed to have accepted these Terms and You agree to be bound by these Terms when You place any Order.

2.4 These Terms together with the Literature and Order comprise the whole agreement relating to the supply of the Services to You by InfoTrack Ltd.

2.5 If You are not a Consumer You acknowledge that You have not relied upon any representations save insofar as the same have been expressly incorporated in these Terms and You agree that you shall have no remedy in respect of any misrepresentation (other than fraudulent misrepresentation) which has not become a term of these Terms.

2.6 If You are a Consumer then, while We accept responsibility for statements and representations made by Our duly authorised agents, please ensure You ask for any variations from these Terms to be confirmed in writing.

3 Services

3.1 InfoTrack Ltd shall use reasonable care and skill in providing the Services to You and shall use only established and trusted suppliers where obtaining information or data from third parties in accordance with the Code.

3.2 We reserve the right to make any changes to the Services described in our Literature to conform with any applicable statutory requirements or any non-material changes which we reasonably deem appropriate in our sole discretion.

3.3 Our Services are provided solely for Your use, or the use of Your Clients on whose behalf You have commissioned the Services, and shall not be used or relied upon by any other party, without Our written consent.

3.4 You hereby agree that We will start performing the Services as soon as possible, following the formation of the Agreement, which is likely to be before the end of the fourteen working day period set out in clause 5.3.

4 **Price and Payment**

4.1 The price payable for the Services shall be in pounds sterling inclusive of VAT as set out in the Literature or Order, as applicable.

4.2 Payment is due in full from You within 30 days of the date of Our invoice (or as otherwise contracted). We will invoice You following the provision of the Service(s) or as otherwise notified to You at the point of order or as set out in the Literature.

4.3 InfoTrack Ltd reserves the right to amend its prices from time to time and the Services will be charged at the price applicable at the date on which an Order is submitted.

4.4 If You fail to pay Our invoice on or before the due date, InfoTrack Ltd may charge You interest on the late payment at the prevailing statutory rate pursuant to the Late Payment of Commercial Debts (Interest) Act 1998 until the outstanding payment is made in full.

5 Cancellation of Services

This Term 5 only applies if you are a Consumer.

5.1 If you are a Consumer, you have a legal right to cancel the Agreement under the Consumer Contracts (Information, Cancellation and Additional Charges) Regulations 2013, during the period set out in Term 5.3.

5.2 This cancellation right does not apply:

5.2.1 in the case of goods made to Your specifications, where these are personalised goods or by reason of their nature cannot be returned; or

5.2.2 where We have started work on the Services with Your agreement (given in Term 3.4).

5.3 As a Consumer Your right to cancel the Agreement starts on the date the Agreement is formed. You have fourteen working days to cancel the Agreement. If you cancel the Agreement within this period, and the exceptions set out in Term 5.2 do not apply, then You will receive a full refund of any price paid by You. The refund will be processed as soon as possible, and in any case within 30 days of the day on which you gave us notice of cancellation. You will not be liable for any further payment to us in respect of the Agreement.

5.4 To cancel the Agreement You must contact Us in writing at our registered office address by sending an email to helpdesk@infotrack.co.uk

5.5 Following cancellation of the Agreement (save for cancellation in accordance with Term 5.3) You will remain liable for any costs, expenses and disbursements incurred by Us prior to receiving written notice of cancellation. Such costs, expenses and disbursements shall be invoiced and payable in accordance with Term 4.2.

6 Termination

6.1 InfoTrack Ltd may suspend or terminate any agreement with You without any liability to You with immediate effect if at any time:

6.1.1 You fail to make any payment due in accordance with Term 4;

6.1.2 If You repeatedly breach or commit or cause to be committed a material breach of these Terms; or

6.1.3 You commit a breach and You fail to remedy the breach within 7 days of receipt of a written notice to do so.

6.2 If an Agreement is terminated under this Term 6 and You have made an advance payment We will refund You a reasonable proportion of the balance as determined exclusively by Us having regard to the value of Services already provided to You.

7 **Events Beyond Our Control**

7.1 We reserve the right without notice or liability to You, to defer the date of performance (by a period equivalent to the period during which the Services could not be performed) or to cancel the provision of the Services or reduce the volume of the Services ordered by You if we are prevented from or delayed in the carrying on of Our business due to circumstances beyond Our reasonable control provided that, if the event in question continues for a continuous period in excess of 60 days, You shall be entitled to give notice in writing to us to terminate the Order.

8 **Warranties and Limitation of Liability**

8.1 Subject to Term 9 and Term 10 (as applicable), We provide warranties and accept liability only to the extent stated in this Term 8.

8.2 We do not exclude or restrict our liability for death or personal injury caused by our own negligence or any other liability the exclusion of which is expressly prohibited by law.

8.3 Unless otherwise indicated on the front page of the Report, We confirm that any individuals within Our business who conducted any searches has not knowingly had any personal or business relationship with any individual involved in the sale of or dealings with the Property.

8.4 In providing the Services You acknowledge and accept that:-

8.4.1 InfoTrack Ltd's only obligation is to exercise reasonable care and skill in providing the Services in accordance with the Code.

8.4.2 The Services do not include any information relating to the value or worth of the Property or the Company.

8.4.3 InfoTrack Ltd cannot warrant or guarantee that the Website or any website linked to or from the Website will be uninterrupted or error free or free of viruses or other harmful components and furthermore InfoTrack Ltd cannot warrant the performance of any linked internet service not operated by InfoTrack Ltd. Accordingly InfoTrack Ltd shall not be liable for any damage or loss whatsoever caused: by any virus, including damage to Your computer equipment, software, data or other property resulting from Your access to, use of or browsing of the Website; or as a result of downloading any material, data, text, images, video or audio from the Website; or by the contents of or Your access to, any website linked to the Website; or for inaccuracies or typographical errors of information or on the Website.

8.4.4 InfoTrack Ltd shall use reasonable endeavours to provide the Services within the timescale set out in the Literature.

8.4.5 Any services other than our Services, which are advertised in the Literature are for information only, and We are not responsible for any such services which You may use as a result of our recommendation or otherwise. Any such third party services may be subject to the terms and conditions of the relevant third party service provider.

8.5 In connection with the Report You undertake to make a reasonable inspection of any results set out therein to satisfy Yourself that there are no defects or failures. In the event that there is a material defect You will notify Us in writing of such defect as soon as possible after its discovery.

8.6 Any claim relating to data or information obtained from a Supplier shall in the first instance be made against the Supplier (with such assistance from InfoTrack Ltd as may reasonably be required) and only if such a claim cannot be made against the Supplier will You make a claim against InfoTrack Ltd.

9 Our Liability if you are a Business
This Term 9 only applies if you are not contracting as a Consumer

9.1 We only supply the Reports for use by You and Your Clients, and You agree not to use the Reports for any re-sale purposes unless You have obtained Our prior written consent.

9.2 Nothing in these Terms limits or excludes Our liability for:

9.2.1 Death or personal injury caused by Our negligence;

9.2.2 Fraud or fraudulent misrepresentation;

9.2.3 Any loss or damage sustained as a direct consequence of Our negligence;

9.2.4 Breach of the terms implied by section 12 of the Sale of Goods Act 1979 (title and quiet possession); or

9.2.5 Defective products under the Consumer Protection Act 1987.

9.3 Subject to Term 9.2, We will under no circumstances whatever be liable to You (or any other party entitled to rely on the Report(s)), whether in contract, tort (including negligence), breach of statutory duty, or otherwise, arising under or in connection with the Agreement for:

9.3.1 Any loss of profits, sales, business or revenue;

9.3.2 Loss or corruption of data, information or software;

9.3.3 Loss of business opportunity;

9.3.4 Loss of anticipated savings;

9.3.5 Loss of goodwill; or

9.3.6 Any indirect or consequential loss.

9.4 Subject to Term 9.2 and Term 9.3, Our total liability to You in respect of all other losses arising under or in connection with the Contract, whether in contract, tort (including negligence), breach of statutory duty, or otherwise, shall in no circumstances exceed £10 million.

9.5 Except as expressly stated in these Terms, We do not give any representation, warranties or undertakings in relation to the Reports. Any representation, condition or warranty which might be implied or incorporated into these Terms by statute, common law or otherwise is excluded to the fullest extent permitted by law. In particular, We will not be responsible for ensuring that the Reports are suitable for Your purposes.

10 **Our liability if you are a Consumer**
This Term 10 only applies if you are a Consumer.

10.1 If We fail to comply with these Terms, We are responsible for loss or damage You suffer that is a foreseeable result of Our breach of these Terms or Our negligence, but We are not responsible for any loss or damage that is not foreseeable. Loss or damage is foreseeable if they were an obvious consequence of Our breach or if they were contemplated by You and us at the time We entered into the Agreement.

10.2 We only supply the Reports for private use. You agree not to use the Reports for any commercial, business or re-sale purposes, and We have no liability to You for any loss of profit, loss of business, business interruption, or loss of business opportunity.

10.3 We do not in any way exclude or limit Our liability for:

10.3.1 Death or personal injury caused by Our negligence;

10.3.2 Fraud and fraudulent misrepresentation;

10.3.3 Any breach of the terms implied by section 12 of the Sale of Goods Act 1979 (title and quiet possession);

10.3.4 Any breach of the terms implied by sections 13 to 15 of the Sale of Goods Act 1979 (description, satisfactory quality, fitness for purpose and samples); and

10.3.5 Defective products under the Consumer Protection Act 1987.

10.4 We have obtained insurance cover in respect of Our own liability for individual claims not exceeding £10 million per claim. Our liability is therefore limited to £10 million in respect of any single claim, event, or series of related claims or events and You are responsible for making your own arrangements for the insurance of any excess loss.

11 Intellectual Property Rights

11.1 You acknowledge that all Intellectual Property Rights in the Services are and shall remain owned by either InfoTrack Ltd or our Suppliers and nothing in these Terms purports to transfer, assign or grant any rights to You in respect of the Intellectual Property Rights.

11.2 You agree to indemnify Us against all liabilities, costs, expenses, damages and losses (including but not limited to any direct, indirect or consequential losses and all interest, penalties and legal costs (calculated on a full indemnity basis) and all other professional costs and expenses) arising out of or in connection with any claim for actual or alleged infringement of a third party's Intellectual Property Rights as a result of You including an Ordnance Survey plan within the Order.

12 **Insurance**

12.1 Our insurers are QBE Insurance (Europe) Ltd whose address is Plantation Place, 30 Fenchurch Street, London, EC3M 3BD. The level of cover provided by them for our Professional Indemnity Insurance is £10 million.

12.2 Our Professional Indemnity Insurance includes cover for errors and omissions in local authority and water company data and records used to compile our search reports.

12.3 Should we cease to trade for any reason, prior to that event, we shall execute run-off insurance cover under our Professional Indemnity Insurance for our past search products and services.

13 Complaints

13.1 Full details of Our Complaints Procedure are set out on Our Website. We will deal with any complaints made by You in accordance with the Complaints Procedure.

13.2 As per Our Complaints Procedure, should you not be satisfied with our final response or we have exceeded the response timescales pursuant to Our Complaints Procedure, you may refer your complaint to The Property Ombudsman Scheme. The Property Ombudsman Scheme's website is www.tpos.co.uk and email address is admin@tpos.co.uk.

13.3 We will co-operate fully with The Property Ombudsman Scheme during an investigation and comply with his final decision.

14 General

14.1 You shall not be entitled to assign the Agreement or any part of it without Our prior written consent.

14.2 We may assign the Agreement or any part of it to any person, firm or company provided that such assignment shall not materially affect Your rights under the Agreement.

14.3 The parties to these Terms do not intend that any term of Our Agreement shall be enforceable by virtue of the Contracts (Rights of Third Parties) Act 1999 by any person that is not a party to these Terms or a permitted assignee.

14.4 Failure or delay by Us in enforcing or partially enforcing any provision of the Agreement will not be construed as a waiver of any of Our rights under the Agreement.

14.5 Any waiver by Us of any breach of, or any default under, any provision of the Agreement by You will not be deemed a waiver of any subsequent breach or default and will in no way affect the other terms of the Agreement.

14.6 If any provision or part of a provision is held to be invalid or unenforceable by any court or other body of competent jurisdiction, that provision or part of that provision shall be deemed severable and the other provisions or the remainder of the relevant provision will continue in full force and effect.

14.7 Unless otherwise stated in these Terms, all notices from You to InfoTrack Ltd or vice versa must be in writing and sent to InfoTrack Ltd's registered office address as stipulated in Term 1.15 (or as updated from time to time) or Your address as stipulated in the Order.

14.8 In providing the Services and Reports We will comply with the Code.

14.9 Any personal information which you provide to us will be held in accordance with the Data Protection Act 1998 and other applicable regulations and only used in accordance with Our Privacy Policy (details of which are set out on Our Website).

14.10 The Agreement shall be governed by and construed in accordance with English law and shall be subject to the non-exclusive jurisdiction of the Courts of England and Wales. However, if You are a resident of Northern Ireland you may also bring proceedings in Northern Ireland, and if you are a resident of Scotland you may also bring proceedings in Scotland.

Revised 29 January 2019

Appendix C: Hydraulic Modelling Results

FRA and SuDS Strategy

6 Lindfield Gardens

eight associates

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info@eightassociates.co.uk

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	5	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.400	Preferred Cover Depth (m)	1.200
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
1	0.009	5.00	13.910	1200	40.300	630.200	1.300
2	0.029	5.00	13.040	1500	62.300	628.800	1.300
3	0.010	5.00	13.040	1200	84.500	643.400	1.300
4			13.040	1200	84.000	629.000	1.665
5	0.021	5.00	10.040	1200	94.100	629.000	1.350
Outfall	0.000		10.040	1200	94.100	641.500	1.474

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	1	2	22.045	0.600	12.610	11.740	0.870	25.3	100	5.24	50.0
1.001	2	4	21.701	0.600	11.740	11.375	0.365	59.5	100	5.60	50.0
2.000	3	4	14.409	0.600	11.740	11.375	0.365	39.5	100	5.20	50.0
1.002	4	5	10.100	0.600	11.375	8.740	2.635	3.8	100	5.64	50.0
1.003	5	Outfall	12.500	0.600	8.690	8.566	0.124	100.8	150	5.85	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	1.539	12.1	1.2	1.200	1.200	0.009	0.0	21	0.985
1.001	1.001	7.9	5.1	1.200	1.565	0.038	0.0	59	1.066
2.000	1.231	9.7	1.4	1.200	1.565	0.010	0.0	25	0.868
1.002	3.978	31.2	6.5	1.565	1.200	0.048	0.0	31	3.140
1.003	1.001	17.7	9.4	1.200	1.324	0.069	0.0	78	1.015

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	22.045	25.3	100	Circular	13.910	12.610	1.200	13.040	11.740	1.200
1.001	21.701	59.5	100	Circular	13.040	11.740	1.200	13.040	11.375	1.565
2.000	14.409	39.5	100	Circular	13.040	11.740	1.200	13.040	11.375	1.565
1.002	10.100	3.8	100	Circular	13.040	11.375	1.565	10.040	8.740	1.200

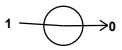
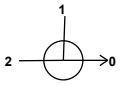
Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	1	1200	Manhole	Adoptable	2	1500	Manhole	Adoptable
1.001	2	1500	Manhole	Adoptable	4	1200	Manhole	Adoptable
2.000	3	1200	Manhole	Adoptable	4	1200	Manhole	Adoptable
1.002	4	1200	Manhole	Adoptable	5	1200	Manhole	Adoptable

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.003	12.500	100.8	150	Circular	10.040	8.690	1.200	10.040	8.566	1.324

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.003	5	1200	Manhole	Adoptable	Outfall	1200	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
1	40.300	630.200	13.910	1.300	1200				
						0	1.000	12.610	100
2	62.300	628.800	13.040	1.300	1500	1	1.000	11.740	100
									
						0	1.001	11.740	100
3	84.500	643.400	13.040	1.300	1200				
						0	2.000	11.740	100
4	84.000	629.000	13.040	1.665	1200		1	2.000	11.375	100
							2	1.001	11.375	100
						0	1.002	11.375	100
5	94.100	629.000	10.040	1.350	1200		1	1.002	8.740	100
						0	1.003	8.690	150
Outfall	94.100	641.500	10.040	1.474	1200	1	1.003	8.566	150
									

Simulation Settings

Rainfall Methodology	FSR	Drain Down Time (mins)	240
FSR Region	England and Wales	Additional Storage (m³/ha)	20.0
M5-60 (mm)	20.000	Check Discharge Rate(s)	✓
Ratio-R	0.400	1 year (l/s)	0.7
Summer CV	0.750	30 year (l/s)	1.6
Winter CV	0.840	100 year (l/s)	2.0
Analysis Speed	Normal	Check Discharge Volume	✓
Skip Steady State	x	100 year +40% 360 minute (m³)	36

Storm Durations

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

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
30	0	0	0
100	0	0	0
100	40	0	0

Pre-development Discharge Rate

Site Makeup	Brownfield	Time of Concentration (mins)	5.00
Brownfield Method	MRM	Betterment (%)	17
Contributing Area (ha)	0.118	Q 1 year (l/s)	0.7
PIMP (%)	56	Q 30 year (l/s)	1.6
CV	0.750	Q 100 year (l/s)	2.0

Pre-development Discharge Volume

Site Makeup	Brownfield	CV	0.750	Betterment (%)	17
Brownfield Method	MRM	Return Period (years)	100	PR	0.420
Contributing Area (ha)	0.118	Climate Change (%)	40	Runoff Volume (m^3)	36
PIMP (%)	56	Storm Duration (mins)	360		

Node 5 Online Depth/Flow Control

Flap Valve x | Replaces Downstream Link ✓ | Invert Level (m) 8.690

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.200	0.300	0.400	0.500	0.800	1.200	1.350	1.900

Node 5 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	8.690
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	

Depth (m)	Area (m^2)	Inf Area (m^2)	Depth (m)	Area (m^2)	Inf Area (m^2)	Depth (m)	Area (m^2)	Inf Area (m^2)
0.000	28.0	0.0	1.150	28.0	0.0	1.151	0.0	0.0

Results for 1 year Critical Storm Duration. Lowest mass balance: 99.69%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	1	10	12.632	0.022	1.3	0.0279	0.0000	OK
15 minute winter	2	11	11.807	0.067	5.4	0.1485	0.0000	OK
15 minute winter	3	10	11.766	0.026	1.4	0.0328	0.0000	OK
15 minute winter	4	11	11.407	0.032	6.5	0.0364	0.0000	OK
480 minute winter	5	352	8.980	0.290	1.3	8.5404	0.0000	SURCHARGED
15 minute summer	Outfall	1	8.566	0.000	0.2	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	1	1.000	2	1.3	0.380	0.105	0.0753	
15 minute winter	2	1.001	4	5.2	1.331	0.657	0.0842	
15 minute winter	3	2.000	4	1.4	0.743	0.142	0.0267	
15 minute winter	4	1.002	5	6.5	3.083	0.209	0.0406	
480 minute winter	5	Depth/Flow	Outfall	0.4				10.0

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.69%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	1	10	12.644	0.034	3.1	0.0437	0.0000	OK
15 minute winter	2	12	12.131	0.391	13.0	0.8664	0.0000	SURCHARGED
15 minute winter	3	10	11.783	0.043	3.5	0.0547	0.0000	OK
15 minute winter	4	11	11.418	0.043	12.2	0.0488	0.0000	OK
360 minute winter	5	264	9.331	0.641	3.3	18.8818	0.0000	SURCHARGED
15 minute summer	Outfall	1	8.566	0.000	0.4	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	1	1.000	2	3.1	0.505	0.253	0.1125	
15 minute winter	2	1.001	4	9.1	1.429	1.162	0.1200	
15 minute winter	3	2.000	4	3.5	1.097	0.357	0.0454	
15 minute winter	4	1.002	5	12.2	3.413	0.389	0.0558	
360 minute winter	5	Depth/Flow	Outfall	0.9				19.0

Results for 100 year Critical Storm Duration. Lowest mass balance: 99.69%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	1	10	12.650	0.040	4.0	0.0501	0.0000	OK
15 minute winter	2	13	12.407	0.667	17.0	1.4752	0.0000	SURCHARGED
15 minute winter	3	10	11.790	0.050	4.5	0.0638	0.0000	OK
15 minute winter	4	11	11.423	0.048	14.6	0.0541	0.0000	OK
360 minute winter	5	264	9.512	0.822	4.3	24.1884	0.0000	SURCHARGED
15 minute summer	Outfall	1	8.566	0.000	0.5	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	1	1.000	2	4.0	0.631	0.327	0.1179	
15 minute winter	2	1.001	4	10.9	1.658	1.384	0.1250	
15 minute winter	3	2.000	4	4.4	1.194	0.459	0.0535	
15 minute winter	4	1.002	5	14.6	3.387	0.467	0.0582	
360 minute winter	5	Depth/Flow	Outfall	1.2				24.9

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.69%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	1	13	12.904	0.294	5.7	0.3730	0.0000	SURCHARGED
15 minute winter	2	13	12.844	1.104	23.1	2.4433	0.0000	FLOOD RISK
15 minute winter	3	10	11.802	0.062	6.3	0.0798	0.0000	OK
15 minute winter	4	11	11.430	0.055	18.7	0.0626	0.0000	OK
240 minute winter	5	192	9.947	1.257	8.2	34.0264	0.0000	FLOOD RISK
15 minute summer	Outfall	1	8.566	0.000	0.8	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	1	1.000	2	5.1	0.785	0.424	0.1725	
15 minute winter	2	1.001	4	13.3	1.953	1.698	0.1332	
15 minute winter	3	2.000	4	6.2	1.325	0.643	0.0676	
15 minute winter	4	1.002	5	18.6	3.495	0.597	0.0620	
240 minute winter	5	Depth/Flow	Outfall	1.8				30.0

Appendix D: SuDS Inspection & Maintenance Checklist

FRA and SuDS Strategy

6 Lindfield Gardens

eight associates

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www.eightassociates.co.uk
info@eightassociates.co.uk

Sustainable Drainage Systems (SuDS) Inspection and Maintenance Checklist*	
General information	
Development name and location	
SuDS measure(s) being inspected	
Inspection frequency	
SuDS measure(s) specification(s) and drawing(s)	

Inspection date								
	Details	**Y/N**	**Action required**	**Date completed**	**Details**	**Y/N**	**Action required**	**Date Completed**
General inspection items								
Is there any evidence of erosion, channelling, ponding (where not desirable) or other poor hydraulic performance?								
Is there any evidence of accidental spillages, oils, poor water quality, odours or nuisance insects?								
Have any health and safety risks been identified to either the public or maintenance operatives?								
Is there any deterioration in the surface of permeable or porous surfaces (e.g. rutting, spreading of blocks or signs of ponding								

Silt/sediment accumulation								
Is there any sediment accumulation at inlets (or other defined accumulation zones such as the surface of filter drains or infiltration basins and within proprietary devices)? If yes, state depth (mm) and extent. Is removal required? If yes, state waste disposal requirements and confirm that all waste management requirements have been complied with (consult environmental regulator)								
Is surface clogging visible (potentially problematic where water has to soak into the underlying construction or ground (e.g. underdrained swale or infiltration basin)?								
Does permeable or porous surfacing require sweeping to remove silt?								
System blockages and litter build-up								
Is there evidence of litter accumulation in the system? If yes, is this a blockage risk?								
Is there any evidence of any other clogging or blockage of outlets or drainage paths?								

Vegetation								
Is the vegetation condition satisfactory (density, weed growth, coverage etc)? (Check against approved planting regime)								
Does any part of the system require weeding, pruning or mowing? (Check against maintenance frequency stated in approved design)								
Is there any evidence of invasive species becoming established? If yes, state action required								
Infrastructure								
Are any check dams or weirs in good condition?								
Is there evidence of any accidental damage to the system (e.g. wheel ruts?)								
Is there any evidence of cross connections or other unauthorised inflows?								
Is there any evidence of tampering with the flow controls?								
Are there any other matters that could affect the performance of the system in relation to the design objectives for hydraulic, water quality, biodiversity and visual aspects? (Specify.)								
Other observations								
Information appended (e.g. photos)								
Suitability of current maintenance regime								
Continue as current; Increase maintenance; or Decrease maintenance								
Next inspection								
Proposed date for next inspection								

*The SuDS Manual (C753) 2015, Maintenance Inspection Checklist; http://www.susdrain.org/resources/SuDS_Manual.html

Appendix E: Existing Site Plan

FRA and SuDS Strategy

6 Lindfield Gardens

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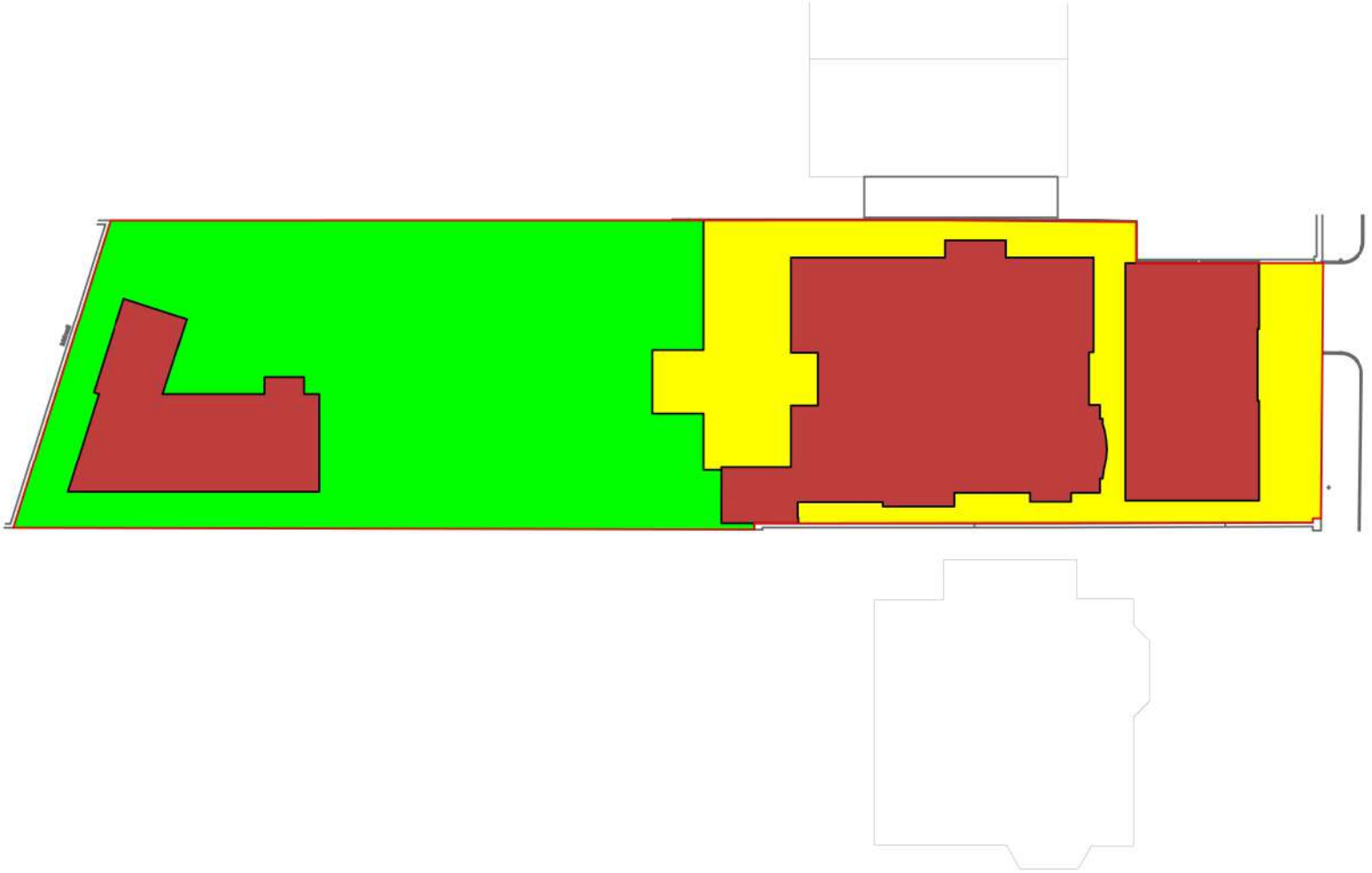

Legend

- Site boundary
- Hard landscaping (impermeable) - c. 226m2 total
- Buildings (impermeable) - c. 437m2 total
- Soft landscaping (permeable) - c. 521m2 total

Notes

This drawing shows measured areas of the existing site, as shown in the topographical plan. This drawing should be read in conjunction with the Eight Associates SuDS Strategy report.

Where areas are not shown on the topographical plan, aerial imagery has been used to estimate the areas relevant to this plan. This drawing is not to scale.

Project name

6 Lindfield Gardens

Drawing name

Existing - areas

Date

10/09/2020

Drawing number

5207_A_01

Appendix F: Proposed Site Plan

FRA and SuDS Strategy

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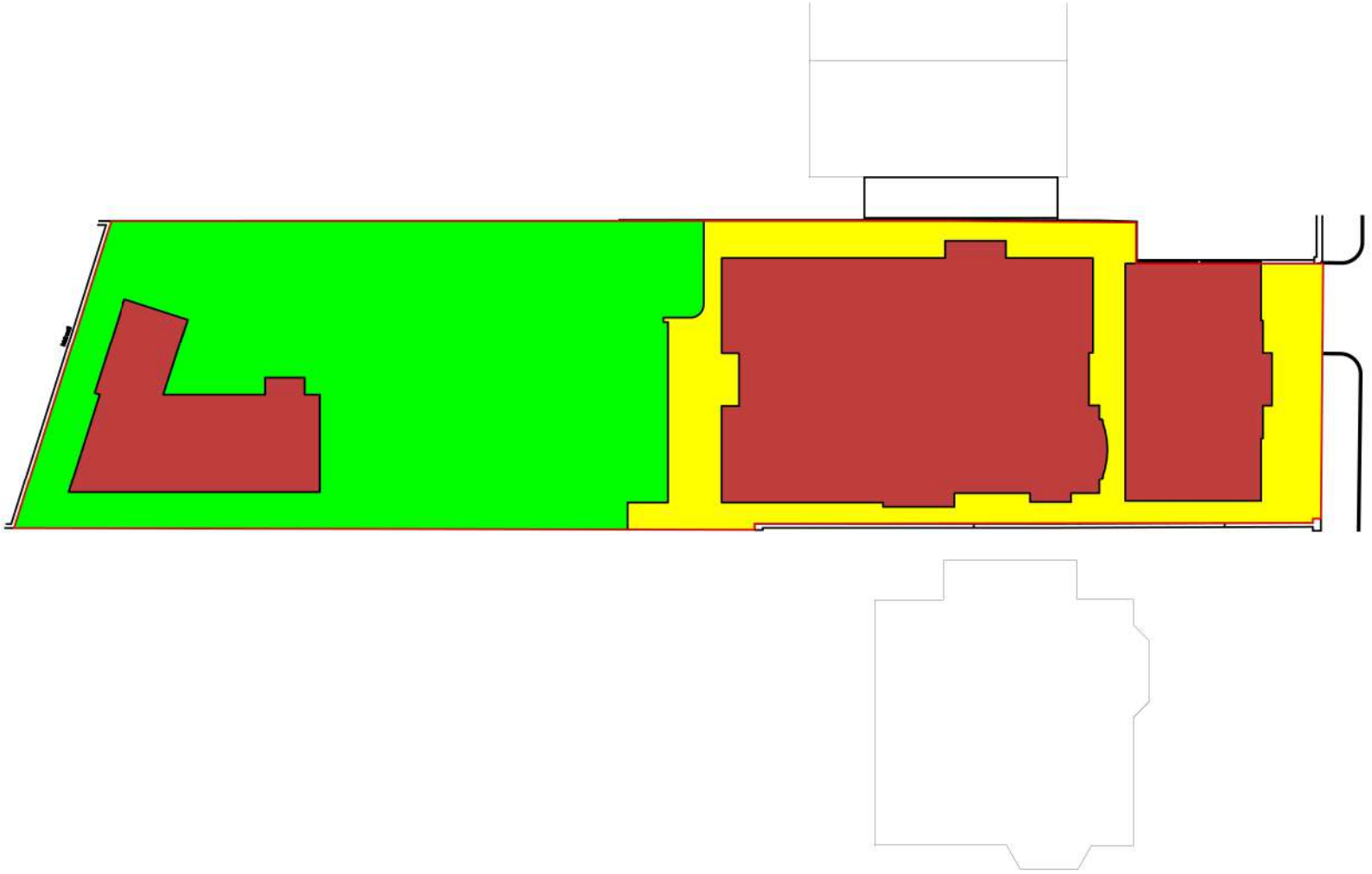

Legend

- Site boundary
- Hard landscaping (impermeable) - c. 212m2 total
- Buildings (impermeable) - c. 484m2 total
- Soft landscaping (permeable) - c. 488m2 total

Notes

This drawing shows measured areas of the proposed development site, as shown in architect drawings. This drawing should be read in conjunction with the Eight Associates SuDS Strategy report.

The areas on the site are subject to change during the detailed design stages and should be reviewed by the design team.This drawing is not to scale.

Project name

6 Lindfield Avenue

Drawing name

Proposed - areas

Date

23/09/2020

Drawing number

5207_A_02

Appendix G: Preliminary SuDS Layout

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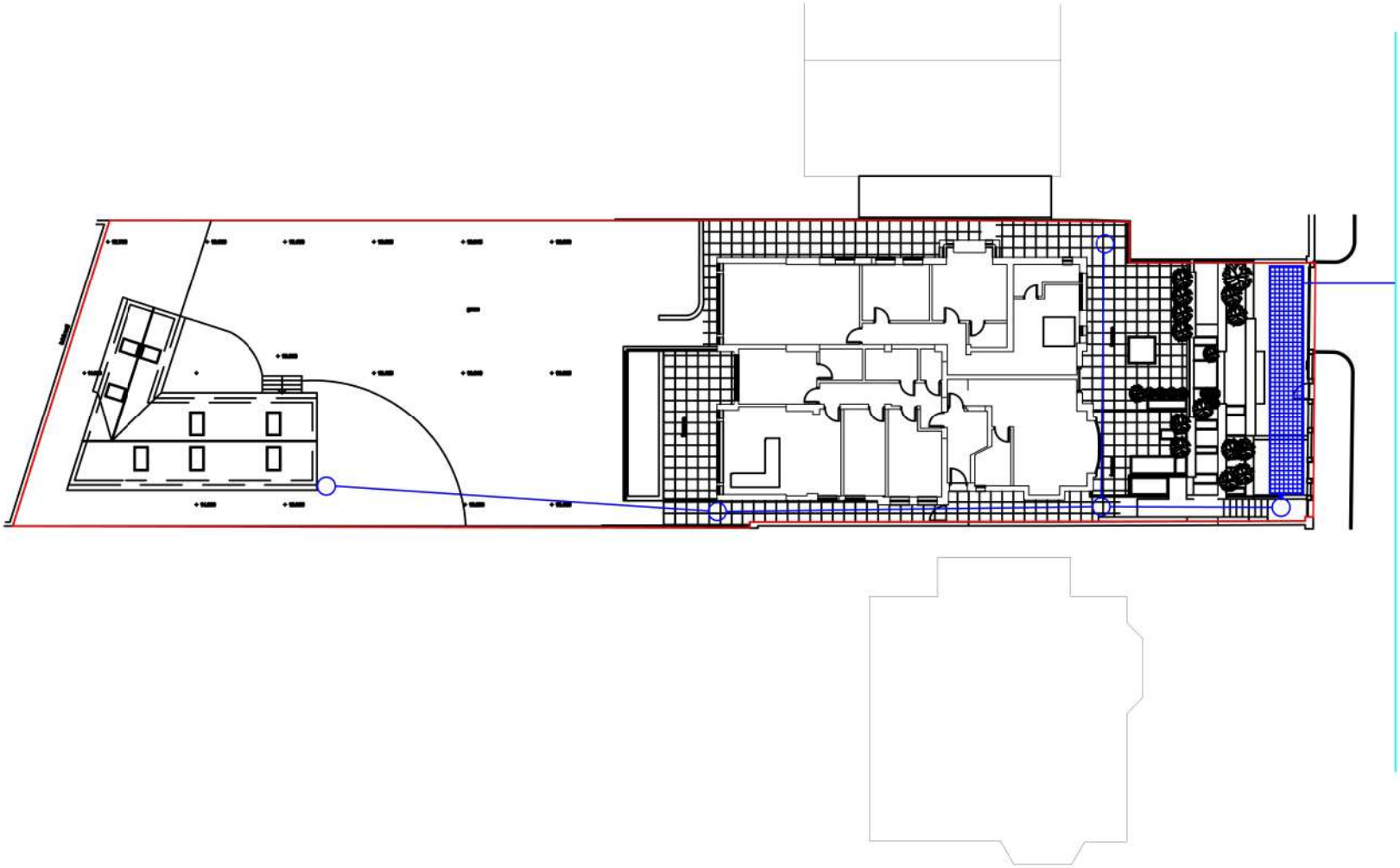

Legend

- Site boundary
- Approximate location of existing combined water sewer
- Sub-surface geocellular attenuation storage
- Proposed notional pumped flow control device
- Proposed notional surface water drainage network
- Proposed notional drainage junctions, inspection chambers, manholes

Notes

This drawing shows potential locations of sustainable drainage systems (SuDS) components and a preliminary notional surface water drainage network layout. This drawing should be read in conjunction with the Eight Associates SuDS Strategy report.

The locations and arrangements of SuDS components in this drawing are indicative and should be subject to a detailed review of feasibility by a structural or drainage engineer during the detailed design stages. This drawing is not to scale.

Project name

6 Lindfield Gardens

Drawing name

Proposed - preliminary SuDS layout

Date

23/09/2020

Drawing number

5207_A_03

Appendix H: Camden SuDS Proforma

FRA and SuDS Strategy

6 Lindfield Gardens

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Surface Water Drainage Pro-forma for new developments

This pro-forma accompanies our advice note on surface water drainage. Developers should complete this form and submit it to the Local Planning Authority, referencing from where in their submission documents this information is taken. The pro-forma is supported by the Defra/EA guidance on Rainfall Runoff Management and uses the storage calculator on www.UKsuds.com. This pro-forma is based on current industry best practice and focuses on ensuring surface water drainage proposals meet national and local policy requirements. The pro-forma should be considered alongside other supporting SuDS Guidance.

1. Site Details

Site	6 Lindfield Gardens
Address & post code or LPA reference	6 Lindfield Gardens, NW3 6PU
Grid reference	X - 526093, Y - 185276
Is the existing site developed or Greenfield?	Developed
Is the development in a LFRZ or in an area known to be at risk of surface or ground water flooding? If yes, please demonstrate how this is managed, in line with DP23?	No
Total Site Area served by drainage system (excluding open space) (Ha)*	0.0663

* The Greenfield runoff off rate from the development which is to be used for assessing the requirements for limiting discharge flow rates and attenuation storage from a site should be calculated for the area that forms the drainage network for the site whatever size of site and type of drainage technique. Please refer to the Rainfall Runoff Management document or CIRIA manual for detail on this.

2. Impermeable Area

	Existing	Proposed	Difference (Proposed-Existing)	Notes for developers
Impermeable area (ha)	0.0663	0.0695	0.0032	If the proposed amount of impermeable surface is greater, then runoff rates and volumes will increase. Section 6 must be filled in. If proposed impermeability is equal or less than existing, then section 6 can be skipped and section 7 filled in.
Drainage Method (infiltration/sewer/watercourse)	Sewer	Sewer	N/A	If different from the existing, please fill in section 3. If existing drainage is by infiltration and the proposed is not, discharge volumes may increase. Fill in section 6.

3. Proposing to Discharge Surface Water via

	Yes	No	Evidence that this is possible	Notes for developers
Existing and proposed MicroDrainage calculations	X		Appendix C	Please provide MicroDrainage calculations of existing and proposed run-off rates and volumes in accordance with a recognised methodology or the results of a full infiltration test (see line below) if infiltration is proposed.
Infiltration		X	Page 12, Figure 12	e.g. soakage tests. Section 6 (infiltration) must be filled in if infiltration is proposed.
To watercourse		X	Page 13, Figure 14	e.g. Is there a watercourse nearby?
To surface water sewer	X		Combined water sewer utilised (page14)	Confirmation from sewer provider that sufficient capacity exists for this connection.
Combination of above		X		e.g. part infiltration part discharge to sewer or watercourse. Provide evidence above.
Has the drainage proposal had regard to the SuDS hierarchy?	X		See Page 25 of report	Evidence must be provided to demonstrate that the proposed Sustainable Drainage strategy has had regard to the SuDS hierarchy as outlined in Section 2.5 above.
Layout plan showing where the sustainable drainage infrastructure will be located on site.	X		See Appendix G	Please provide plan reference numbers showing the details of the site layout showing where the sustainable drainage infrastructure will be located on the site. If the development is to be constructed in phases this should be shown on a separate plan and confirmation should be provided that the sustainable drainage proposal for each phase can be constructed and can operate independently and is not reliant on any later phase of development.

4. Peak Discharge Rates – This is the maximum flow rate at which storm water runoff leaves the site during a particular storm event.

	Existing Rates (l/s)	Proposed Rates (l/s)	Difference (l/s) (Proposed-Existing)	% Difference (difference /existing x 100)	Notes for developers
Greenfield QBAR	0.5	N/A	N/A	N/A	QBAR is approx. 1 in 2 storm event. Provide this if Section 6 (QBAR) is proposed.
1 in 1	0.8	0.4	0.4	50	Proposed discharge rates (with mitigation) should aim to be equivalent to greenfield rates for all corresponding storm events. As a minimum, peak discharge rates must be reduced by 50% from the existing sites for all corresponding rainfall events.
1 in 30	1.9	0.9	1	53	
1in 100	2.4	1.2	1.2	50	
1 in 100 plus climate change	N/A	1.8	-	25	The proposed 1 in 100 +CC peak discharge rate (with mitigation) should aim to be equivalent to greenfield rates. As a minimum, proposed 1 in 100 +CC peak discharge rate must be reduced by 50% from the existing 1 in 100 runoff rate sites.

5. Calculate additional volumes for storage –The total volume of water leaving the development site. New hard surfaces potentially restrict the amount of stormwater that can go to the ground, so this needs to be controlled so not to make flood risk worse to properties downstream.

	Greenfield runoff volume (m^3)	Existing Volume (m^3)	Proposed Volume (m^3)	Difference (m^3) (Proposed-Existing)	Notes for developers
1 in 1	10	9	8.4	0.6	Proposed discharge volumes (with mitigation) should be constrained to a value as close as is reasonably practicable to the greenfield runoff volume wherever practicable and as a minimum should be no greater than existing volumes for all corresponding storm events. Any increase in volume increases flood risk elsewhere. Where volumes are increased section 6 must be filled in.
1 in 30	24	20	19	1	
1in 100 6 hour	33	31	24.9	6.1	
1 in 100 6 hour plus climate change	48	43	35.5	7.5	The proposed 1 in 100 +CC discharge volume should be constrained to a value as close as is reasonably practicable to the greenfield runoff volume wherever practicable. As a minimum, to mitigate for climate change the proposed 1 in 100 +CC volume discharge from site must be no greater than the existing 1 in 100 storm event. If not, flood risk increases under climate change.

6. Calculate attenuation storage – Attenuation storage is provided to enable the rate of runoff from the site into the receiving watercourse to be limited to an acceptable rate to protect against erosion and flooding downstream. The attenuation storage volume is a function of the degree of development relative to the greenfield discharge rate.

		Notes for developers
Storage Attenuation volume (Flow rate control) required to meet greenfield run off rates (m^3)	32.2	Volume of water to attenuate on site if discharging at a greenfield run off rate. Can't be used where discharge volumes are increasing
Storage Attenuation volume (Flow rate control) required to reduce rates by 50% (m^3)	32.2	Volume of water to attenuate on site if discharging at a 50% reduction from existing rates. Can't be used where discharge volumes are increasing
Storage Attenuation volume (Flow rate control) required to meet [OTHER RUN OFF RATE (as close to greenfield rate as possible] (m^3)	-	Volume of water to attenuate on site if discharging at a rate different from the above – please state in 1st column what rate this volume corresponds to. On previously developed sites, runoff rates should not be more than three times the calculated greenfield rate. Can't be used where discharge volumes are increasing
Storage Attenuation volume (Flow rate control) required to retain rates as existing (m^3)	32.2	Volume of water to attenuate on site if discharging at existing rates. Can't be used where discharge volumes are increasing
Percentage of attenuation volume stored above ground,	0 - Limited space at right topographical level	Percentage of attenuation volume which will be held above ground in swales/ponds/basins/green roofs etc. If 0, please demonstrate why.

7. How is Storm Water stored on site?

Storage is required for the additional volume from site but also for holding back water to slow down the rate from the site. This is known as attenuation storage and long term storage. The idea is that the additional volume does not get into the watercourses, or if it does it is at an exceptionally low rate. You can either infiltrate the stored water back to ground, or if this isn't possible hold it back with on site storage. Firstly, can infiltration work on site?

			Notes for developers
Infiltration	**State the Site's Geology and known Source Protection Zones (SPZ)**	Site not in a SPZ - Page 12 (fig 13)	Avoid infiltrating in made ground. Infiltration rates are highly variable and refer to Environment Agency website to identify and source protection zones (SPZ)
	Are infiltration rates suitable?	Not suitable - Figure 12 (page 12)	Infiltration rates should be no lower than $1x10^{-6}$ m/s.
	State the distance between a proposed infiltration device base and the ground water (GW) level	n/a	Need 1m (min) between the base of the infiltration device & the water table to protect Groundwater quality & ensure GW doesn't enter infiltration devices. Avoid infiltration where this isn't possible.

	Were infiltration rates obtained by desk study or infiltration test?	Desk study	Infiltration rates can be estimated from desk studies at most stages of the planning system if a back up attenuation scheme is provided..
	Is the site contaminated? If yes, consider advice from others on whether infiltration can happen.	n/a	Advice on contaminated Land in Camden can be found on our supporting documents webpage Water should not be infiltrated through land that is contaminated. The Environment Agency may provide bespoke advice in planning consultations for contaminated sites that should be considered.
In light of the above, is infiltration feasible?	**Yes/No? If the answer is No, please identify how the storm water will be stored prior to release**	No - Infiltration rates are expected to be too low and lack of suitable space	If infiltration is not feasible how will the additional volume be stored?. The applicant should then consider the following options in the next section.

Storage requirements

The developer must confirm that either of the two methods for dealing with the amount of water that needs to be stored on site.

Option 1 Simple – Store both the additional volume and attenuation volume in order to make a final discharge from site at the greenfield run off rate. This is preferred if no infiltration can be made on site. This very simply satisfies the runoff rates and volume criteria.

Option 2 Complex – If some of the additional volume of water can be infiltrated back into the ground, the remainder can be discharged at a very low rate of 2 l/sec/hectare. A combined storage calculation using the partial permissible rate of 2 l/sec/hectare and the attenuation rate used to slow the runoff from site.

		Notes for developers
Please confirm what option has been chosen and how much storage is required on site.	Option 1	The developer at this stage should have an idea of the site characteristics and be able to explain what the storage requirements are on site and how it will be achieved.

8. Please confirm

		Notes for developers
Which Drainage Systems measures have been used, including green roofs?	Pervious paving, attenuation storage	SUDS can be adapted for most situations even where infiltration isn't feasible e.g. impermeable liners beneath some SUDS devices allows treatment but not infiltration. See CIRIA SUDS Manual C697.
Drainage system can contain in the 1 in 30 storm event without flooding	Yes	This a requirement for sewers for adoption & is good practice even where drainage system is not adopted.
Will the drainage system contain the 1 in 100 +CC storm event? If no please demonstrate how buildings and utility plants will be protected.	Yes	National standards require that the drainage system is designed so that flooding does not occur during a 1 in 100 year rainfall event in any part of: a building (including a basement); or in any utility plant susceptible to water (e.g. pumping station or electricity substation) within the development.
Any flooding between the 1 in 30 & 1 in 100 plus climate change storm events will be safely contained on site.	No risk of flooding - all stormwater contained within	**Safely:** not causing property flooding or posing a hazard to site users i.e. no deeper than 300mm on roads/footpaths. Flood waters must drain away at section 6 rates. Existing rates can be used where runoff volumes are not increased.
How will exceedance events be catered on site without increasing flood risks (both on site and outside the development)?	No risk of flooding - all stormwater contained within system	**Safely:** not causing property flooding or posing a hazard to site users i.e. no deeper than 300mm on roads/footpaths. Flood waters must drain away at section 6 rates. Existing rates can be used where runoff volumes are not increased. Exceedance events are defined as those larger than the 1 in 100 +CC event.
How are rates being restricted (vortex control, orifice etc)	Depth/flow control	Detail of how the flow control systems have been designed to avoid pipe blockages and ease of maintenance should be provided.
Please confirm the owners/adopters of the entire drainage systems throughout the development. Please list all the owners.	tbc - To be finalised at detailed design.	If these are multiple owners then a drawing illustrating exactly what features will be within each owner's remit must be submitted with this Proforma.
How is the entire drainage system to be maintained?	Building owner to follow management plan on pages 29 to 31. Inspection and maintenance checklist provided in Appendix G. To be finalised at detailed design.	If the features are to be maintained directly by the owners as stated in answer to the above question please answer yes to this question and submit the relevant maintenance schedule for each feature. If it is to be maintained by others than above please give details of each feature and the maintenance schedule. Clear details of the maintenance proposals of all elements of the proposed drainage system must be provided. Details must demonstrate that maintenance and operation requirements are economically proportionate. Poorly maintained drainage can lead to increased flooding problems in the future.

9. Evidence Please identify where the details quoted in the sections above were taken from. i.e. Plans, reports etc. Please also provide relevant drawings that need to accompany your proforma, in particular exceedance routes and ownership and location of SuDS (maintenance access strips etc

Pro-forma Section	Document reference where details quoted above are taken from	Page Number
Section 2	5207-6 Lindfield Gardens-FRA and SuDS Strategy-2009-09bes	Appendix E and F
Section 3	5207-6 Lindfield Gardens-FRA and SuDS Strategy-2009-09bes	App C, G. Pg 12-15, pg 23-25
Section 4	5207-6 Lindfield Gardens-FRA and SuDS Strategy-2009-09bes	Page 27 and App C
Section 5	5207-6 Lindfield Gardens-FRA and SuDS Strategy-2009-09bes	Page 27 and App C
Section 6	5207-6 Lindfield Gardens-FRA and SuDS Strategy-2009-09bes	Appendix C and G
Section 7	5207-6 Lindfield Gardens-FRA and SuDS Strategy-2009-09bes	Page 12
Section 8	5207-6 Lindfield Gardens-FRA and SuDS Strategy-2009-09bes	App C, D, G and Page 29 to 31

The above form should be completed using evidence from the Flood Risk Assessment and site plans. It should serve as a summary sheet of the drainage proposals and should clearly show that the proposed rate and volume as a result of development will not be increasing. If there is an increase in rate or volume, the rate or volume section should be completed to set out how the additional rate/volume is being dealt with.

This form is completed using factual information from the Flood Risk Assessment and Site Plans and can be used as a summary of the surface water drainage strategy on this site.

Form Completed By: Ben Shirbini
Qualification of person responsible for signing off this pro-forma: Sustainable Built Environment BEng - Univesity of Nottingham, SuDS - R Wallingford

Company: Eight Associates
On behalf of (Client's details): Dimitar Stoyanov - AS Studio
Date: 09.09.2020

Appendix I: Camden SFRA Historic Floods

FRA and SuDS Strategy

6 Lindfield Gardens

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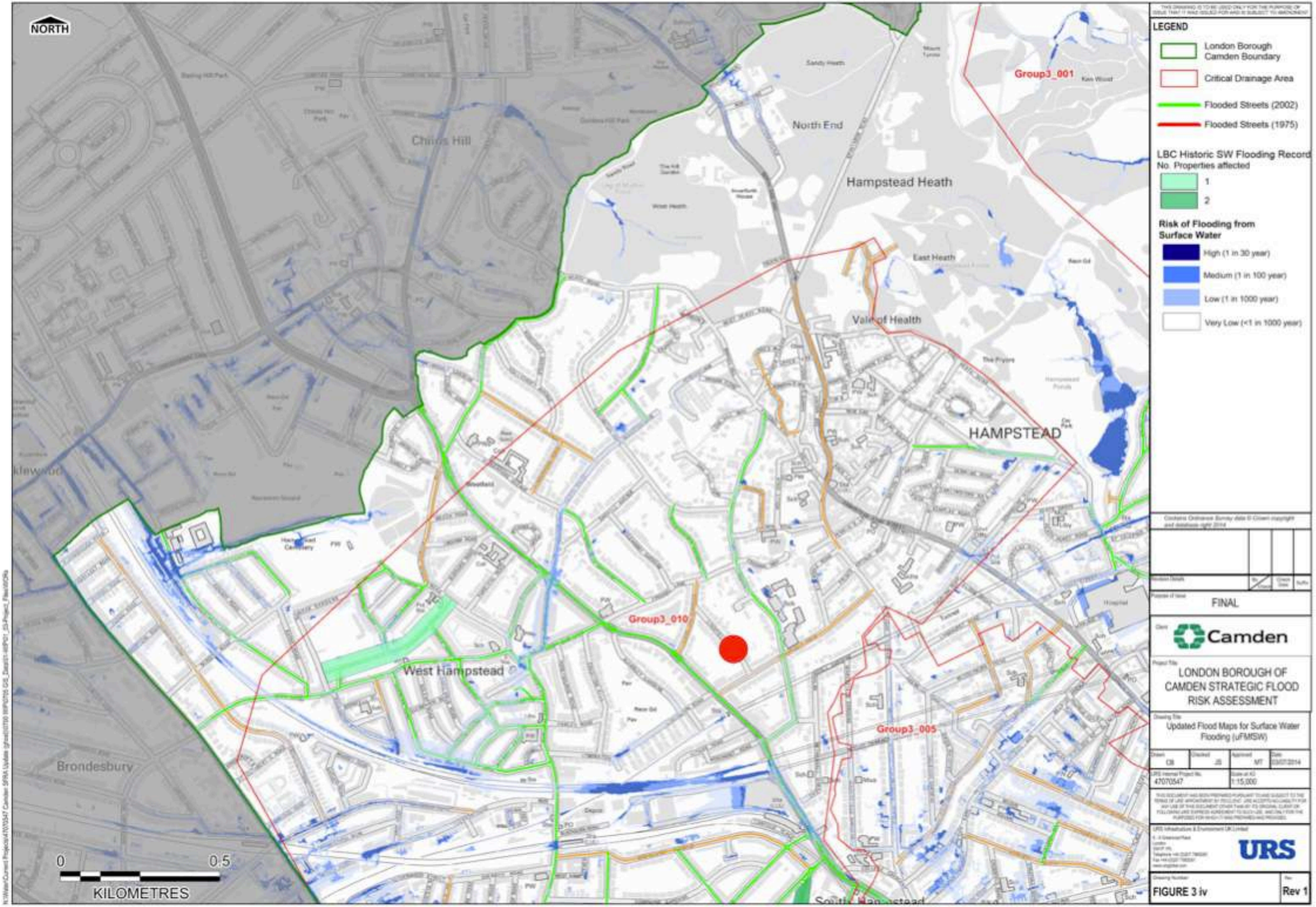
NORTH
Group3_001
Group3_010
Group3_005
Chimes Hill
North End
Hampstead Heath
East Heath
Vale of Health
HAMPSTEAD
West Hampstead
Brondesbury
0
0.5
KILOMETRES
LEGEND
London Borough Camden Boundary
Critical Drainage Area
Flooded Streets (2002)
Flooded Streets (1975)
LBC Historic SW Flooding Record
No. Properties affected
1
2
Risk of Flooding from Surface Water
High (1 in 30 year)
Medium (1 in 100 year)
Low (1 in 1000 year)
Very Low (<1 in 1000 year)
FINAL
Camden
LONDON BOROUGH OF CAMDEN STRATEGIC FLOOD RISK ASSESSMENT
Updated Flood Maps for Surface Water Flooding (uFMSW)
47070547
1:15,000
URS
FIGURE 3 iv
Rev 1