RUGBY CHAMBERS, 2 RUGBY STREET

Flood Risk Assessment

794-PLN-LSE-00270
Flood Risk Assessment
1
June 2024

rpsgroup.com

Quality Management

Version	Status	Authored by	Reviewed by	Approved by	Review date
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Approval for issue

C Patmore	21 June 2024

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The Rugby Trust

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1 INTRODUCTION

1.1 RPS was commissioned to prepare a Flood Risk Assessment (FRA) for a site located at Rugby Chambers, 2 Rugby Street, WC1N 3QU in relation to the proposed change of use from offices to residential.

1.2 As the proposed development includes residential dwellings on the lower ground floor, the FRA has been commissioned to demonstrate there will be no flood risk to future residents.

1.3 The aim of the FRA is to outline the potential for the site to be impacted by flooding, the impacts of the proposed development on flooding in the vicinity of the site, and the proposed measures which could be incorporated into the development to mitigate the identified risk. The report has been produced in accordance with the guidance detailed in the National Planning Policy Framework (NPPF) and the associated Planning Practice Guidance (PPG). Reference has also been made to the CIRIA SuDS manual (C753), the London Borough of Camden Strategic Flood Risk Assessment (SFRA), the London Borough of Camden Surface Water Management Plan (SWMP) and the Camden Planning Guidance (CPG).

1.4 This report has been produced in consultation with the Environment Agency (EA) and the Lead Local Flood Authority (LLFA). The site is not located within an Internal Drainage Board (IDB) District.

1.5 The desk study was undertaken by reference to information provided / published by the following bodies:

- EA;
- Centre for Ecology and Hydrology;
- British Geological Survey (BGS);
- Ordnance Survey (OS); and
- Thames Water (TW).

2 PLANNING POLICY CONTEXT

National Planning Policy

2.1 The National Planning Policy Framework (NPPF) was released in March 2012 and was updated in December 2023. The document advises of the requirements for a site-specific Flood Risk Assessment (FRA) for any of the following cases (Planning and Flood Risk paragraph 173 (footnote 59)):

- All proposals (including minor development and change of use) located within the EA designated floodplain, recognised as either Flood Zone 2 (medium probability) or Flood Zone 3 (high probability);
- All proposals of 1 hectare (ha) or greater in an area located in Flood Zone 1 (low probability);
- All proposals within an area which has critical drainage problems (as notified to the Local Planning Authority by the EA);
- Land identified in a strategic flood risk assessment as being at increased flood risk in future; and
- Where proposed development may be subject to other sources of flooding, where its development would introduce a more vulnerable use.

2.2 Paragraph 175 of the updated NPPF identifies that major developments (developments of 10 homes or more and to major commercial development) should incorporate Sustainable Drainage Systems unless there is clear evidence that this would be inappropriate. The systems used should:

a. Take account of advice from the Lead Local Flood Authority;

b. Have appropriate proposed minimum operational standards;

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

d. Where possible, provide multifunctional benefits.

2.3 Defra published their 'Non-statutory technical standards for sustainable drainage systems' in March 2015. These are supported by the revised NPPF.

Regional Planning Policy

2.4 The development site is within the London Borough of Camden which is covered by the London Plan 2021, published in March 2021. The London Plan contains various policies pertaining to flood risk and drainage, the relevant aspects of which are reproduced below.

Policy SI12 Flood Risk Management

A. Current and expected flood risk from all sources (as defined in paragraph 9.2.12) across London should be managed in a sustainable and cost-effective way in collaboration with the Environment Agency, the Lead Local Flood Authorities, developers and infrastructure providers.

B. Development Plans should use the Mayor's Regional Flood Risk Appraisal and their Strategic Flood Risk Assessment as well as Local Flood Risk Management Strategies, where necessary, to identify areas where particular and cumulative flood risk issues exist and develop actions and policy approaches aimed at reducing these risks. Boroughs should co-operate and jointly address cross-boundary flood risk issues including with authorities outside London.

C. *Development proposals should ensure that flood risk is minimised and mitigated, and that residual risk is addressed. This should include, where possible, making space for water and aiming for development to be set back from the banks of watercourses.*

D. *Developments Plans and development proposals should contribute to the delivery of the measures set out in Thames Estuary 2100 Plan. The Mayor will work with the Environment Agency and relevant local planning authorities, including authorities outside London, to safeguard an appropriate location for a new Thames Barrier.*

E. *Development proposals for utility services should be designed to remain operational under flood conditions and buildings should be designed for quick recovery following a flood.*

F. *Development proposals adjacent to flood defences will be required to protect the integrity of flood defences and allow access for future maintenance and upgrading. Unless exceptional circumstances are demonstrated for not doing so, development proposals should be set back from flood defences to allow for any foreseeable future maintenance and upgrades in a sustainable and cost-effective way.*

G. *Natural flood management methods should be employed in development proposals due to their multiple benefits including increasing flood storage and creating recreational areas and habitat.*

Policy SI13 Sustainable Drainage

A. *Lead Local Flood Authorities should identify – through their Local Flood Risk Management Strategies and Surface Water Management Plans – areas where there are particular surface water management issues and aim to reduce these risks. Increases in surface water runoff outside these areas also need to be identified and addressed.*

B. *Development proposals should aim to achieve greenfield run-off rates and ensure that surface water run-off is managed as close to its source as possible. There should also be a preference for green over grey features, in line with the following drainage hierarchy:*

1) *rainwater use as a resource (for example rainwater harvesting, blue roofs for irrigation)*
2) *rainwater infiltration to ground at or close to source*
3) *rainwater attenuation in green infrastructure features for gradual release (for example green roofs, rain gardens)*
4) *rainwater discharge direct to a watercourse (unless not appropriate)*
5) *controlled rainwater discharge to a surface water sewer or drain*
6) *controlled rainwater discharge to a combined sewer.*

C. *Development proposals for impermeable surfacing should normally be resisted unless they can be shown to be unavoidable, including on small surfaces such as front gardens and driveways.*

D. *Drainage should be designed and implemented in ways that promote multiple benefits including increased water use efficiency, improve water quality, and enhance biodiversity, urban greening, amenity and recreation.*

Local Planning Policy

2.5 The Camden Local Plan 2016-2031 adopted in July 2017 contains the following Policies relating to flood risk and drainage:

Policy CC2 Adapting to Climate Change

The Council will require development to be resilient to climate change.

All development should adopt appropriate climate change adaptation measures such as:

a. *the protection of existing green spaces and promoting new appropriate green infrastructure;*

b. *not increasing, and wherever possible reducing, surface water runoff through increasing permeable surfaces and use of Sustainable Drainage Systems;*

c. *incorporating bio-diverse roofs, combination green and blue roofs and green walls where appropriate; and*

d. *measures to reduce the impact of urban and dwelling overheating, including application of the cooling hierarchy.*

Any development involving 5 or more residential units or 500sqm or more of any additional floorspace is required to demonstrate the above in a Sustainable Statement.

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.

We will require development to:

a. *incorporate water efficiency measures;*

b. *avoid harm to the water environment and improve water quality;*

c. *consider the impact of development in areas at risk of flooding (including drainage);*

d. *incorporate flood resilient measures in areas prone to flooding;*

e. *utilise Sustainable Drainage Systems (SuDS) in line with the drainage hierarchy to achieve a greenfield run-off rate where feasible;*

f. *and not locate vulnerable development in flood-prone areas.*

Where an assessment of flood risk is required, developments should consider surface water flooding in detail and groundwater flooding where applicable.

The Council will protect the borough's existing drinking water and foul water infrastructure, including the reservoirs at Barrow Hill, Hampstead Heath, Highgate and Kidderpore.

2.6 The London Borough of Camden Level 1 SFRA (January 2024) identifies and maps flood risk from all sources at a borough-wide scale as well as providing guidance on producing site specific FRAs. Relevant information from the SFRA has been referenced throughout this FRA report.

2.7 The London Borough of Camden SWMP (2011) assesses the risk of surface water flooding within Camden and identifies options to manage risk to acceptable level. Relevant information from the SWMP has been reproduced throughout this FRA report.

2.8 The Camden Planning Guidance (CPG) on Basements was produced in January 2021 and provides extra guidance on the development of basements within the borough. Any relevant information from the CPG has been reproduced throughout this FRA report.

3 CONSULTATION

Environment Agency

3.1 As the site is located within Flood Zone 1, the risk of flooding from fluvial and tidal sources are considered to be very low. As a result, the EA have not been consulted further.

Thames Water

3.2 The public sewer network within the vicinity of the site is operated by Thames Water. TW were consulted for records of sewer flooding at the site, and they have indicated that there have been no incidents of flooding in the requested area because of surcharging public sewers. The TW response is provided in Appendix A.

3.3 A pre-development enquiry was also submitted to Thames Water, a response was not received at the time of report issue.

Lead Local Flood Authority

3.4 The site is within the administrative boundary of Camden Borough Council. Consultation has been undertaken with the council and included the following response:

- Any proposed basement development for this site to undertake extensive ground surveys to establish to make up of the ground (considering evidence of a historic watercourse), establish groundwater levels and hydrological modelling to determine if it possible for the development to prevent any significant harm from changes to groundwater levels or flow. However, as the site is already developed this will not be necessary.
- The Council also advised that where flood risk is identified the Council will not permit habitable rooms at basement level. This will be assessed throughout the following FRA.

3.5 The full response is included as Appendix B.

Internal Drainage Board

3.6 The site is not located within an IDB District.

4 SITE DESCRIPTION

Site Description

4.1 The site is located at National Grid Reference TQ 30710 82044, is square in shape and occupies an area of approximately 200m²/0.02 hectares (ha). The site location is presented in Figure 1.

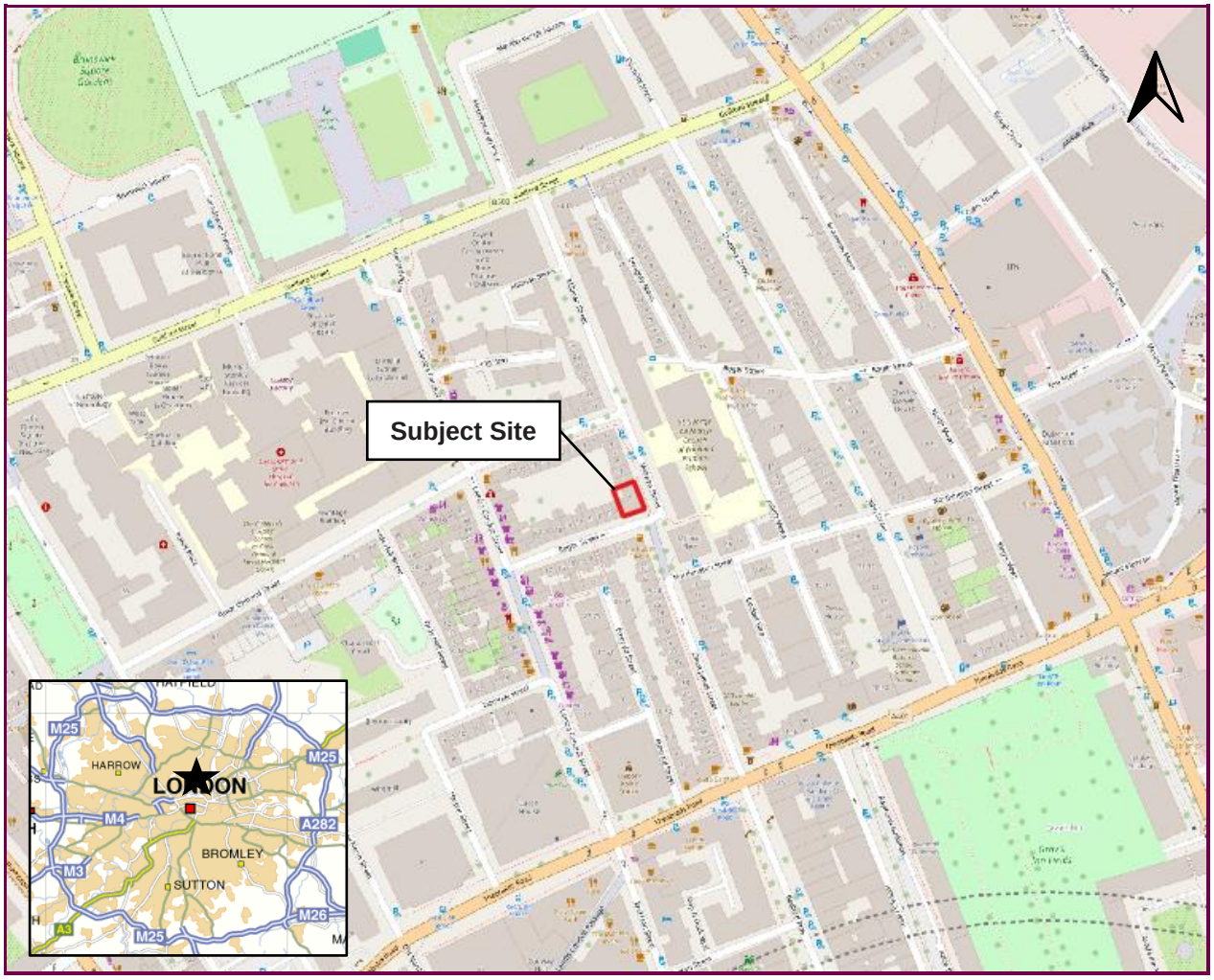

Figure 1. Site Location

4.2 The site is currently occupied by a 6-floor office building. The building is located on the corner of Rugby and Millman Street.

4.3 Vehicular access to the site will be via Rugby Street which is accessed via Millman Street, located to the east of the site. Pedestrian access to site will be via Rugby Street and via an alleyway connecting to Northington Street.

4.4 The site is currently 95% building cover and 5% hardstanding.

Surrounding Land Uses

4.5 The site is located within central London, it is situated in an area predominately residential and commercial. Located approximately 104.4m to the north of the site is Great Ormond Street Hospital. Located 200m to the north of the site is Brunswick Square Gardens.

4.6 The site is not located within a designated sensitive area (e.g. Special Area of Conservation (SAC), Special Protection Area (SPA) or Site of Special Scientific Interest (SSSI)) within close proximity to the site. There are also no designated sensitive areas within 1km of the site.

Topography

4.7 A topographic survey was not provided for the site. A LIDAR DTM (2022) to a 1m resolution was obtained for the site. LiDAR data has an error margin of +/- 150 mm. The elevations at the site are relatively, flat. The lowest elevation is 19.2 metres above ordnance datum m(AOD) in the east of the site, with the highest elevation at 21.5m AOD in the northwest/west of the site.

4.8 Finished floor levels of the site have not been provided. A lower ground floor is present at the site, which sits at 3.7m below the ground level. As such the lower ground level has conservatively been assumed to sit at a level of circa 15.5m AOD.

4.9 The LiDAR DTM is Included as Appendix C.

5 PROPOSED DEVELOPMENT

5.1 The proposal is for the proposed change of use from offices to residential units across all floors of the building. No external development is proposed with internal refurbishment only. Development plans are shown in Appendix D.

5.2 A total of 11 residential units are proposed across six floors: lower ground, ground, first, second, third and forth. These comprise of a mix of 2-bedroom and 1-bedroom units.

5.3 Vehicular and pedestrian access will remain as existing.

5.4 Entrance to the building will remain via Rugby Street.

5.5 The proposed proportions of hardstanding building will remain as existing.

5.6 The proposed use of the site is classified as ‘more vulnerable’ within the PPG.

6 HYDROLOGICAL SETTING

Nearby Watercourses

6.1 London's lost rivers network indicate that the nearest river to the site is the River Fleet, which is located approximately 0.2km to the southeast of the site. The River Fleet is located entirely underground and flows in a southerly direction where it discharges into the River Thames.

6.2 The River Thames is located approximately 1.3km to the south of the site. Itis an EA designated Main River and is tidally influenced.

6.3 No significant artificial watercourses / features (e.g. canals, reservoirs) have been identified within 1km of the site. However, located approximately 1.4km to the north of the site is Regent's Canal. Located 3.57km to the north west of the site is Barrow Hill Reservoir.

Fluvial / Tidal Flood Risk Classification

6.4 The EA Flood Map for Planning (available online) indicates that whole site (100%) is located within Flood Zone 1. The annual probability from fluvial or tidal sources is classified as the following:

- **Flood Zone 1:** land assessed as having a less than 1 in 1,000 annual probability of river or sea flooding (0.1%).
- **Flood Zone 2:** land assessed as having between a 1 in 100 and 1 in 1,000 annual probability of river flooding (1% – 0.1%), or between a 1 in 200 and 1 in 1,000 annual probability of sea flooding (0.5% – 0.1%) in any year.
- **Flood Zone 3:** land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%), or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year.

6.5 The EA Flood Map for Planning is provided in Figure 2.

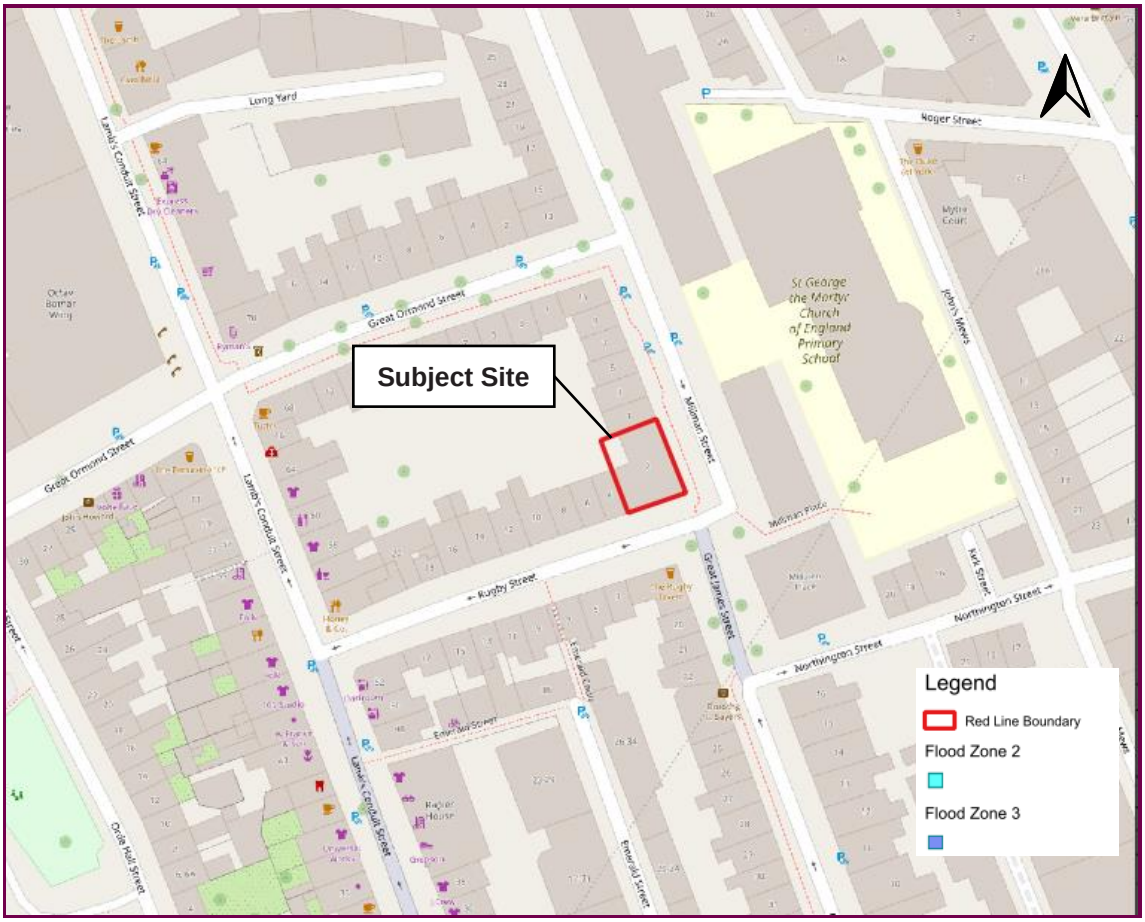

Figure 2. EA Flood Map for Planning

EA Flood Warning Area

6.6 The EA defines a Flood Warning Area as "*geographical areas where we expect flooding to occur and where we provide a Flood Warning Service. They generally contain properties that are expected to flood from rivers or the sea and in some areas, from groundwater*."

6.7 The site is not located within a Flood Warning or Flood Alert Area given its location within Flood Zone 1.

Surface Water Flood Risk Classification

6.8 The EA's updated Flood Map of Surface Water, which is available online, identifies areas at risk of surface water flooding. The classification of the risk is based on the following:

- **High risk:** The area has a chance of flooding of greater than 1 in 30 (3.3%) each year.
- **Medium risk:** The area has a chance of flooding of between 1 in 100 (1%) and 1 in 30 (3.3%) each year.
- **Low risk:** The area has a chance of flooding of between 1 in 1000 (0.1%) and 1 in 100 (1%) each year.
- **Very low risk:** The area has a chance of flooding of less than 1 in 1000 (0.1%) each year.

6.9 The updated Flood Map for Surface Water indicates that the whole site (100%) is classified as 'very low risk' of surface water. The are no depths or velocities expected at the site as a result of surface water flooding during any of the modelled surface water flood events.

6.10 The roads bounding the site, both Rugby Street to the south and Milman Street, the east, are indicated to be at 'low' risk of surface water flooding. During this event, flood depths will remain shallow and are not expected to exceed 300mm. The flood extent appears to be contained within the carriageway and not impact the walkway nor the building at the location of the site. The roads surrounding the site will remain dry during both the 'medium' and 'high' surface water flood events.

6.11 The updated Flood Map for Surface Water is presented in Figure 3.

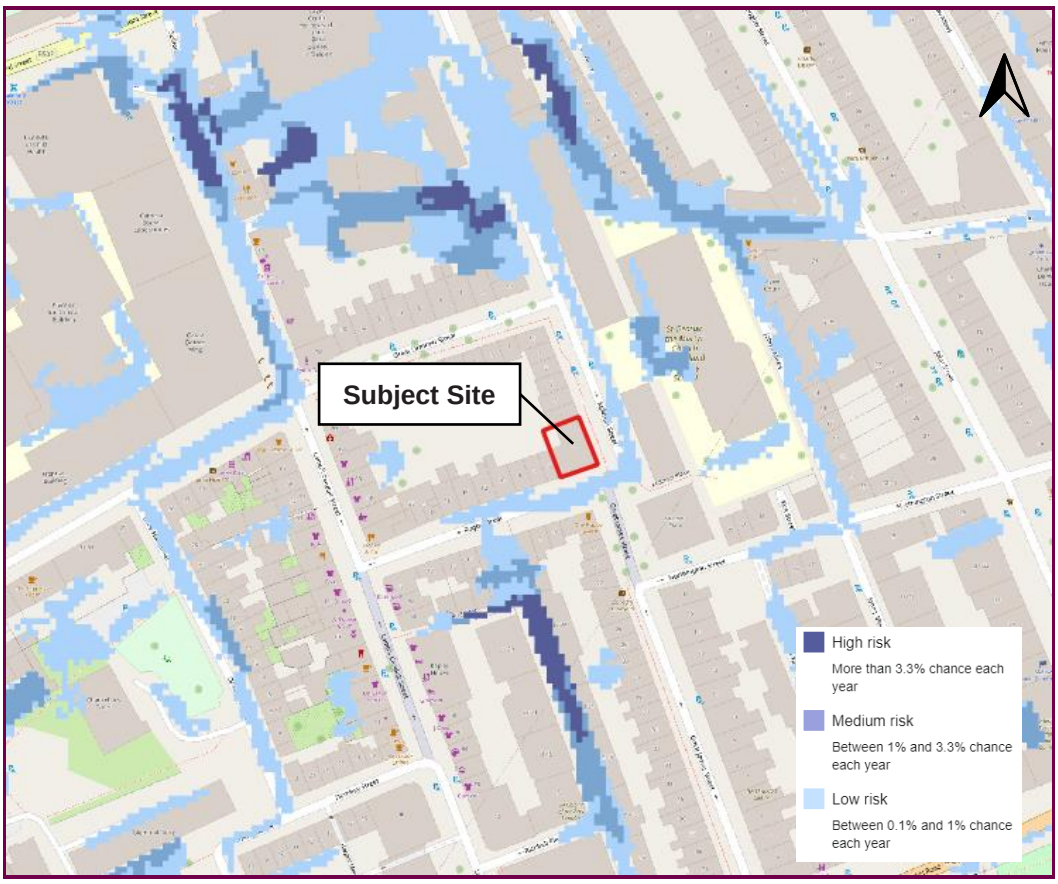

Figure 3. Updated Flood Map for Surface Water

Reservoir Flood Risk Classification

6.12 EA mapping also indicates that the site is not located within an area potentially at risk from reservoir flooding.

Local Authority Flood Risk Assessment

6.13 The Camden Level 1 SFRA was published in January 2024. It provides an overview of flood risk from various sources within the borough. Information relevant to this assessment is summarised below:

- The site is not located within any streets which has experienced flooding during 1975, 2002 and 2021.
- The site is not included within the EA's Historic Flood Extent Map.
- The SFRA confirms that the site has a bedrock geology of London Clay formation and superficial deposits of Lynch Hill Gravel Member.
- The SFRA confirms that the site is not located within Flood Zone 2 or 3.

- The SFRA mapping indicates that the site is located in an area with a very low risk of surface water. However, due to the broadscale mapping of the site, it is hard to be site specific.
- The site is located within Group3_003 Local Critical Drainage Areas (CDA).
- The site is confirmed not to be located within Counters Creek Catchment and also not located within an area of Potential External and Internal Flooding.
- The site is situated within an area where there is potential for groundwater flooding of property situated below the ground level. There is also potential for groundwater flooding to occur at the surface.
- The SFRA mapping indicates that the site is located within a Secondary A Aquifer designation. These formations are formed of permeable layers capable of supporting water supplies at a local scale, in some cases forming an important source of base flow to rivers.
- The SFRA confirms that the site is not located within a Source Protection Zone.
- The SFRA indicates the site is situated within an area served by a combined sewer network.
- The SFRA indicates that the site is located within an area which has experienced 0 – 5 Sewer incidents, between January 2013 and April 2023.
- The site is not located within the Reservoir Flood Extent, in all scenarios.
- The site is not located within a Flood Alert Area.
- The site is not affected by the maximum flood extents during a defended 1 in 100-year event plus all climate change scenarios for the River Lee, River Brent and Silk Stream.
- In the event of the River Thames Tidal Breach Scenario, the site is not affected in both the 2005 and the 2100 scenario.
- The site is not located within any areas where specific Section 19 Flood Investigation Reports have been carried out.

6.14 The Camden SWMP was published in July 2011. It provides an overview of flood risk from various sources within the borough. Information relevant to this assessment is summarised below:

- The site is located within Group3_003 Local Critical Drainage Areas (CDA) within the River Fleet Catchment.
- The main source of flooding in this CDA is pluvial.
- The CDA indicates that 84 commercial/industrial (15 which have basements) properties are at risk of flooding to a depth greater than 0.03m. 15 commercial/industrial properties are at risk of flooding to a depth greater than 0.5m. This information provided is not site specific and covers the whole CDA.

6.15 The Camden Planning Guidance (CPG) on Basements was published in January 2021 and provides extra guidance on the development of basements within the borough. Information relevant to this assessment is summarised below:

- Sewers are designed to surcharge to just below cover level, basement and other subterranean developments are at risk of flooding with sewage.
- Thames Water advises that to protect against flooding, the Council will ensure that all basement and other subterranean development Is protected from sewer flooding by the installation of a positive pumped device.

7 HYDROGEOLOGICAL SETTING

7.1 British Geological Survey (BGS) online mapping (1:50,000 scale) indicates that the site is situated on superficial deposits of Lynch Hill Gravel Member formed of Sand and gravel. This is underlain by a bedrock geology of London Clay Formation which is formed of Clay, silt and sand.

7.2 BGS GeoIndex records indicate that there are no boreholes present onsite. The nearest borehole, reference TQ38SW266 is located 35m to the north of the site. Made Ground is present until 3.04m, this is underlain by brown sandy clay and yellow clay until a depth of 7.3m. This is underlain by dark grey and mottle Reading Clay until 25.9m below ground level (bgl). The borehole had a total depth of 25.9m. No groundwater was recorded as being present.

7.3 The soils are described as ‘Freely draining slightly acid loamy soils’ by the National Soils Research Institute.

7.4 According to the EA’s Aquifer Designation Mapping, the strata at the surface are classified as a Secondary A Aquifer. These formations are formed of permeable layers capable of supporting water supplies at a local scale, in some cases forming an important source of base flow to rivers. This is underlain by a bedrock of unproductive strata, these formations have a low permeability and have negligible significance for water supply or base flow.

7.5 EA online groundwater Source Protection Zone (SPZ) mapping indicates that the site is not located within a groundwater SPZ.

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8 FLOOD RISK AND MITIGATION

8.1 The key sources of flooding that could potentially impact the site are discussed below:

Fluvial / Tidal Flooding

8.2 The EA Flood Map for Planning, as seen in Figure 2, indicates that the site is located completely within Flood Zone 1. The annual probability of flooding is classified as land assessed as having a less than 1 in 1,000 annual probability of river or sea flooding (0.1%) in the absence of any defences.

8.3 The Level 1 SFRA carried out by Camden Council confirmed that the site was not located within the EA's Historic Flood Extent Map. The site is also not included in the extent of historic street flooding maps that occurred during 1975, 2002 and 2021. Modelling was also undertaken for the defended 1 in 100-year event plus climate change for River Lee, River Brent and Silk Stream, in all modelled scenarios the site was not affected.

8.4 In the event of the River Thames Tidal Breach Scenario, the site is not affected during both the 2005 (Present Day) and the 2100 scenario (Future Scenario).

8.5 Dry access and egress will be available at the site, along the road of Rugby Chambers, during all fluvial/tidal flood events.

8.6 The PPG details the suitability of different land uses within each flood zone. The proposed land use is classified as 'more vulnerable' and such uses are generally considered appropriate within Flood Zone 1.

8.7 Overall, the risk of fluvial and tidal flooding at the site is deemed to be 'very low'.

Flooding from Sewers

8.8 Sewer flooding can occur during periods of heavy rainfall when a sewer becomes blocked or is of inadequate capacity. The site is currently served by Thames Water (detailed in Section 8).

8.9 The SFRA indicates that the site is located within an area which has experienced 0 – 5 Sewer Incidents, between January 2013 and April 2023.

8.10 Thames Water have been contacted regarding any records of historic sewer flooding. They confirmed that no sewer flooding has occurred at the site.

8.11 Pre and post-development calculations have been undertaken for the site to understand how the change of use of the site may affect foul flows. The calculations are included in Appendix E.

8.12 The Camden Planning Guidance on Basements states that as sewers are designed to surcharge just below cover level, basement and other subterranean developments they are at risk of flooding with sewage. It would be recommended that all basements and other subterranean developments are protected by the installation of a positive pumped device.

8.13 The discharge rate to the existing sewer will need to be updated and agreed with Thames Water to ensure that there is capacity to receive discharge from the site without significantly increasing flood risk, as the development will have increased users as it changes from offices to residential units. A Pre-development has been submitted to Thames Water and a response is currently awaited.

8.14 Overall, the risk of flooding from sewers can be considered to be 'low to moderate'.

Surface Water Flooding (Overland Flow)

8.15 This can occur during intense rainfall events, when water cannot soak into the ground or enter drainage systems.

8.16 The site will remain dry during all modelled surface water flood events. However, along Rugby Street and Milan Street there are areas of low risk. The depths are not expected to exceed 300mm in all risk scenarios. Flooding will be confined within the streets and the flood extent will not the reach the building or impact the proposed development.

8.17 Therefore, the risk of flooding from surface water to the proposed development is considered to be 'low'.

Groundwater Flooding

8.18 This can occur in low-lying areas when groundwater levels rise above surface levels, or within underground structures. BGS mapping indicates that the site is situated on superficial deposits of Lynch Hill Gravel Member and underlain by a bedrock of London Clay formation.

8.19 The SFRA states that the site is situated in an area where there is potential for groundwater flooding to occur at properties situated below the ground level and also potential for groundwater flooding to occur at the surface. As the site is indicated to have a lower ground floor level, the risk of groundwater flooding can be considered to be low to moderate. As the property is already existing and for a change of use it could be recommended that non-return valves are retrofitted to all pipes at groundwater level and that a positive pumped device is installed at lower ground level as per CPG on Basements guidance.

8.20 Overall, the risk from groundwater flooding can be considered to be 'low to moderate'.

Mitigation Measures

8.21 It is recommended that non-return valves are retrofitted to all pipes at groundwater level and that a positive pump device is installed in the lower ground floor units.

Other Sources

8.22 The risk of flooding associated with reservoirs, canals and other artificial structures is considered to be low given the absence of any such structures in the site close vicinity. The SFRA and EA mapping confirm that the site does not lie within the extent from reservoir flooding.

8.23 There is a limited risk of flooding occurring as a result of a break in a water main. However, considering that the lower ground floor levels will be lower than the street level, there could be a potential risk. However, the risk of flooding from a water main are no higher here than at another site. In addition, the measures proposed for mitigating the risk of groundwater flooding will provide sufficient protection against the unlikely event of flooding from this source.

8.24 Therefore, the risk of flooding as a result of other sources can be considered to be 'low'.

Event Exceedance

8.25 The mitigation measures proposed as part of the development scheme are considered appropriate to help mitigate against event exceedance scenarios.

9 DRAINAGE

9.1 Thames Water plans of public sewers, included as Appendix A, indicates that the site is served by a foul water sewer (FW) and a surface water sewer (SW). No information has been provided for the SW sewer, The FW manhole located within close proximity to the site, along with the cover level and invert level is given in Table 1.

Table 1. Manhole level details

Manhole Reference	Type of Sewer	Manhole Cover Level (mAOD)	Manhole Invert Level (mAOD)	Invert Depth (m)
7004	FW	22.37	18.51	3.86

9.2 The SW and FW connections are anticipated to remain as is in existing.

9.3 We have calculated the likely alterations to foul flows based on the and these are included in Appendix E. Foul flow rates are anticipated to increase from 2.8 l/s to approximately 4.4 l/s. The alteration in foul discharge will need to be agreed by Thames Water.

9.4 A sewer flood history enquiry was also made to Thames Water, which confirmed they hold no record of any sewer flooding as a result of sewer surcharging. A pre-development enquiry has been submitted to Thames Water and a response is awaited.

9.5 Given that the proposed works comprise the conversion of the existing buildings only, with no external alterations to the building footprint or drainage system, there will be no off-site increase in surface water runoff because of the proposed works. It is therefore considered neither practical nor sustainable to include SuDS in the proposed scheme.

10 SUMMARY AND CONCLUSIONS

10.1 The aim of the FRA is to outline the potential for the site to be impacted by flooding, the potential impacts of the development on flooding both onsite and in the vicinity, and the proposed measures which can be incorporated into the development to mitigate the identified risks. The report has been produced in accordance with the guidance detailed in the NPPF. Reference has also been made to the CIRIA SuDS manual (C753), the SFRA and the SWMP.

10.2 The potential flood risks to the site, and the measures proposed to mitigate the identified risks, are summarised in Table 1.

Table 2. Proposed mitigation

Source of Flooding	Identified Risk			Mitigation Proposed	Residual Risk		
	L	M	H		L	M	H
Fluvial	✓			No mitigation required	✓		
Tidal	✓				✓		
Sewers	✓			Recommended that all basements and other subterranean developments are protected by the installation of a positive pumped device.	✓		
Surface Water	✓			No mitigation required	✓		
Groundwater	✓			Recommended that non-return valves are retrofitted to all pipes at groundwater level.	✓		
Other Sources (e.g. reservoirs, water mains)	✓			No mitigation required	✓		

10.3 The site is located wholly within Flood Zone 1. The site is not at risk of reservoir flooding.

10.4 The site is indicated to have a ‘very low risk’ of surface water. Along Rugby Street located south and Milman Street, the risk is expected to be ‘low’ and not expected to exceed 300mm or encroach the site.

10.5 The risk from groundwater and sewer flooding is considered to be ‘low to moderate’. It is recommended that non-return valves are retrofitted to all pipes at groundwater level and a positive pumped device is installed in the lower ground floor units.

APPENDICES

Appendix A

Thames Water Asset Plans and Sewer History

Asset Location Search

Thames Water Property Searches

RPS
20

LONDON
EC4A 4AB

Search address supplied	Weeks Computing Services Llp Rugby Chambers 2 Rugby Street London WC1N 3QU
Your reference	Rugby Chambers
Our reference	ALS/ALS Standard/2024_4999738
Search date	4 June 2024

Notification of Price Changes

From 1st April 2024 Thames Water Property Searches will be increasing the prices of its CON29DW Residential and Commercial searches along with the Asset Location Search. Costs will rise in line with RPI as per previous years, which is sat at 6%.

Customers will be emailed with the new prices by February 28th 2024.

Any orders received with a higher payment prior to the 1st April 2024 will be non-refundable. For further details on the price increase please visit our website at www.thameswater-propertysearches.co.uk.

Thames Water Utilities Ltd
Property Searches, PO Box 3189, Slough SL1 4WW

searches@thameswater.co.uk
www.thameswater-propertysearches.co.uk

0800 009 4540

Asset Location Search

Property Searches

Search address supplied: Weeks Computing Services Llp, Rugby Chambers, 2, Rugby Street, London, WC1N 3QU

Dear Sir / Madam

An Asset Location Search is recommended when undertaking a site development. It is essential to obtain information on the size and location of clean water and sewerage assets to safeguard against expensive damage and allow cost-effective service design.

The following records were searched in compiling this report: - the map of public sewers & the map of waterworks. Thames Water Utilities Ltd (TWUL) holds all of these.

This search provides maps showing the position, size of Thames Water assets close to the proposed development and also manhole cover and invert levels, where available.

Please note that none of the charges made for this report relate to the provision of Ordnance Survey mapping information. The replies contained in this letter are given following inspection of the public service records available to this company. No responsibility can be accepted for any error or omission in the replies.

You should be aware that the information contained on these plans is current only on the day that the plans are issued. The plans should only be used for the duration of the work that is being carried out at the present time. Under no circumstances should this data be copied or transmitted to parties other than those for whom the current work is being carried out.

Thames Water do update these service plans on a regular basis and failure to observe the above conditions could lead to damage arising to new or diverted services at a later date.

Contact Us

If you have any further queries regarding this enquiry please feel free to contact a member of the team on 0800 009 4540, or use the address below:

Thames Water Utilities Ltd
Property Searches
PO Box 3189
Slough
SL1 4WW

Email: searches@thameswater.co.uk
Web: www.thameswater-propertysearches.co.uk

Waste Water Services

Please provide a copy extract from the public sewer map.

Enclosed is a map showing the approximate lines of our sewers. Our plans do not show sewer connections from individual properties or any sewers not owned by Thames Water unless specifically annotated otherwise. Records such as "private" pipework are in some cases available from the Building Control Department of the relevant Local Authority.

Where the Local Authority does not hold such plans it might be advisable to consult the property deeds for the site or contact neighbouring landowners.

This report relates only to sewerage apparatus of Thames Water Utilities Ltd, it does not disclose details of cables and or communications equipment that may be running through or around such apparatus.

The sewer level information contained in this response represents all of the level data available in our existing records. Should you require any further Information, please refer to the relevant section within the 'Further Contacts' page found later in this document.

For your guidance:

- The Company is not generally responsible for rivers, watercourses, ponds, culverts or highway drains. If any of these are shown on the copy extract they are shown for information only.
- Any private sewers or lateral drains which are indicated on the extract of the public sewer map as being subject to an agreement under Section 104 of the Water Industry Act 1991 are not an ‘as constructed’ record. It is recommended these details be checked with the developer.

Clean Water Services

Please provide a copy extract from the public water main map.

Enclosed is a map showing the approximate positions of our water mains and associated apparatus. Please note that records are not kept of the positions of individual domestic supplies.

For your information, there will be a pressure of at least 10m head at the outside stop valve. If you would like to know the static pressure, please contact our Customer Centre on 0800 316 9800. The Customer Centre can also arrange for a full flow and

pressure test to be carried out for a fee.

For your guidance:

- Assets other than vested water mains may be shown on the plan, for information only.
- If an extract of the public water main record is enclosed, this will show known public water mains in the vicinity of the property. It should be possible to estimate the likely length and route of any private water supply pipe connecting the property to the public water network.

Payment for this Search

A charge will be added to your suppliers account.

Further contacts:

Waste Water queries

Should you require verification of the invert levels of public sewers, by site measurement, you will need to approach the relevant Thames Water Area Network Office for permission to lift the appropriate covers. This permission will usually involve you completing a TWOSA form. For further information please contact our Customer Centre on Tel: 0845 920 0800. Alternatively, a survey can be arranged, for a fee, through our Customer Centre on the above number.

If you have any questions regarding sewer connections, budget estimates, diversions, building over issues or any other questions regarding operational issues please direct them to our service desk. Which can be contacted by writing to:

Developer Services (Waste Water)
Thames Water
Clearwater Court
Vastern Road
Reading
RG1 8DB

Tel: 0800 009 3921
Email: developer.services@thameswater.co.uk

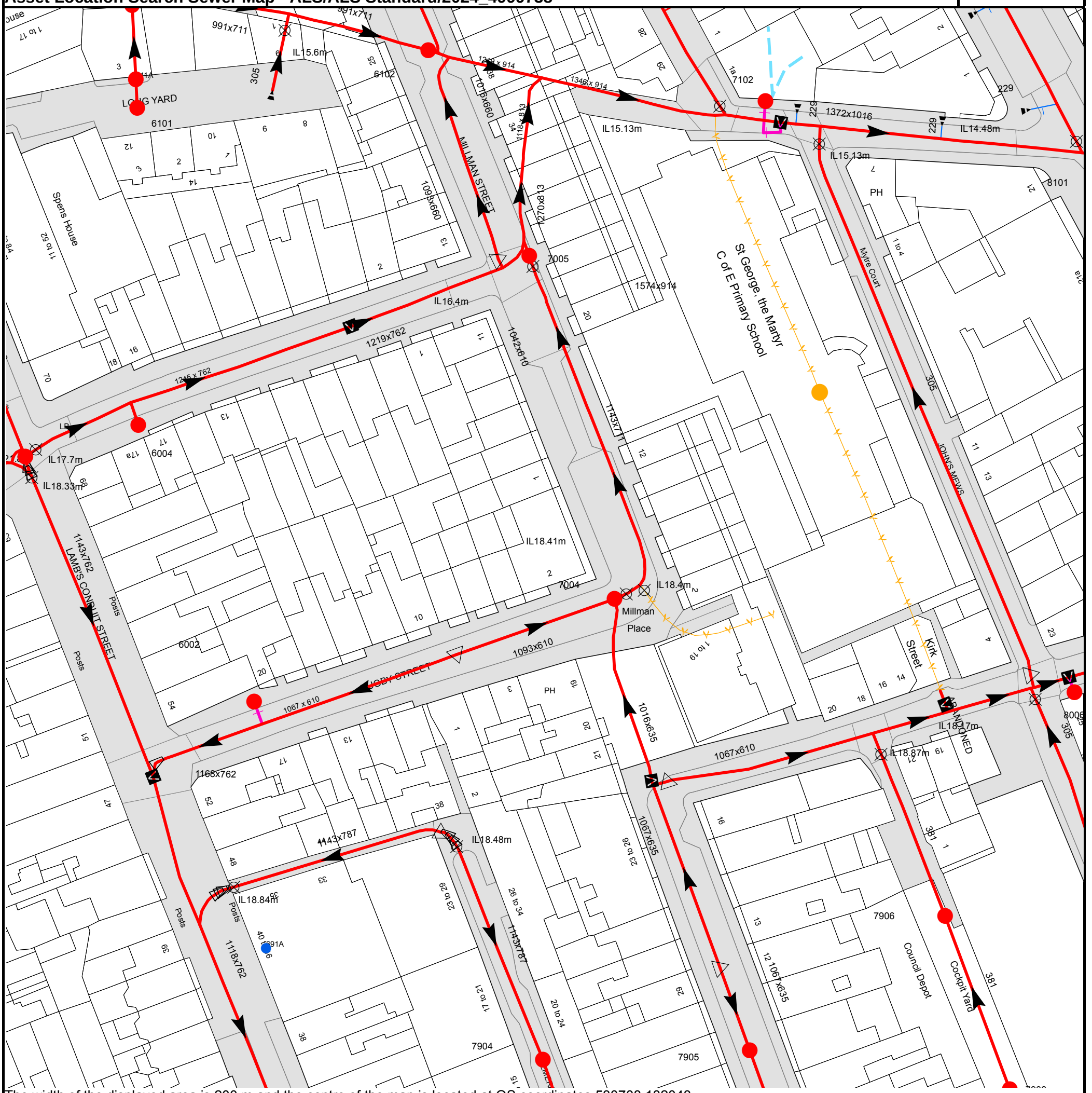
Clean Water queries

Should you require any advice concerning clean water operational issues or clean water connections, please contact:

Developer Services (Clean Water)
Thames Water
Clearwater Court
Vastern Road
Reading
RG1 8DB

Tel: 0800 009 3921
Email: developer.services@thameswater.co.uk

Asset Location Search Sewer Map - ALS/ALS Standard/2024_4999738



The width of the displayed area is 200 m and the centre of the map is located at OS coordinates 530708,182043

The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

Based on the Ordnance Survey Map (2020) with the Sanction of the controller of H.M. Stationery Office, License no. 100019345 Crown Copyright Reserved.

NB. Levels quoted in metres Ordnance Newlyn Datum. The value -9999.00 indicates that no survey information is available

Manhole Reference	Manhole Cover Level	Manhole Invert Level
7903	21.76	19.63
7904	22.75	18.08
7905	23.65	19.82
691A	n/a	n/a
7906	21.99	19.37
6002	22.62	n/a
8006	n/a	n/a
7004	22.37	18.51
6004	21.87	n/a
7005	20.95	n/a
7102	n/a	n/a
6102	20.49	15.73
6003	21.81	n/a
611B	n/a	n/a
611A	n/a	n/a
6101	19.31	17.29

The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

Asset Location Search - Sewer Key

Public Sewer Types (Operated and maintained by Thames Water)

Foul Sewer: A sewer designed to convey waste water from domestic and industrial sources to a treatment works.

Surface Water Sewer: A sewer designed to convey surface water (e.g. rain water from roofs, yards and car parks) to rivers or watercourses.

Combined Sewer: A sewer designed to convey both waste water and surface water from domestic and industrial sources to a treatment works.

- Storm Sewer
- Sludge Sewer
- Foul Trunk Sewer
- Surface Trunk Sewer
- Combined Trunk Sewer
- Foul Rising Main
- Surface Water Rising Main
- Combined Rising Main
- Vacuum
- Thames Water Proposed
- Vent Pipe
- Gallery

Other Sewer Types (Not operated and maintained by Thames Water)

- Sewer
- Culverted Watercourse
- Proposed
- Decommissioned Sewer
- Content of this drainage network is currently unknown
- Ownership of this drainage network is currently unknown

Sewer Fittings

A feature in a sewer that does not affect the flow in the pipe. Example: a vent is a fitting as the function of a vent is to release excess gas.

- Air Valve
- Meter
- Dam Chase
- Vent
- Fitting

Operational Controls

A feature in a sewer that changes or diverts the flow in the sewer. Example: A hydrobrake limits the flow passing downstream.

- Ancillary
- Drop Pipe
- Control Valve
- Weir

End Items

End symbols appear at the start or end of a sewer pipe. Examples: an Undefined End at the start of a sewer indicates that Thames Water has no knowledge of the position of the sewer upstream of that symbol. Outfall on a surface water sewer indicates that the pipe discharges into a stream or river.

- Inlet
- Outfall
- Undefined End

Other Symbols

Symbols used on maps which do not fall under other general categories.

- Change of Characteristic Indicator
- Public / Private Pumping Station
- Invert Level
- Summit

Areas

Lines denoting areas of underground surveys, etc.

- Agreement
- Chamber
- Operational Site

Ducts or Crossings

- Casement

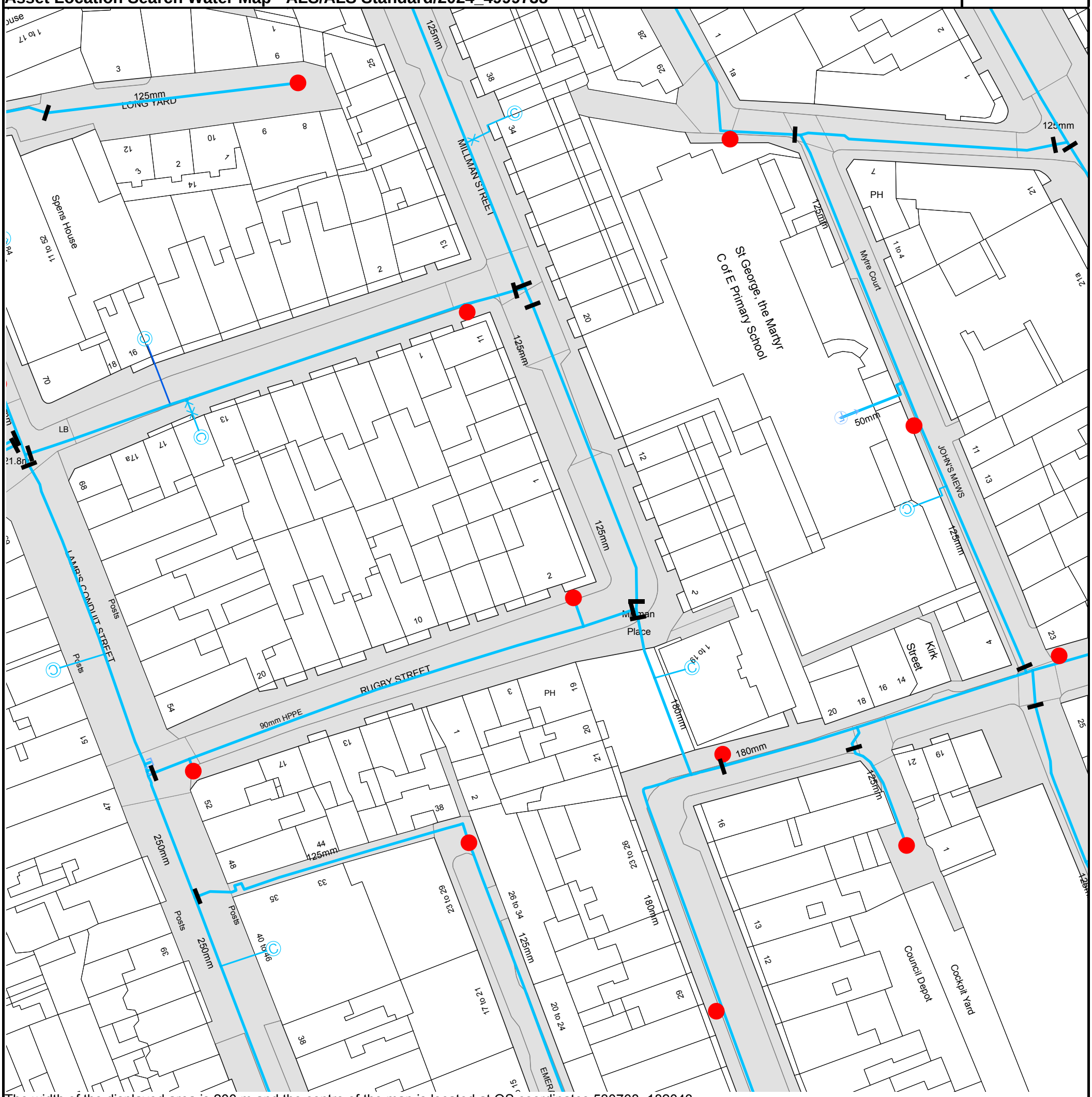
Ducts may contain high voltage cables. Please check with Thames Water.

- Conduit Bridge
- Subway
- Tunnel

Notes:

1) All levels associated with the plans are to Ordnance Datum Newlyn.
2) All measurements on the plan are metric.
3) Arrows (on gravity fed sewers) or flecks (on rising mains) indicate the direction of flow.
4) Most private pipes are not shown on our plans, as in the past, this information has not been recorded.
5) 'na' or '0' on a manhole indicates that data is unavailable.
6) The text appearing alongside a sewer line indicates the internal diameter of the pipe in millimeters. Text next to a manhole indicates the manhole reference number and should not be taken as a measurement. If you are unsure about any text or symbology, please contact Property Searches on 0800 009 4540.

Asset Location Search Water Map - ALS/ALS Standard/2024_4999738



The width of the displayed area is 200 m and the centre of the map is located at OS coordinates 530708, 182043.

The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

Asset Location Search - Water Key

Water Pipes (Operated & Maintained by Thames Water)

Distribution Main: The most common pipe shown on water maps. With few exceptions, domestic connections are only made to distribution mains.

Trunk Main: A main carrying water from a source of supply to a treatment plant or reservoir, or from one treatment plant or reservoir to another. Also a main transferring water in bulk to smaller water mains used for supplying individual customers.

Supply Main: A supply main indicates that the water main is used as a supply for a single property or group of properties.

Fire Main: Where a pipe is used as a fire supply, the word FIRE will be displayed along the pipe.

Metered Pipe: A metered main indicates that the pipe in question supplies water for a single property or group of properties and that quantity of water passing through the pipe is metered even though there may be no meter symbol shown.

Transmission Tunnel: A very large diameter water pipe. Most tunnels are buried very deep underground. These pipes are not expected to affect the structural integrity of buildings shown on the map provided.

Proposed Main: A main that is still in the planning stages or in the process of being laid. More details of the proposed main and its reference number are generally included near the main.

PIPE DIAMETER	DEPTH BELOW GROUND
Up to 300mm (12")	900mm (3')
300mm - 600mm (12" - 24")	1100mm (3' 8")
600mm and bigger (24" plus)	1200mm (4')

Valves

- General Purpose Valve
- Air Valve
- Pressure Control Valve
- Customer Valve

Hydrants

- Single Hydrant

Meters

- Meter

End Items

Symbol indicating what happens at the end of a water main.

- Blank Flange
- Capped End
- Emptying Pit
- Undefined End
- Manifold
- Customer Supply
- Fire Supply

Operational Sites

- Booster Station
- Other
- Other (Proposed)
- Pumping Station
- Service Reservoir
- Shaft Inspection
- Treatment Works
- Unknown
- Water Tower

Other Symbols

- Data Logger

Casement: Ducts may contain high voltage cables. Please check with Thames Water.

Other Water Pipes (Not Operated or Maintained by Thames Water)

Other Water Company Main: Occasionally other water company water pipes may overlap the border of our clean water coverage area. These mains are denoted in purple and in most cases have the owner of the pipe displayed along them.

Private Main: Indiates that the water main in question is not owned by Thames Water. These mains normally have text associated with them indicating the diameter and owner of the pipe.

Payment Terms and Conditions

All sales are made in accordance with Thames Water Utilities Limited (TWUL) standard terms and conditions unless previously agreed in writing.

1. All goods remain in the property of Thames Water Utilities Ltd until full payment is received.
2. Provision of service will be in accordance with all legal requirements and published TWUL policies.
3. All invoices are strictly due for payment within 14 days of the date of the invoice. Any other terms must be accepted/agreed in writing prior to provision of goods or service or will be held to be invalid.
4. Penalty interest may be invoked by TWUL in the event of unjustifiable payment delay. Interest charges will be in line with UK Statute Law 'The Late Payment of Commercial Debts (Interest) Act 1998'.
5. Interest will be charged in line with current Court Interest Charges, if legal action is taken.
6. A charge may be made at the discretion of the company for increased administration costs.

A copy of Thames Water's standard terms and conditions are available from the Commercial Billing Team (cashoperations@thameswater.co.uk).

We publish several Codes of Practice including a guaranteed standards scheme. You can obtain copies of these leaflets by calling us on 0800 980 8800.

If you are unhappy with our service, you can speak to your original goods or customer service provider. If you are still not satisfied with the outcome provided, we will refer the matter to a Senior Manager for resolution who will provide you with a response.

If you are still dissatisfied with our final response, and in certain circumstances such as you are buying a residential property or commercial property within certain parameters, The Property Ombudsman will investigate your case and give an independent view. The Ombudsman can award compensation of up to £25,000 to you if he finds that you have suffered actual financial loss and/or aggravation, distress, or inconvenience because of your search not keeping to the Code. Further information can be obtained by visiting www.tpos.co.uk or by sending an email to admin@tpos.co.uk.

If the Goods or Services covered by this invoice falls under the regulation of the 1991 Water Industry Act, and you remain dissatisfied you can refer your complaint to Consumer Council for Water on 0300 034 2222 or write to them at Consumer Council for Water, 1st Floor, Victoria Square House, Victoria Square, Birmingham, B2 4AJ.

Ways to pay your bill

Credit Card	**BACS Payment**	**Telephone Banking**
Please Call **0800 009 4540** quoting your invoice number starting CBA or ADS	Account number **90478703** Sort code **60-00-01** A remittance advice must be sent to: **Thames Water Utilities Ltd., PO Box 3189, Slough SL1 4WW.** or email **ps.billing@thameswater.co.uk**	By calling your bank and quoting: Account number **90478703** Sort code **60-00-01** and your invoice number

Thames Water Utilities Ltd Registered in England & Wales No. 2366661 Registered Office Clearwater Court, Vastern Rd, Reading, Berks, RG1 8DB.

Sewer Flooding
History Enquiry

Thames Water Property Searches

RPS

Search address supplied	Weeks Computing Services Llp Rugby Chambers 2 Rugby Street London WC1N 3QU
Your reference	Rugby Chambers
Our reference	SFH/SFH Standard/2024_4999740
Received date	**4 June 2024**
Search date	**4 June 2024**

Thames Water Utilities Ltd
Property Searches, PO Box 3189, Slough SL1 4WW

searches@thameswater.co.uk
www.thameswater-propertysearches.co.uk

0800 009 4540

Sewer Flooding
History Enquiry

Property Searches

Search address supplied: Weeks Computing Services Llp,Rugby Chambers,2,Rugby Street,London,WC1N 3QU

This search is recommended to check for any sewer flooding in a specific address or area

TWUL, trading as Property Searches, are responsible in respect of the following:-

(i) any negligent or incorrect entry in the records searched;

(ii) any negligent or incorrect interpretation of the records searched;

(iii) and any negligent or incorrect recording of that interpretation in the search report

(iv) compensation payments

Thames Water Utilities Ltd
Property Searches, PO Box 3189, Slough SL1 4WW

searches@thameswater.co.uk
www.thameswater-propertysearches.co.uk

0800 009 4540

Sewer Flooding
History Enquiry

Thames Water Property Searches

History of Sewer Flooding

Is the requested address or area at risk of flooding due to overloaded public sewers?

The flooding records held by Thames Water indicate that there have been no incidents of flooding in the requested area as a result of surcharging public sewers.

For your guidance:

- A sewer is "overloaded" when the flow from a storm is unable to pass through it due to a permanent problem (e.g. flat gradient, small diameter). Flooding as a result of temporary problems such as blockages, siltation, collapses and equipment or operational failures are excluded.
- "Internal flooding" from 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 presented 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. This report excludes flooding from private sewers and drains and the Company makes no comment upon this matter.
- For further information please contact Thames Water on Tel: 0800 316 9800 or website www.thameswater.co.uk

Thames Water Utilities Ltd
Property Searches, PO Box 3189, Slough SL1 4WW

searches@thameswater.co.uk
www.thameswater-propertysearches.co.uk

0800 009 4540

Appendix B

LLFA Response

Evans, Caitlin

From: Katherine Frost <Katherine.Frost@camden.gov.uk>
Sent: 22 May 2024 17:51
To: Anscomb, Louisa
Subject: FW: Flood Risk Query WC1N 3QU

Dear Louisa

Your enquiry has been passed to me.

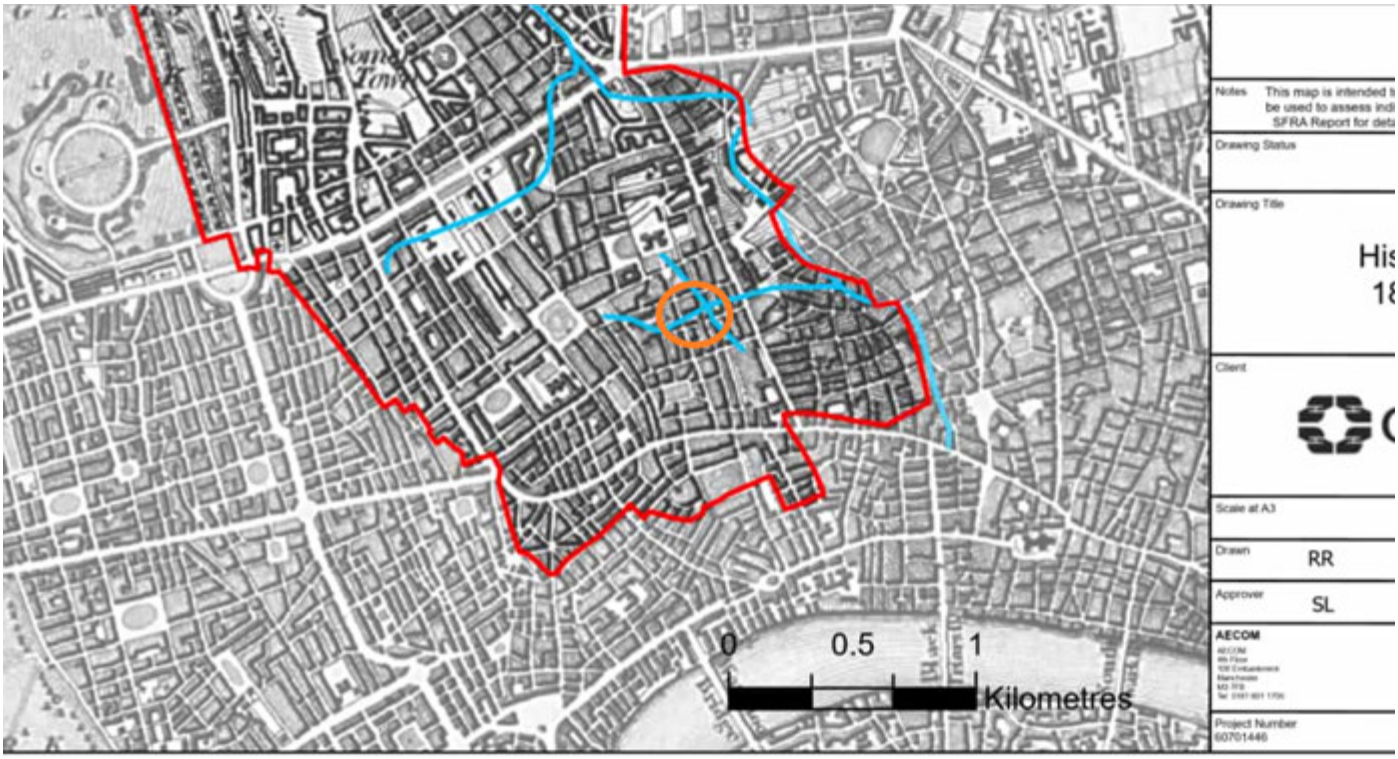
I have considered the location and our records indicate that the property is in close proximity historic watercourses and in an area which is susceptible to groundwater flooding.

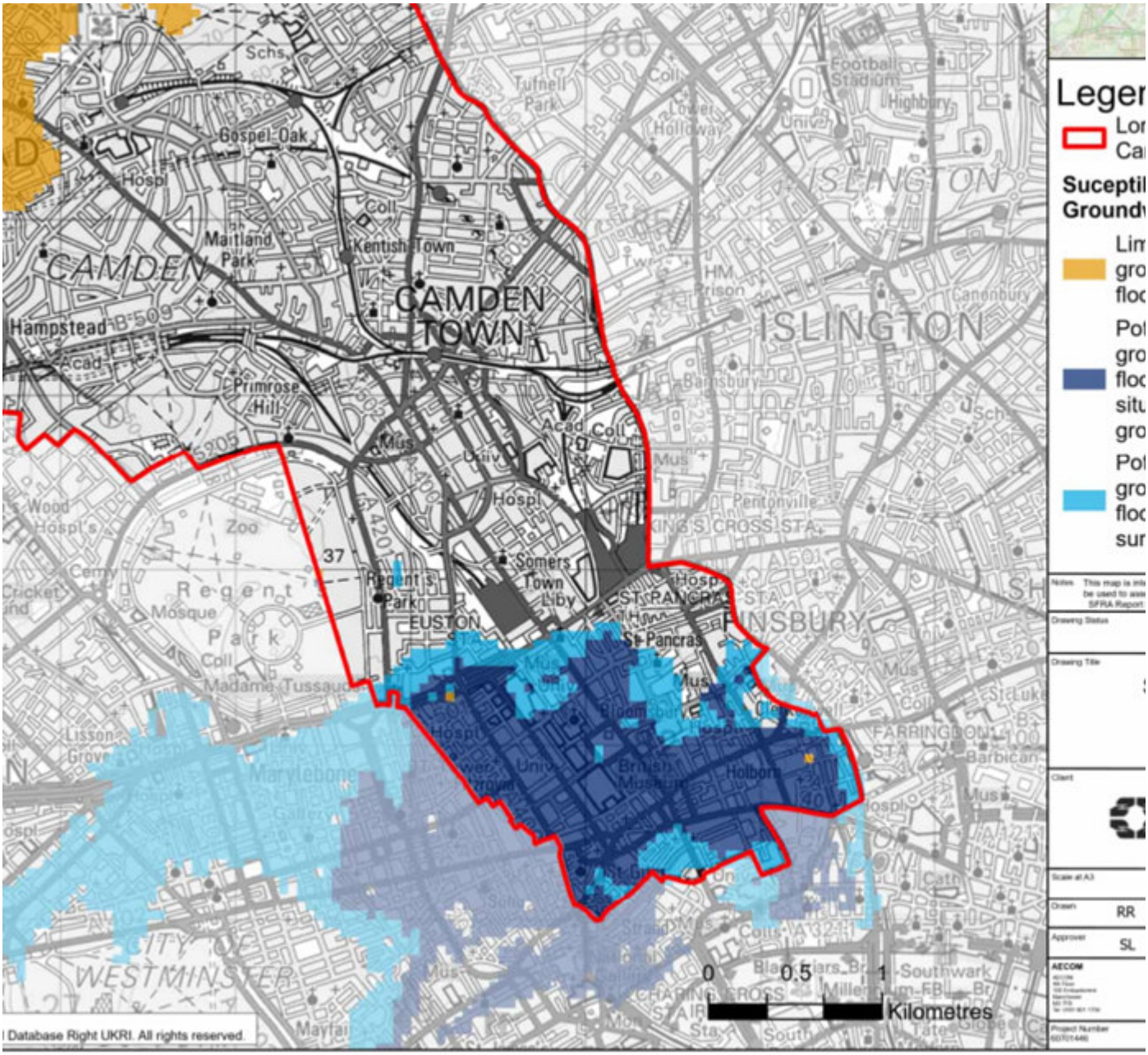
Level 1 Strategic Flood Risk Assessment (camden.gov.uk)

The Camden Local Plan 2017 states that development should refer to the SFRA. Please see above a link to our updated SFRA.

Please note references to 'Lost' or 'Historic' watercourses on Pages 9, 16, 43-46, 55, 60, 68 and Figure 11 on 91 in particular. The property is noted to be in the vicinity of the historic River Fleet which is stated in Table 5-1 of the SFRA to have links to sewer flood risk. Figure 19 indicates susceptibility to groundwater.

Please note that areas underlain by the 'lost' rivers are at increased risk of flooding, due to natural catchment topography and drainage, connectivity to the sewer and the permeable River Terrace Deposits which follow the channel.





A habitable basement development is considered highly vulnerable and the location of a historic river in the vicinity of the development should be carefully considered particularly if a basement structures is likely to affect groundwater flows through diversion and any changes to the water table.

Where flood risk is identified the Council will not permit habitable rooms at basement level.

Therefore as the LLFA we would ask for any proposed basement development for this site to undertake extensive ground surveys to establish to make up of the ground (considering evidence of a historic watercourse), establish groundwater levels and hydrological modelling to determine if it possible for the development to prevent any significant harm from changes to groundwater levels or flow.

Please refer to the CPG Water and Flooding and complete and submit the GLA SuDS proforma with any application.

Kind regards

Katherine

Katherine Frost
Senior Sustainability Officer (Planning)

Telephone: 020 7974 5922

From: Anscomb, Louisa <Louisa.Anscomb@rps.tetratech.com>
Sent: Tuesday, May 21, 2024 4:21 PM
To: GreenCamden <Smallsteps@lbcamden.mail.onmicrosoft.com>
Subject: Flood Risk Query WC1N 3QU

Good afternoon,

RPS have been commissioned to prepare a Flood Risk Assessment for the conversion of a site at 2 Rugby Street WC1N 3QU.

As part of our enquiries, could we please request the following if available :

- Details of any historic flooding from any source in the vicinity of the site
- Details of any culverted watercourses in the vicinity of the site
- Any flood modelling or mapping that the council has regarding the vicinity of the site
- Details of any known surface water drainage issues in the vicinity of the site
- Any specific requirements regarding groundwater

Do you have any site-specific comments and drainage constraints or requirements for this site?

The site boundary has been included below.

Please let me know if you require any further information.

Kind regards,

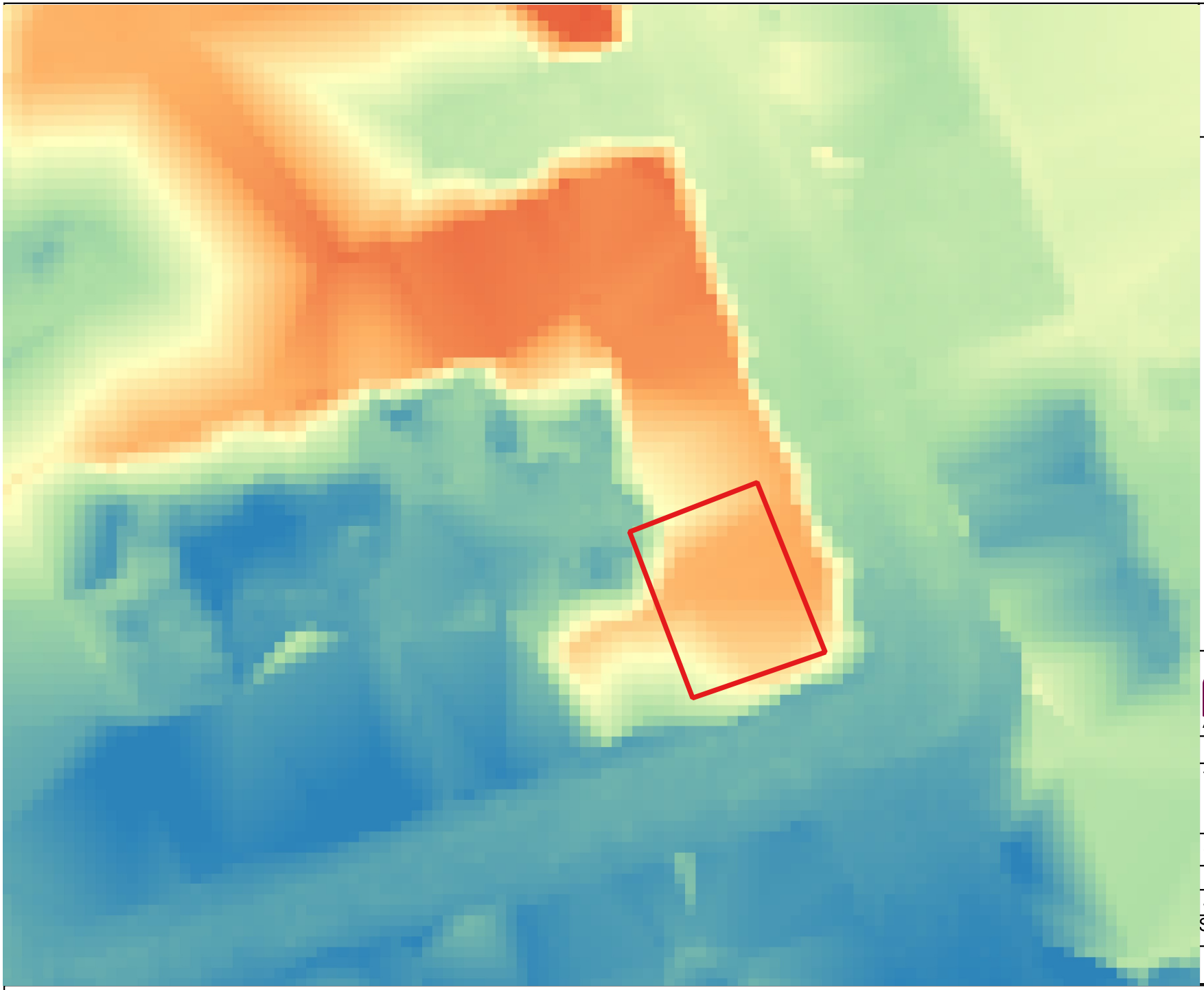
Louisa

Louisa Anscomb (She/Her)
Graduate Consultant
RPS | Consulting UK & Ireland
20 Farringdon Street
London, EC4A 4AB, United Kingdom
T +44 20 3691 0500
E louisa.anscomb@rps.tetratech.com

Follow us on: rpsgroup.com | LinkedIn | Facebook | Instagram | YouTube

Appendix C

LiDAR DTM



Notes

1. This drawing has been prepared in accordance with the scope of RPS's appointment with its client and is subject to the terms and conditions of that appointment. RPS accepts no liability for any use of this document other than by its client and only for the purpose for which it was prepared and provided.
2. If received electronically it is the recipients responsibility to print to the correct scale. Only written dimensions should be used.

Legend

Red Line Boundary

TQ38sw_DTM_1m

Band 1: Band_1 (Gray)

23

18

rps
A TETRA TECH COMPANY
20 Farringdon Street
London, EC4A 4AB
E:rpshydrologyservices@rpsgroup.com

Client: The Rugby Trust

Title: LiDAR DTM

Site: 2 Rugby Street

Date: 22-05-2024

Job Ref:	Size: A3
Scale: 1:500	Rev: A

Drawn	Checked	Approved
LA	FC	JM

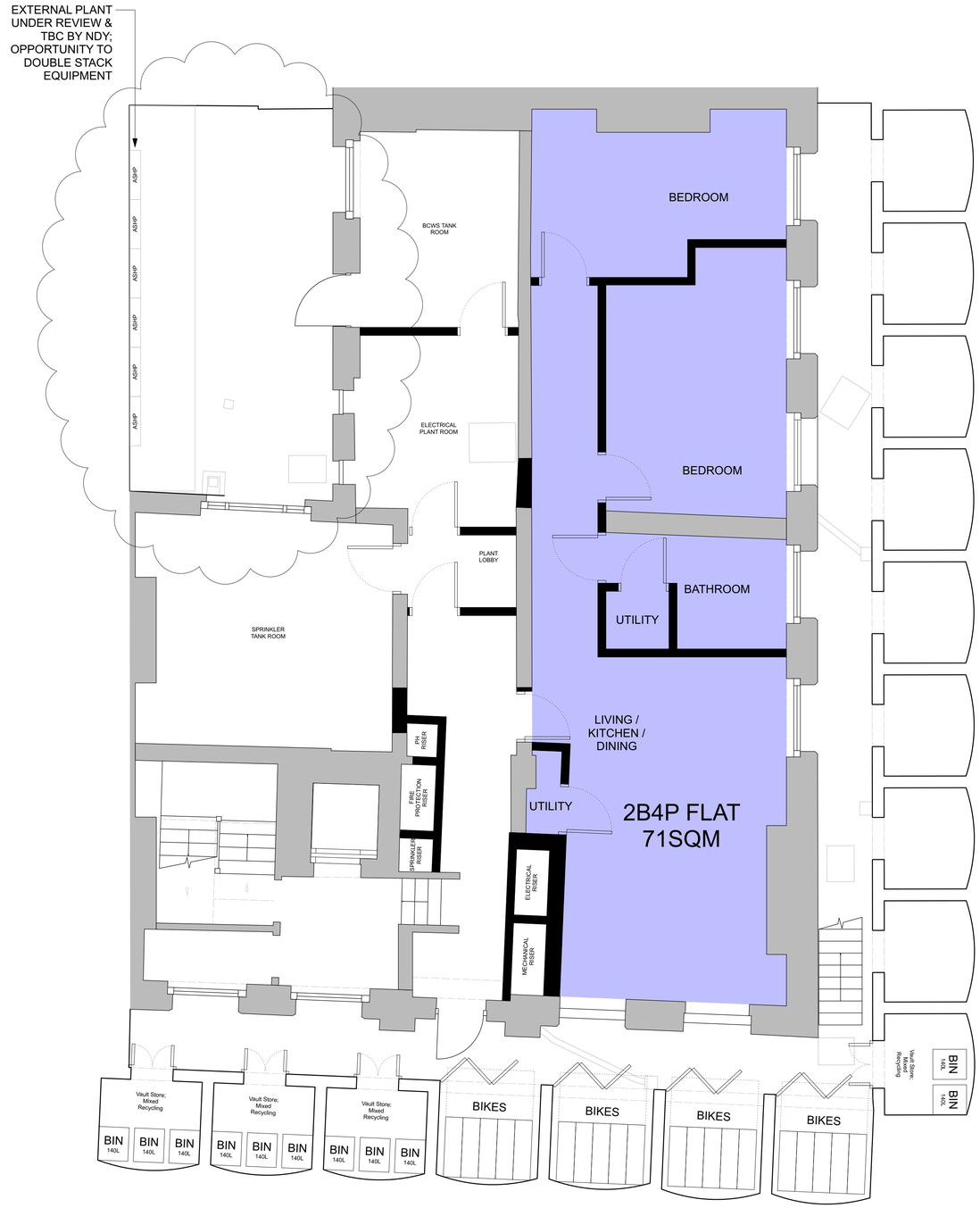
0 0.01 0.02 km

N

rpsgroup.com

Appendix D

Development Plans



KEY

- Existing wall
- Proposed wall
- 1B1P Flat
- 2B4P Flat

revision	date	check	description
P04	05/04/2024		For Information
C	21/09/2023		For Information
B	18/09/2023		For Information
A	12/09/2023		For Information

THREEFOLD Architects

Studio 9, The Dove Centre, London NW5 2BJ +44(0)20 8969 2323

project title
RUGBY CHAMBERS

drawing title/location
Residential-Proposed Lower Ground Floor Plan

prepared on behalf of
THE RUGBY TRUST

stage	Stage 01		
date	21/09/2023		
scale	size	status	revision
1:50	A1	For Information: Preliminary	P04

project no	orig	funct	spatial	form	disc	number
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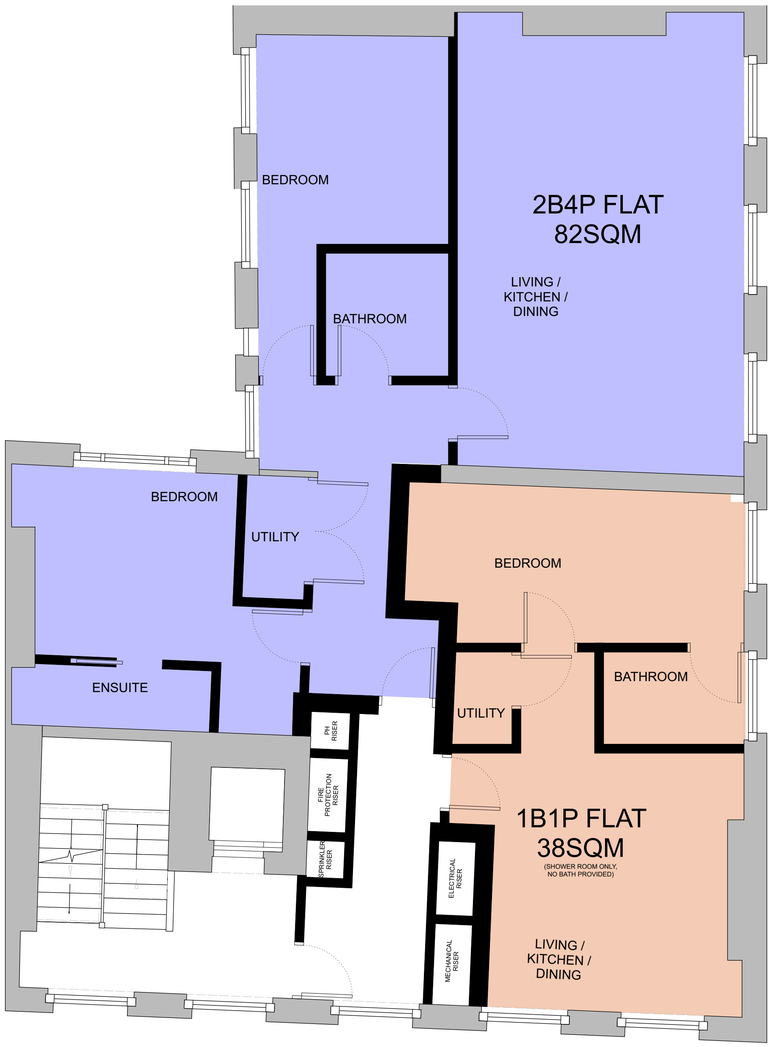

KEY

- Existing wall
- Proposed wall
- 1B1P Flat
- 2B4P Flat

P04	05/04/2024	Updated 1 Bedroom Flat Plan
C	21/09/2023	For Information
B	18/09/2023	For Information
A	12/09/2023	For Information

revision	date	check	description

THREEFOLD Architects

Studio 9, The Dove Centre, London NW5 2BJ +44(0)20 8969 2323

project title
RUGBY CHAMBERS

drawing title/location
Residential-Proposed Second Floor Plan

prepared on behalf of
THE RUGBY TRUST

stage	Stage 01					
date	21/09/2023					
scale	size	status				revision
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project no	orig	funct	spatial	form	disc	number
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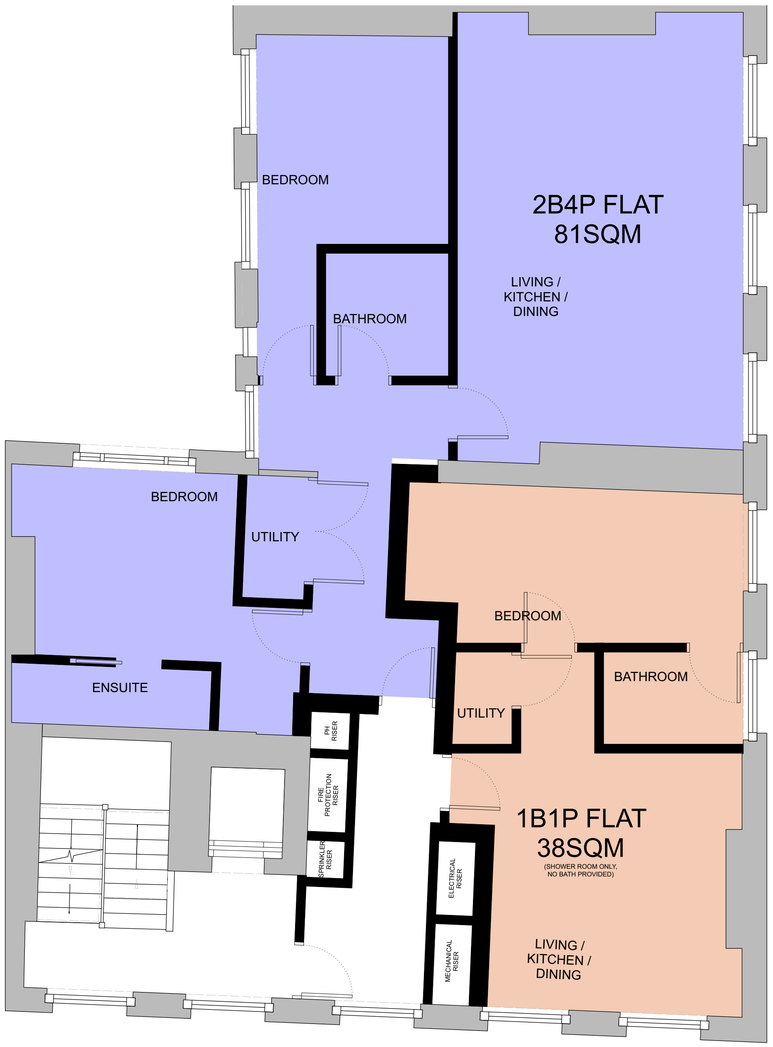

KEY

- Existing wall
- Proposed wall
- 1B1P Flat
- 2B4P Flat

P04	05/04/2024	Updated 1 Bedroom Flat Plan
C	21/09/2023	For Information
B	18/09/2023	For Information
A	12/09/2023	For Information

revision	date	check	description

THREEFOLD Architects

Studio 9, The Dove Centre, London NW5 2BJ +44(0)20 8969 2323

project title
RUGBY CHAMBERS

drawing title/location
Residential-Proposed First Floor Plan

prepared on behalf of
THE RUGBY TRUST

stage	Stage 01					
date	21/09/2023					
scale	size	status				revision
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project no	orig	funct	spatial	form	disc	number
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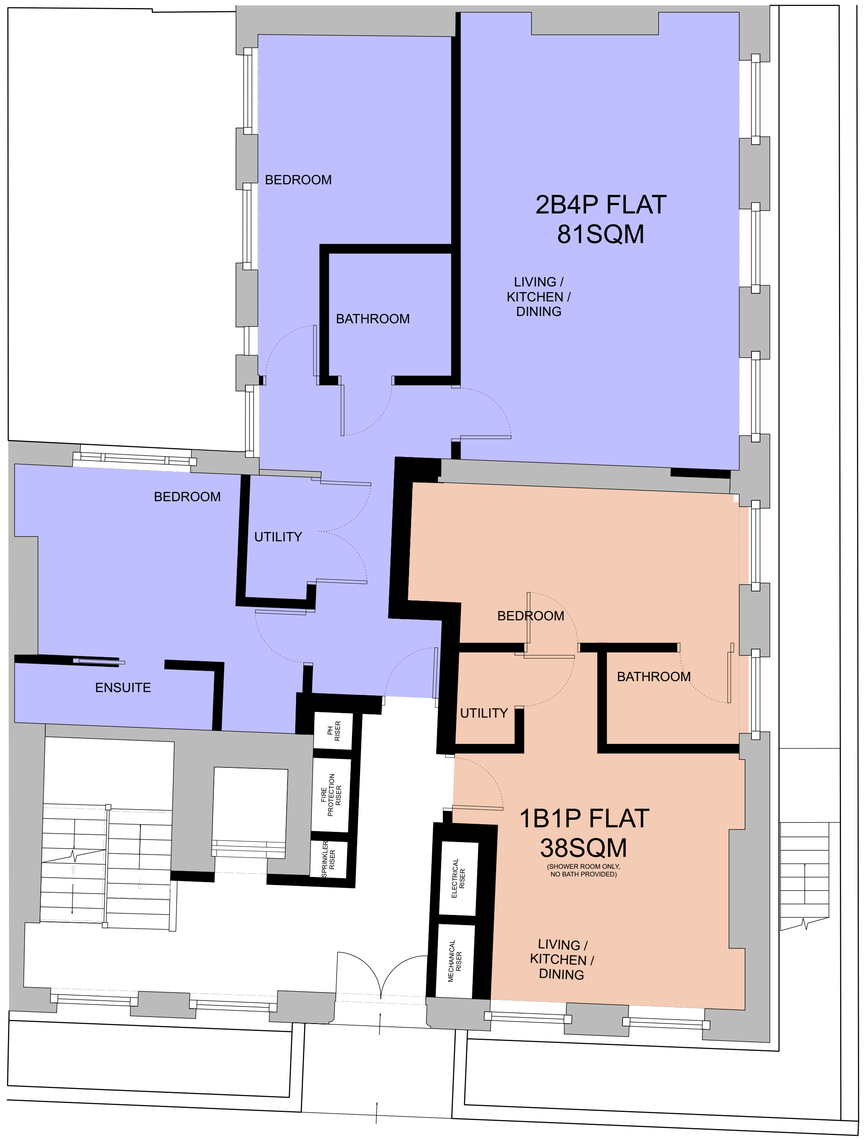

KEY

- Existing wall
- Proposed wall
- 1B1P Flat
- 2B4P Flat

revision	date	description
P04	05/04/2024	Updated 1 Bedroom Flat Plan
C	21/09/2023	For Information
B	18/09/2023	For Information
A	12/09/2023	For Information

THREEFOLD Architects

Studio 9, The Dove Centre, London NW5 2BJ +44(0)20 8969 2323

project title
RUGBY CHAMBERS

drawing title/location
Residential-Proposed Ground Floor Plan

prepared on behalf of
THE RUGBY TRUST

stage	Stage 01					
date	21/09/2023					
scale	size	status				revision
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project no	orig	funct	spatial	form	disc	number
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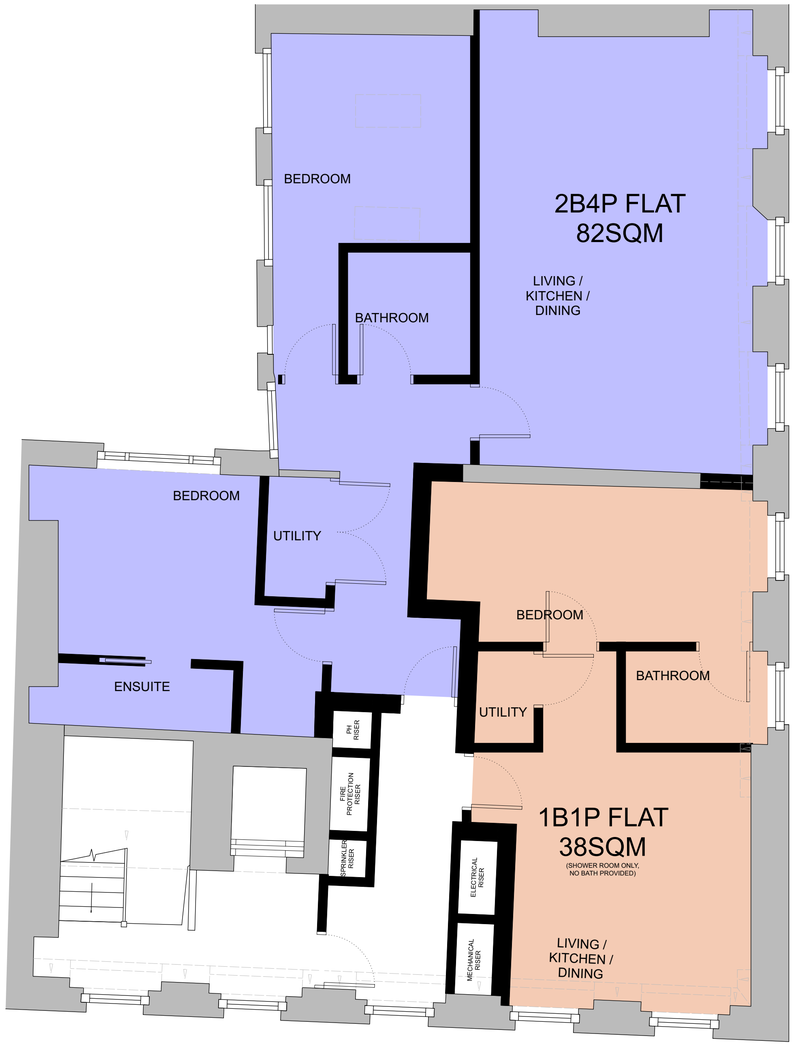

KEY

- Existing wall
- Proposed wall
- 1B1P Flat
- 2B4P Flat

P04	03/04/2024	Updated 1 Bedroom Flat Plan
C	21/09/2023	For Information
B	18/09/2023	For Information
A	12/09/2023	For Information

revision	date	check	description

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project title
RUGBY CHAMBERS

drawing title/location
Residential-Proposed Fourth Floor Plan

prepared on behalf of
THE RUGBY TRUST

stage	Stage 01						
date	21/09/2023						
scale	size	status					revision
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project no	orig	funct	spatial	form	disc	number	
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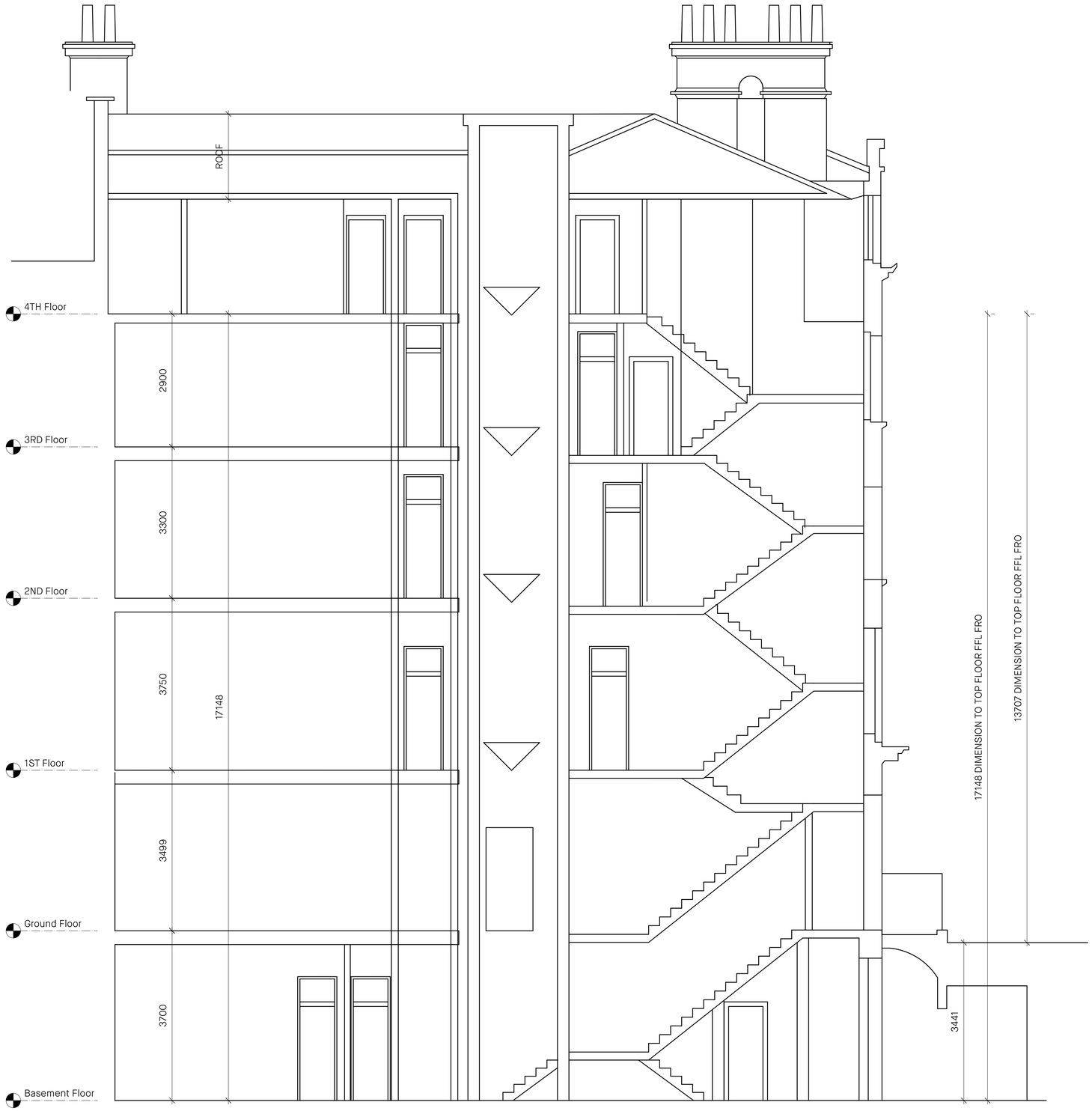

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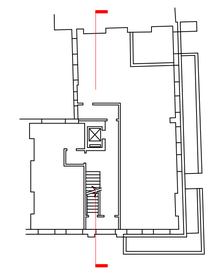
revision	date	check	description



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project title
RUGBY CHAMBERS

drawing title/location
Existing Section

prepared on behalf of
THE RUGBY TRUST

stage	Stage 01					
date	23/05/23					
scale	size	status				revision
1:50	A1	S0: Preliminary				
project no	orig	funct	spatial	form	disc	number
23106	TFA	XX	00	DR	A	0160

Appendix E

Pre and Post Development Calculations

1 FOUL FLOW RATE CALCULATIONS

The foul flow rates for the site have been calculated in accordance with BS EN 12056-2: 2000. Previously, the building was used as an office and the proposed land use is a hotel with some commercial space on the ground floor.

The appliances for the existing and proposed land uses have been estimated based on the survey and proposed floor plans provided. Discharge unit values for the appliances and the formula used to calculate the flow rates are provided in Figure 1 below.

Appliance	Discharge Unit Value
Wash basin	0.5
Bidet	0.5
Shower	0.6
Single urinal with cistern	0.8
Bath	0.8
Sink	0.8
Dishwasher	0.8
Washing machine	0.8
WC with 7.5 litre cistern	2.0

TABLE 3: DISCHARGE UNIT VALUES

Formula for calculation of flow rate: $Q=k\sqrt{\sum DU}$

Where: Q = *Flow Rate in litres/sec*
K = *Frequency factor*
$\sum DU$ = *Sum of discharge units*

K= *0.5 for dwellings, guest houses, offices etc.*
0.7 for hospitals, schools, restaurants, hotels etc.
1.0 for toilets/showers open to the public

Figure 1: Discharge Unit Values

1.1 Existing Flow Rate – Office

Existing appliances for the office have been assumed based on the survey, appliance numbers are provided in Table 1 below. Offices have a Frequency Factor of 0.5, therefore the existing foul flow rate is 2.208 l/s.

Appliance	Number
Wash Basin	11
Shower	0
Single Urinal with cistern	0
WC with 7.5 litre cistern	11
Sink	5

Table 1: Existing Appliances

1.2 Proposed Flow Rate – Residential

Proposed appliances for the hotel have been assumed based on the proposed floor plans, appliance numbers are provided in Table 2 below. Hotels have a Frequency Factor of 0.5, therefore the existing foul flow rate is 4.41 l/s.

Appliance	Number
Wash Basin	16
Shower	11
Single Urinal with cistern	0
WC with 7.5 litre cistern	16
Sink	11
Washing Machine	11
Bath	6
Dishwasher	11

Table 2: Proposed Appliances

1.3 Summary

The conversion of Rugby Chambers, 2 Rugby Street, from office use to residential will result in an increase in foul flow rates of 1.603l/s.