FLOOD RISK ASSESSMENT
of a site at
CLEVELAND ROAD, FITZROVIA
for
EMMA KUMAR

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1 EXECUTIVE SUMMARY

The proposed development comprises a multi storey residential development with a change of the ground and the basement of the premises from commercial to provide a single residential flat including parking facilities and cycle and bin storage

The entire site is covered by two adjoining buildings, one facing onto Cleveland Street and the other onto Warren Mews. This report only addresses the property fronting onto Cleveland Street.

The property is not located in an Environment Agency identified flood zone and no other significant potential sources of flooding have been identified.

The risk assessment has determined that there is a negligible level of flood risk to the site from: rivers, seas, surface water, groundwater, sewers and reservoirs and artificial sources.

The use of appropriate flood protection measures and water resilient and resistant construction are not considered necessary but would provide an increased level of protection in the event of an extreme flooding event and ensure that the site is safe without increasing flood risk elsewhere.

As the site is in Flood Zone 1 and has been found to have a negligible risk of flooding from all sources, it is considered that development of a habitable basement area is acceptable for this location.

There are areas immediately adjacent to the site that are unaffected by any source of flooding and it is not anticipated that emergency access and escape routes will be significantly restricted.

Therefore, the proposed development satisfies the requirements of the National Planning Policy Framework and is considered suitable for the proposed residential use.

2 BRIEF

Ms Emma Kumar requested a flood risk assessment for a site at 112 Cleveland Street London W1P 5DP.

The FRA is prepared generally in accordance with the requirements of the National Planning Policy Framework in particular Section 10: Meeting the Challenge of Climate Change Flooding and Coastal Change and the Supporting Technical Guidance; and the Environment Agency Flood Risk Assessment (FRA) Guidance Note 3 for all development in Flood Zones 2 and 3 where standing advice does not apply.

The FRA is required to assess the risk to the site from all significant forms of flooding identified in Annex C of PPS25, including climate change considerations; and to demonstrate that the proposed development will be safe for its lifetime without increasing flood risk elsewhere and where possible will reduce the flood risk overall.

This report is based upon factual data for the site obtained from the sources described in the text, a site visit, preliminary discussions with the local authority and product 4 data obtained from the Environment Agency. The information obtained is not necessarily exhaustive and additional information may be available from other sources.

3 REFERENCE INFORMATION

Reference has been made to the following sources of information during the preparation of this report:

- National Planning Policy Framework - February 2019.
- Technical Guidance to the National Planning Policy - March 2012.
- The Environment Agency – Flood Map for Planning
- The Defra- Magic Map
- Thames Catchment Flood Management Plan - 2009.
- L.B. of Camden Strategic Flood Risk Assessment – July 2014.
- L.B. of Camden Preliminary Flood Risk Assessment Report - April 2011.
- L.B. of Camden Surface Water Management Plan -2011
- L.B. of Camden Local Plan 2017

4 SITE VISIT

The site was visited on 10 December 2019. The weather was overcast. Access was available to the Cleveland Road property and a visual inspection was undertaken. Access was not available to the Mews property and a visual inspection was undertaken from the public highway. A photographic record was made during the visit and this is contained in appendix C.

The client's confidentiality was maintained at all times during discussion with third parties.

5 LOCATION

The site is situated on the southern outskirts of Fitzrovia and lies southeast of the junction of Warren Street and Cleveland Road. Refer to Figure 1.

The National Grid Reference for the approximate site centre is 529020, 182100.

6 SITE DESCRIPTION

The site is very approximately rectangular shaped in plan and occupies 0.01ha.

The entire site is covered by two adjoining buildings, one facing onto Cleveland Street and the other onto Warren Mews. The site description includes both properties, however this report only addresses the property fronting onto Cleveland Street.

The Cleveland Street property is four-storey, five including the basement. It is of traditional masonry construction with a mansard roof. The property is currently unoccupied, it was most recently used for retail at ground and basement with residential accommodation above. The basement occupies the full footprint of the building and extends under the public footpath. In the basement there is a passage in front of the line of the ground floor building frontage lit by pavement lights with two, barrel-vaulted chambers running off at right angles further under the footpath. The basement floor is assumed to be concrete and the basement appeared to be reasonably dry. The basement had a kitchen, toilet and shower.

Photographs: 1: View from Cleveland St, 2 View from Warren Mews

The mews property is a two-storey brick structure with a flat roof. There is no basement. It has a private garage which occupies most of the ground floor.

The west and east boundaries are formed by the back of footpath to Cleveland Street and Warren Mews respectively. The north and south boundaries are formed by the party walls with the adjacent properties.

There appeared to be a slight fall to the south in the area immediately surrounding the site.

The nearby surrounding area is a mix of offices, retail and residential.

No visual or olfactory evidence of contamination was noted during the visit.

7 GROUND CONDITIONS

7.1 Geology

Reference to the geological survey of Great Britain indicates that beneath made ground, the area generally is underlain by superficial deposits comprising Sand and Gravel which is described as Lynch Hill Gravel Member

The superficial deposits are underlain by bedrock comprising Clay, Silt and Sand described as London Clay Formation.

7.2 Hydrogeology

The Environment Agency maps show the site to be located over a Secondary A Aquifer in the superficial or drift deposits, in the bedrock they show the site to be over Unproductive Strata.

Unproductive Strata are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow.

Secondary A Aquifers comprise permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers.

The soils overlying the aquifers are assumed to have a high leaching potential (U) and a worst case vulnerability classification (H) is assumed due to a lack of data available for restored workings and urban areas.

The Environment Agency maps show the site is not located within a source protection zone of a borehole abstraction point.

7.3 Hydrology

The nearest surface water feature appears to be a boating lake approximately 764 metres to the west. This is considered to be too distant to be significantly impacted by the site.

8 PROPOSED DEVELOPMENT

Plan details for the proposed redevelopment of the site are shown on the Evolution Architects drawing contained in appendix B.

The drawing shows a development comprising a multi storey residential development with a change of the ground and the basement of the premises from commercial to provide a single dwelling. The unit above will remain as residential. Access to the property is gained from Cleveland Street.

9 PLANNING POLICY

The National Planning Policy Framework (NPPF) promotes sustainable development and as a core principle encourages the effective use of land by reusing land that has been previously developed (brownfield land) provided that it is not of high environmental value. In addition, the following sets out advice from the NPPF that is of relevance to the proposed works.

- Section 5: Delivering a sufficient supply of homes advises that:

To support the Government's objective of significantly boosting the supply of homes, it is important that a sufficient amount and variety of land can come forward where it is needed, that the needs of groups with specific housing requirements are addressed and that land with permission is developed without unnecessary delay.

- Section 14: Meeting the challenge of climate change, flooding and coastal change advises that:

The application of the exception test should be informed by a strategic or site specific flood risk assessment, depending on whether it is being applied during plan production or at the application stage. For the exception test to be passed it should be demonstrated that:

a) the development would provide wider sustainability benefits to the community that outweigh the flood risk; and
b) the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.

When determining any planning applications, local planning authorities should ensure that flood risk is not increased elsewhere. Where appropriate, applications should be supported

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

a) *within the site, the most vulnerable development is located in areas of lowest flood risk, unless there are overriding reasons to prefer a different location;*
b) *the development is appropriately flood resistant and resilient;*
c) *it incorporates sustainable drainage systems, unless there is clear evidence that this would be inappropriate;*
d) *any residual risk can be safely managed; and*
e) *safe access and escape routes are included where appropriate, as part of an agreed emergency plan.*

10 CAMDEN LOCAL PLAN – A5 BASEMENTS

With reference to the Camden Local Plan 2017, the local plan policy A5 states:

The Council will not permit basement schemes which include habitable rooms and other sensitive uses in areas prone to flooding.

Para 6.135 in the supporting text to A5 confirms:

The Council will not allow habitable rooms and other sensitive uses for self-contained basement flats and other underground structures in areas at risk of flooding.

The supporting text to CC3 at para 8.58 references:

Areas considered at risk from flooding are: Local Flood Risk Zones; and previously flooded streets (shown on "Map 6: Historic flooding and Local Flood Risk Zones").

As the site is in Flood Zone 1 and has been found to have a negligible risk of flooding from all sources, it is considered that development of a habitable basement area is acceptable for this application.

11 SEQUENTIAL AND EXCEPTION TEST

11.1 Sequential Test

From reference to the Environment Agency Flood Maps, the proposed development does not lie within an area likely to be affected by a major flood from fluvial or tidal sources. There is a less than a 1 in 1000 (0.1%) chance of river or sea flooding occurring each year. Therefore, in accordance with Table 1 of the technical guidance to the NPPF (TGNPPF), the site is defined as being in Flood Zone 1, which means it can be developed for water-compatible, less vulnerable, more vulnerable, highly vulnerable and essential infrastructure land uses as classified in Table 2 of the TGNPPF.

The proposed development will provide a dwelling house (residential accommodation) and therefore in accordance with Table 2 of the TGNPPF, would fall within the more vulnerable classification.

As shown by Table 3 of the TGNPPF, the vulnerability classification is compatible with Flood Zone 1 and is therefore the proposed development is considered to be appropriate.

11.2 Exception Test

The proposed development is compatible with flood zone 1 and therefore application of the exception test is not necessary. However, in accordance with Section 14 of the National Planning Policy Framework this FRA will demonstrate that:

- The development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere and, where possible, will reduce flood risk overall.
- The development will be appropriately flood resilient and resistant, including safe access and escape routes where required, and that any residual risk can be safely managed, including emergency planning; and it gives priority to the use of sustainable drainage systems.

12 STRATEGIC FLOOD RISK

12.1 L.B. Camden Strategic Flood Risk Assessment

The L.B. of Camden SFRA (SFRA) was produced in 2014 in order to provide the information required to apply the sequential and exception tests and identify the level of detail required for a site-specific FRA. In addition, the SFRA informs on the extent and severity of flood risk from all sources to the area both at present and in the future.

This SFRA is a planning tool that enables the Council to identify sites for development away from vulnerable flood risk areas. The assessment focuses on the existing site allocations within the Borough but also sets out the procedure to be followed when identifying future sites for development. The SFRA will assist the Council to make the spatial planning decisions required to inform the Local Plan.

In addition to informing site allocations the SFRA will inform decision making on planning applications on non-allocated sites, strategic flood alleviation measures and other measures to reduce flood risk to existing development, planning requirements for new development and emergency planning.

There are no main rivers within the London Borough of Camden and the entire borough is classed as Flood Zone 1 with a less than 1 in 1000 annual probability of flooding from fluvial sources. While the risk of flooding from rivers is considered negligible consideration should be given to the risk of flooding from other sources such as groundwater, sewers, reservoirs and surface water.

The updated Flood Map for Surface Water is the most recent and up-to-date surface water modelling available for L.B of Camden and is presented in Appendix B Figure 3 of the SFRA (Appendix E). The mapping shows that for the model scenarios (3.33% AEP, 1% AEP and 0.1% AEP) the surface water flood extent broadly follows the natural topography of the borough. Potential flooding also follows man-made features such as roads and rail lines.

Whilst potential flooding is identified throughout the borough, concentrations of ponding occur in the Camden Town and Dartmouth Park areas, as well as in West and South Hampstead

Figures 3i – 3v of the SFRA shows mapping for the London Borough of Camden study area in combination with historical surface water flooding data recorded by LBC. Where streets are shown to have experienced flooding during the 1975 and 2002 flood events, this mapping is relatively coarse in scale and does not allow precise mapping of the extent of the flooding.

The mapping does not show any historical, groundwater, sewage of surface water flooding in the near vicinity of the site and shows the site to be in Critical Drainage Area Group 3 005.

13 LOCAL FLOOD RISK

13.1 R.B. Camden Preliminary Flood Risk Assessment

The Camden Council Preliminary Flood Risk Assessment (PFRA) was prepared by Halcrow Group Limited as part of the Drain London Project and was published in April 2011.

The PFRA is a high-level screening exercise to locate areas in which risk of local flooding is of significance and warrants further examination through the production of flood risk maps and flood risk management plans. Local flood risk is defined as the risk originating from surface water runoff, groundwater, ordinary watercourses and lakes and ponds, but not sewers unless the flooding is caused by rainwater affecting the system or flooding originating from the water supply system. The PRFA also informs the local risk management strategy and any updates to the strategic flood risk assessment.

Based upon the following definition of harmful consequences: 'Memorable past floods or otherwise registered on a national scale (such as the summer 2007 event) even if only occurring over a relatively small area', the PFRA has not identified any past floods that are considered to have had any significant harmful consequences. In 2017 Camden borough council released an addendum in conjunction with the 2011 preliminary assessment report. The addendum states that there have been no recorded floods in Camden since 2002. According to the PFRA these floods were primarily in the Hampstead area and Fairfax Road.

However, future flood risk is estimated to be high in the borough and based upon surface water modelling outputs 19,100 properties are at risk of flooding should a 1 in 200 year event occur, particularly in the locations where past flooding has occurred as no alleviation schemes have yet been undertaken.

13.2 Camden Council Surface Water Management Plan

The Camden Council Surface Water Management Plan (SWMP) outlines a surface water management strategy and long term action plan for the management of local surface water flood risk and is used to determine investment, maintenance, land-use planning, emergency planning and future developments to ensure the long term and sustainable management of

water that will also assist in managing surface water flooding and reducing the impact of flooding should it occur.

The SWMP uses modelling from the Drain London Project to analyse the impact of heavy rainfall events across the Borough by assessing flow paths, velocities and catchment response. The main surface water flood mechanism in the Borough is pluvial flooding where water from the extreme rainfall event is not able to drain into the ground due to the heavy urban development in the Borough.

The results of the modelling have been used to identify Local Flood Risk Zones (LFRZs) in the Borough where flooding affects houses, businesses and infrastructure. From this 12 Critical Drainage Areas (CDAs) have been identified where combined sources of flood risk causes flooding in LFRZs during severe weather. The SFRA places the site in CDA group 3_005, the SWMP does not detail any historical flood issues in this area.

The SWMP refers to mapping showing the predicted likelihood and extent of surface water flooding across all the borough. The maps are extracted from the Drain London Project and the SWMP advises that they are good at predicting overland flow paths and areas where surface water flooding might occur in local depressions and are adequate at representing the flooding from drains, small watercourses and ditches (ordinary watercourses). However, the maps were not contained within the appendix of the SWMP. The SWMP does state that the maps do not represent the mechanisms that cause sewer flooding although sewer flooding can be more likely to occur in low lying areas with flat gradients; the same locations where surface water ponds. The coarse nature of the source data used, means that the maps are not considered detailed or accurate enough to reliably predict flooding at individual properties.

The SWMP advises that other sources of flood risk in the borough include the Regent's Canal, which flows east across the Borough and the Hampstead Ponds to the North.

The water levels within the Regents Canal are controlled by British Waterways and for this reason they are considered to pose a minimal risk of flooding.

Thames water is responsible for the maintenance of the foul sewer system in the Borough and they have provided their DG5 database which is based on postcode areas and shows the number of properties affected by both internal and external sewer flooding during the ten-year period from publication of the SWMP. The SWMP advises that historical records contained in the LBCSFRA shows that there has been no significant flooding from sewers across in the vicinity of the site.

13.3 Environment Agency Information

Environment Agency Interactive mapping

The interactive mapping available on the Environment Agency What's in your backyard? Website provides the following information:

The Environment Agency categorise the probability or likelihood of flooding as very low if the chance of flooding is less than 1 in 1000 (0.1%) in any given year.

The surface water mapping shows that the site itself and the immediate surrounding area have a very low risk of flooding, which means that the chance of flooding each year is less than 1 in 1000 (0.1%). In case of a high medium and low risk flooding event, the site will be safe from surface water flooding.

The Interactive mapping also indicates that the site is safe from reservoir flooding.

13.4 Local Authority enquiry

A request for information was sent to the local authority to ascertain whether habitable basement developments were permitted in the London Borough of Camden. A reply from the Senior Sustainability Officer, Katherine Frost was obtained on 13 August 2021. The officer provided an extract from the Local Plan Policy A5 which states: ' *The Council will not allow habitable rooms and other sensitive uses for self-contained basement flats and other underground structures in areas at risk of flooding'.*

Further supporting text was provided from the plan stating: 'Areas *considered at risk from flooding are: Local Flood Risk Zones; and previously flooded streets (shown on "Map 6: Historic flooding and Local Flood Risk Zones").*

Please refer to section 10 which outlines the basement development planning policy.

Please see appendix I for the full reply from the council.

13.5 Planned Works

Any planned or ongoing maintenance or upgrade works can be viewed at the roadworks.org website.

There are several works shown on the website in the area surrounding the site. These are being undertaken by Transport for London, UK Power Networks, Cadent, Thames water and Virgin Media and are both underway and are planned for over the next 12 months.

14 FLOOD SOURCES

Annex C of PPS25 identifies significant forms of flooding that should be considered by a flood risk assessment and these are addressed hereunder.

14.1 Rivers

Flooding from river (fluvial) sources occurs when the volume of water flow exceeds the capacity of the river channel. Most rivers have a flood plain, which is a natural area that water will occupy in the event of a flood. Flooding in these areas can occur very rapidly where there are steep gradients, or very gradually in large relatively flat areas. The local land use and forms of development together with topography are the main influences on the velocity and volume of water and the direction of flow in the event of a flood. The 1 in 100 year flood event is normally taken into consideration with respect to fluvial flooding.

The SFRA advises that there are no main rivers within the London Borough of Camden and the entire borough is classed as Flood Zone 1 with a less than 1 in 1000 annual probability of flooding from fluvial sources

14.2 Seas

Flooding to low-lying land from the sea and tidal estuaries is caused by storm surges and high tides. The severity of tidal flooding is dependent upon several factors including tide heights, weather systems, wind and wave conditions and the effectiveness of defence systems. Tidal defences can be overtopped or breached during severe weather conditions and deep fast flowing flood waters can occur with very little warning, because of this the 1 in 200 year flood event is considered in respect of tidal flooding.

The Environment Agency categorise the likelihood of flooding as very low if the chance of flooding is less than 0.1% (1 in 1000).

14.3 Surface Water

Flooding from surface water generally occurs when rainwater is unable to soak into the ground or enter into the drainage system and therefore runs off the land in an uncontrolled manner. This run off occurs mainly during periods of intense rainfall and is often the cause of localised flooding.

The SFRA shows the results of modelling undertaken to provide an indication of surface water flooding should a 0.1% AEP event occur and also when climate change is taken into

consideration. In both cases the mapping indicates the potential for flooding on or close to the site to be safe or a depth of water less than 0.75m.

The PFRA advises that future flood risk is estimated to be high in the borough and based upon surface water modelling outputs nearly 19,100 properties are at risk of flooding should a 1 in 200 year event occur.

The Environment Agency mapping indicates the site has a very low chance of flooding from surface water.

The available information generally confirms that the site is at very low risk should the 1 in 1000 year event occur and indicates that there is no increased risk when climate change is taken into consideration.

14.4 Groundwater

Flooding from groundwater occurs when water levels in the ground rise above the surface. This occurs most commonly in low-lying areas, which are underlain by permeable rocks (aquifer). These can be extensive regional aquifers such as chalk or sandstone, or sands and gravels such as occur in valley bottoms and underlain by less permeable rock.

The geological information indicates that the site is underlain by superficial deposits of Lynch Hill Gravel, which overlie bedrock deposits of the London Clay.

The SFRA suggests that the site lies in the vicinity of an area with increased susceptibility of elevated groundwater. There are no records of historical groundwater floods in the vicinity of the site.

14.5 Sewers

Rainwater generally drains into the local sewer system and flooding can occur in extreme events, such as periods of intense or prolonged rainfall, if the volume of run off due to insufficient capacity overwhelms the system, or if the sewer is blocked.

The SFRA has not identified any flooding from sewers either on the site or in the surrounding area. Accordingly, there is not considered to be a significant risk of flooding from sewers.

14.6 Reservoirs, Canals and other Artificial Sources

Flooding from artificial sources such as reservoirs and canals is generally a risk when the artificial source retains water above ground level and can occur if there is a breach or failure of the retaining structure. Artificial sources can also include mining, quarrying and mineral extraction as well as some industrial processes and flooding is often the result of operational difficulties such as pump failure.

The Environment Agency interactive mapping shows that the site is safe from reservoirs flooding.

Based on the information currently available there is not considered to be a significant risk of flooding from reservoirs Canals, or other artificial sources.

15 RISK ASSESSMENT

A risk matrix is used to combine the assessment of probability and consequence into an indicative risk level for each of the identified flood sources. The definitions for qualitative flooding probability and consequence used in the DTSFRA have been adopted for this FRA and these definitions are presented below.

15.1 Category Definitions

Qualitative Probability	Definition
Likely	Events of common occurrence that an individual may experience a few times in their lifetime. This corresponds approximately to an annual probability of 10% - 4% (i.e. return periods of between 10 and 25 years)
Infrequent	Events that an individual may experience once in a lifetime, approximately equivalent to the 1% annual probability event (i.e. return period of 1 in 100 years
Possible	Events that may be seen once in every few lifetimes. These correspond to approximately a 0.1% annual probability (1 in 1000 year event). This category may also include the combination of an infrequent event (1% annual probability) in combination with a failure of flood defences designed to protect against such an event.
Remote	Events that are of a low order of likelihood (approximately 0.1% annual probability), but combined with a failure of flood defences designed to protect against such an event.
Very remote	Extreme flood events with an annual probability of less than 0.1%.

Qualitative Consequence	Definition
High	Serious damage to property and high risk of injury and loss of life. High depths of floodwater (>1m) and high flood flow velocities.
Medium	Moderate damage to property, moderate flood depths (<1m) and flow velocities. Some risk of injury.
Low	Minor damage to property, low depths of floodwater (<0.5m) and low flow velocities. Minor risk of injury.
Negligible	No damage to property or risk of injury.

15.2Risk Matrix

Consequence	Probability				
	Likely	**Infrequent**	**Possible**	**Remote**	**Very remote**
High	Very High	Very High	High	High	High
Medium	High	High	Medium	Medium	Medium
Low	Medium	Medium	Low	Low	Negligible
Negligible	Low	Negligible	Negligible	Negligible	Negligible

15.3 Risk Assessment

Based upon the qualitative probability and consequence definitions, the risk assessment provides the site with a level of risk determined by the risk matrix, for each of the identified flood sources.

Flood Source	Probability	Consequence	Risk level
Rivers	Very remote	Low	Negligible
Seas	Very remote	Low	Negligible
Land (surface water)	Very remote	Low	Negligible
Sewers	Very remote	Low	Negligible
Groundwater	Very remote	Low	Negligible
Reservoirs, Canals and other artificial sources	Very remote	Negligible	Negligible

16 MITIGATION AND MANAGEMENT PROPOSALS

16.1 Principles

It is important that new developments, particularly in the higher flood risk zones, are proofed against future uncertainty for their lifespan, which is assumed to be 75 years for commercial and industrial developments and 100 years for residential developments. Therefore it is advised that proposed flood mitigation measures associated with developments are reviewed at the detailed FRA stage, paying attention to the potential implications of future changes in climate and land use. The impact of climate change on drainage networks should also be considered as existing drainage systems and flood barriers will not provide the same level of protection in years to come as now The application of the precautionary principle and the provision of freeboard and flood resistance and resilience in buildings at design stage can mitigate the impact of future increases in flood risk at relatively low cost at the construction stage.

The risk assessment has identified a negligible risk of flooding from rivers, seas, surface water, sewers, groundwater and reservoirs, canals and other artificial sources.

16.2 Building Layout

The plans in appendix B show the development of a ground floor and basement residential area. The ground floor and basement are the most likely to be affected by flooding, however the risk to site from any source of flooding is considered to be negligible.

The Camden local plan - 2017 doesn't permit habitable basement developments in areas that are prone to flooding (Local Flood Risk Zones; and previously flooded streets). The site is in flood zone 1 and has been found to have negligible risk from all sources of flooding, therefore a habitable basement dwelling is considered to be acceptable.

The first-floor apartment will be protected by any form of flooding.

16.3 Resilient and resistant construction

In order to provide mitigation against floodwater damage in any event, it is recommended that where appropriate, the following design initiatives be incorporated into the new building works:

- Water resilient material in structural elements;
- Cracks and joints to be sealed with a suitable material;
- Floor surfaces to have tiled finish;
- Electrical appliances and fittings, service panels, boilers and supplies should be installed at high level;
- Plastic, metal and other easily replaceable alternatives to chipboard or MDF;
- Lime plaster or cement render rather than gypsum plaster;
- Installation of positive pumped devices to foul and surface water drain systems
- Inclusion of emergency Sump and Pump equipment.

Retrofitting properties in this way after flooding is common practice. These measures are not necessarily more expensive than conventional techniques, but will significantly reduce the damage, cost and time to repair should a property be flooded. Reference should be made to BS 85500:2015 Flood resistant and resilient construction, this guide to improving the flood performance of buildings sets out guidance for improving the flood performance, resistance and resilience of buildings.

16.4 Protection from Flooding

The site is considered likely to be affected by flooding only in extreme circumstances and the overall risk level from such an event is categorised as negligible. Consideration should be given in the design for the inclusion of proprietary purpose made protection boards to doorways and windows with low cills and similar air vent protection wherever appropriate. Slight raising of the ground floor slab may also be beneficial to mitigate against shallow flood water.

16.5 Maintenance Regime

A robust maintenance regime should be instigated to support any mitigation and management proposals. The regime should include routine servicing and inspection with particular attention given to emergency pump equipment.

The regime should include routine servicing and inspection and responsibility for maintenance and emergency repairs should be clearly identified and contact details included in the emergency plan.

16.6 Drainage

The site is currently covered by concrete hardstanding and therefore the proposed development will not increase the impermeable area. A drainage strategy should be designed to demonstrate that the site can be drained in a sustainable manner, and that through development flood risk to properties downstream of the site will not be exacerbated. A drainage strategy should include the following information:

- Permitted discharge rates;
- Storm water runoff calculations;
- Attenuation required to restrict runoff to permitted discharge rates;
- Proposed means of attenuation (SuDS techniques);
- Distribution of storm water attenuation across the site; and,
- Design standards and parameters of the proposed storm drainage techniques.

This list should not be considered as exhaustive and may require additional elements to be included depending on the mitigation required.

Although the form of development proposed will increase the number of washing and WC facilities from the previous usage, the maximum discharge from the building will still be less than 1l/sec which is still a negligible flow and therefore it is considered unlikely that the new

flow will have any adverse impact on the existing sewer network. However, it is recommended that Thames Water are contacted at the earliest opportunity to discuss the matter.

16.7 Flood Warning

The risk from all forms and sources of flooding has been assessed as low or negligible and therefore it is not considered necessary for the development to have a flood warning system or an emergency plan. However, consideration could be given to developing a simple emergency plan.

16.8 Emergency Plan

It is recommended that an Emergency Plan is prepared for the development, which takes cognisance of existing local flood incident management strategies and compliment any major incident plans already in place.

The Emergency Plan should be available to all occupants of the site with information displayed in communal areas. It should include the following information and generally accord with the Environment Agency Flood Plan Advice and the Flood warning and Evacuation Plan Requirements in the RBG Developers Guide for Flood Risk.

- Roles and responsibilities of organisations involved in local flood risk management
- Detail of flood sources and expected flood water depths and hazard rating
- Flood risk management measures
- Evacuation Routes
- Contact details
- Individual flood plan pro-forma

16.9 Emergency Access and Escape

Notwithstanding the information provided by the PFRA mapping there are areas immediately adjacent to the site, that are shown to be unaffected by any source of flooding and therefore it is not anticipated that emergency access and escape routes will be significantly restricted.

16.10 Climate Change

The SFRA advises that peak fluvial flows are likely to increase by around 20% over the next 50 to 100 years the SFRA indicates the site to be located in an area safe from the climate change affect on fluvial flooding.

Based on the available information the proposed mitigation and management proposals are considered sufficient to address climate change for the likely lifespan of the development.

17 RESIDUAL RISK

Residual risk is the risk remaining after implementation of all risk management and mitigation measures. It can arise due to the failure of flood management infrastructure, such as breach, or blockage; or severe flood events that exceed the design standard of flood defences, such as overtopping.

Provided that the appropriate mitigation and management proposals recommended in Section 15.0 have been incorporated into the design there is not considered to be any residual risk.

18 FLOODPLAIN AND FLOW ROUTES

18.1 Floodplain

Floodplain is the area that would naturally be affected by flooding if a river rises above its banks, or high tides and stormy seas cause flooding in coastal areas.

The site lies in an area classified as flood zone 1 and is therefore not considered to be floodplain.

18.2 Flow Routes

In extreme flood events flood flow routes can form on roads, pathways and in passages between buildings.

Due to the natural topography of the area around the site, it is anticipated that in an extreme event there will be surface water flow in a easterly direction alongside Euston Rd.

19 CONCLUSIONS

The property is not located in an Environment Agency identified flood zone and no other significant potential sources of flooding have been identified.

The risk assessment has determined that there is a negligible level of flood risk to the site from; rivers, seas, surface water, groundwater, sewers and reservoirs and artificial sources.

The use of appropriate flood protection measures and water resilient and resistant construction are not considered necessary but would provide an increased level of protection in the event of an extreme flooding event and ensure that the site is safe without increasing flood risk elsewhere.

As the site is in Flood Zone 1 and has been found to have a negligible risk of flooding from all sources, it is considered that development of a habitable basement area is acceptable for this location.

There are areas immediately adjacent to the site that are unaffected by any source of flooding and it is not anticipated that emergency access and escape routes will be significantly restricted.

Therefore, the proposed development will satisfy the requirements of the National Planning Policy Framework and is considered suitable for the proposed residential use.

This document has been prepared for the titled project or named part thereof and should not be relied upon or used for any other project without an independent check being carried out as to its suitability and the prior written authority of GO Contaminated Land Solutions Ltd being obtained. No responsibility or liability is accepted for the consequences of this document being used for a purpose other than that for which it was commissioned. Any person using or relying on this document for such other purpose will by such use or reliance be taken to confirm his agreement to indemnify GO Contaminated Land Solutions Ltd for all loss or damage resulting therefrom. GO Contaminated Land Solutions Ltd accepts no responsibility or liability for this document to any party other than ***Emma Kumar*** *by whom it was commissioned.*

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Appendix A – Site Location Plan

1790-FRA-1-A: Cleveland Road, Fitzrovia

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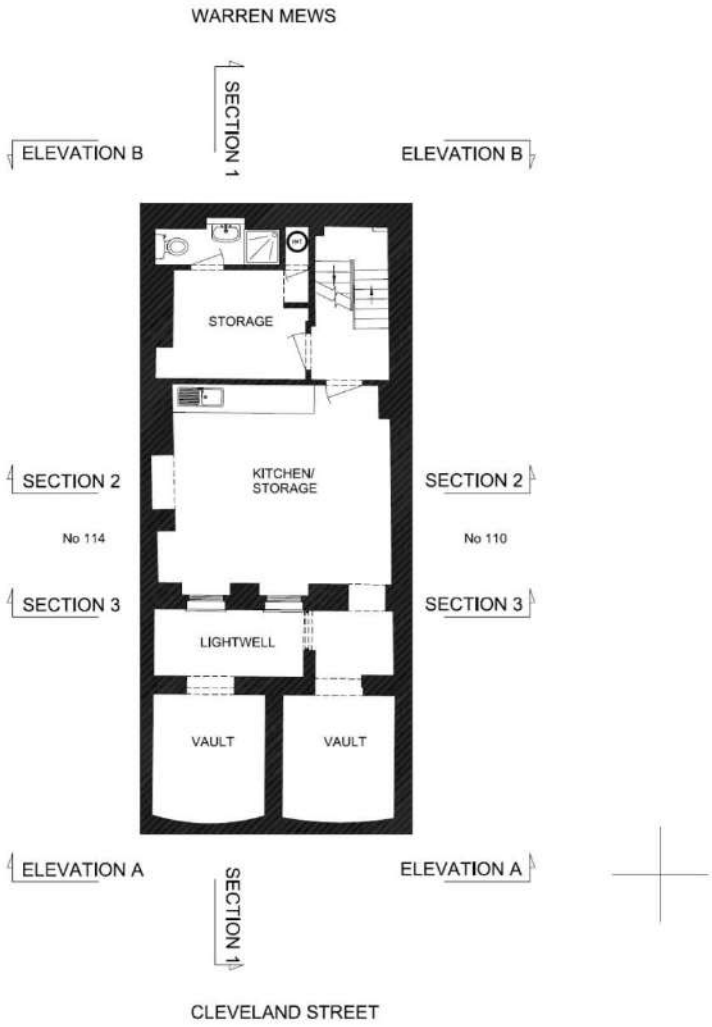
Appendix B – Existing & Proposed Site Plans



DRAWING TITLE : Existing Basement Plan	112 Cleveland Street, London W1	SCALE: 1 : 100@ A3	DATE : 07.02.2020	DRAWING NO:A100	REVISION NO : 00

1790-FRA-1-A: Cleveland Road, Fitzrovia

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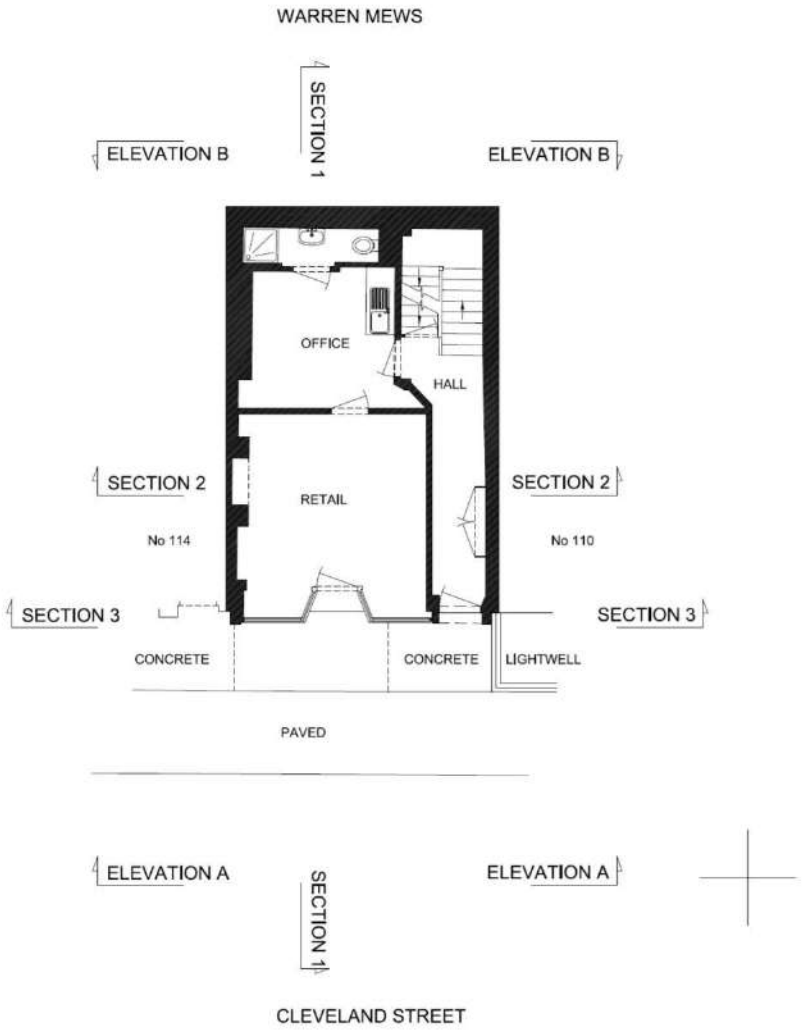

DRAWING TITLE : Existing Ground Floor Plan	112 Cleveland Street, London W1	SCALE: 1 : 100@ A3	DATE : 07.02.2020	DRAWING NO:A101	REVISION NO : 00

1790-FRA-1-A: Cleveland Road, Fitzrovia

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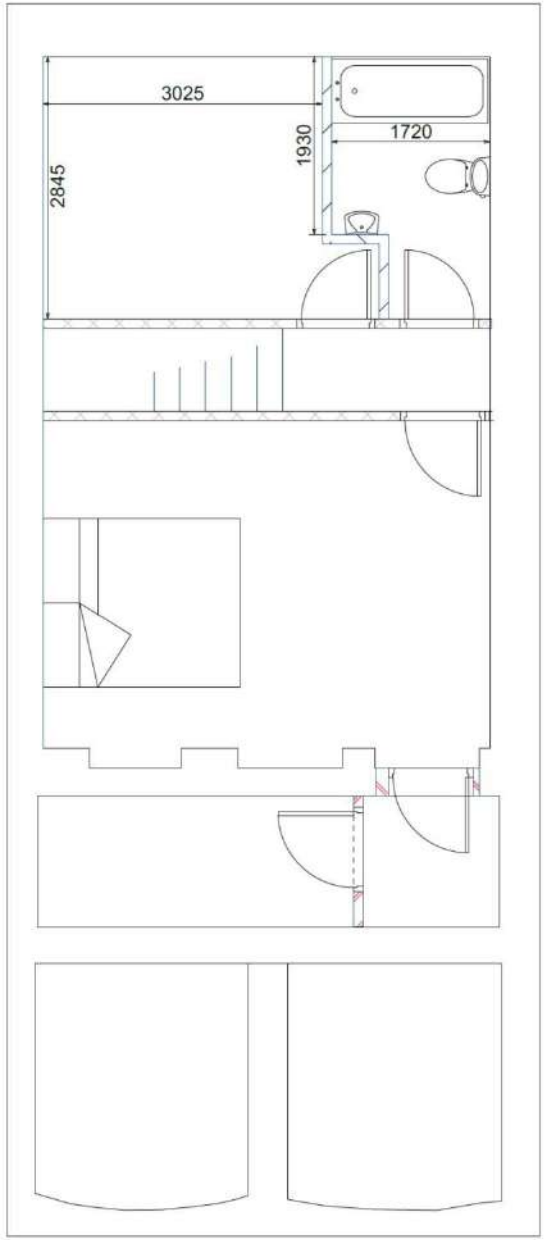
evolution

Design - Build - Furnish



Notes

Unit 1

Project
Renovation Project
112 Cleveland Street
London
W1T 6PA

Mr & Mrs Kumar

Proposed Basement

Drawing No.
19061

17/05/2021
Month Year

Scale
1:50

Drawn by
CS

Checked by
DC

Page Size - A3

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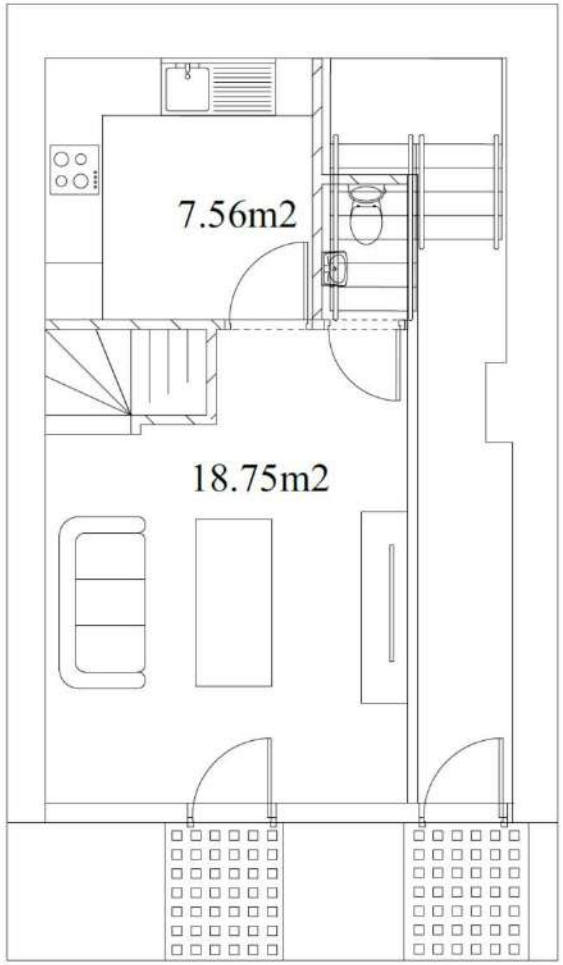
WWW.EVO-DB.CO.UK

1790-FRA-1-A: Cleveland Road, Fitzrovia

Emma Kumar

evolution

Design - Build - Furnish



Notes

Unit 1

Project
Renovation Project
112 Cleveland Street
London
W1T 6PA

Mr & Mrs Kumar

Proposed Ground Floor

Drawing No.
19061

17/05/2021 (Month Year)
Scale 1:50
Drawn by CS
Checked by DC

Page Size - A3

1000mm

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1790-FRA-1-A: Cleveland Road, Fitzrovia

Emma Kumar

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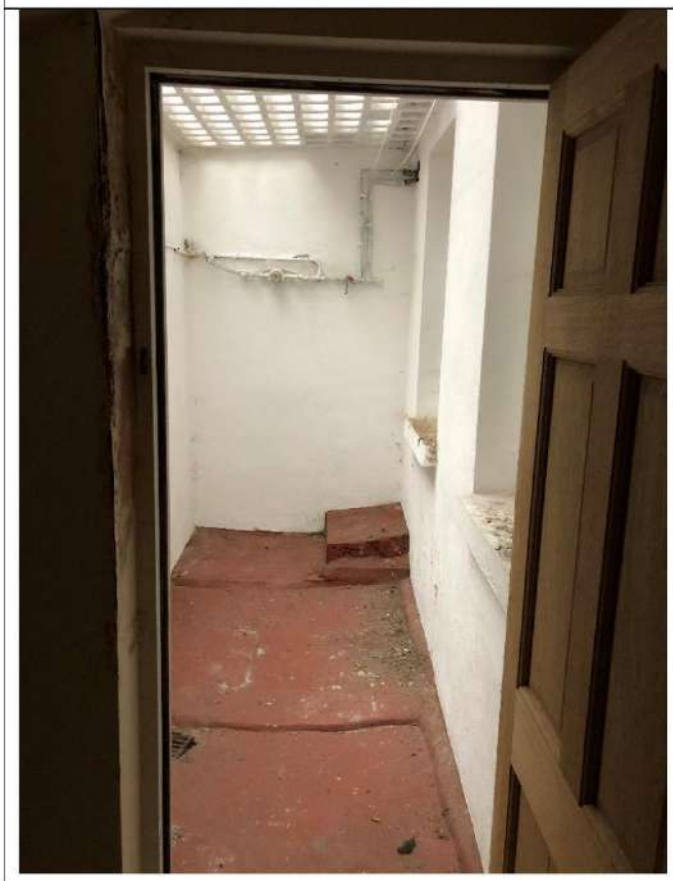
Appendix C – Photographs

View from Cleveland Street

Frontage

Frontage

Barrel Vaulted areas under Footpath



Basement Passage under pavement lights, looking North

Basement Passage under pavement lights, looking South

Basement

Ground Floor, looking towards Retail Entrance

Ground Floor, Rear Room

View down onto roof of Mews Property

View Northwest towards the Mews Property

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Appendix D – Sequential and Exceptional Test

PPS 25 states that when applying the Sequential Test for individual planning applications the following should be considered:

4.20 Planning applications should be determined in accordance with development plan policies. Where plans and policies have been sequentially tested using evidence from SFRAs the application should be relatively straight forward. The site-specific FRA will show how the proposal meets the requirements of PPS25 and the plan policies.

4.21 Where applications are brought forward on sites not allocated in the plan, LPAs should consider the flood risk implications of the proposal, including applying the Sequential Test.

4.22 Where a site has not yet been sequentially tested in the LDD, the Sequential Test will need to be applied at the individual site level. In these cases the developer will need to provide evidence to the LPA that there are no other reasonably available sites where the development could be located. The LPA applies the Sequential Test to the application. If the proposed development is needed for wider sustainable development reasons in flood risk areas it must then satisfy the three criteria of the Exception Test, set out in PPS25 (annex D, paragraph D9), to ensure that the development would be safe for its occupants, and would not increase flood risk.

4.23 Another instance when the Sequential Test will need to be applied to individual planning applications is where the use of the site being proposed is not in accordance with LDD allocations and policies. For example, if housing is proposed on a site allocated for less vulnerable industrial uses.

4.24 It is the responsibility of the developer to assemble the evidence for their application to allow the LPA's planning officer to carry out the Sequential Test. This is likely to include evidence:

- on the flood risk to the site. (The starting point for this will be the Environment Agency's Flood Map. It should be borne in mind that this map does not cover all sources of flooding such as surface water flooding or groundwater flooding. If a SFRA has been produced this should build on the Environment Agency Flood Map and include flooding from all sources. Site-specific FRAs may also be available from previous applications made);
- on the availability of 'reasonably available' (suitable developable and deliverable) sites in the relevant area with a lower flood risk that could be used for the development;
- the vulnerability classification of the development, bearing in mind that a mixed use development could contain various vulnerabilities (table D.2. of PPS25);

- if it is likely that the Exception Test will need to be applied, evidence to show that wider sustainability benefits to the community outweighs the flood risk; and
- that the development is safe and residual flood risk can be overcome to the satisfaction of the Environment Agency and other stakeholders.

PLANNING POLICY STATEMENT 25 PRACTICE GUIDE | The Sequential and Exception Tests 75

4.25 Developers seeking to develop in flood risk areas should undertake pre-application discussions with the LPA, Environment Agency and other relevant stakeholders to scope out the availability of other sites that would meet the functional requirements of the application, and what evidence will be needed to show that consideration has been given to alternative locations in lower risk areas, so that the LPA can apply the Sequential Test.

4.26 The Sequential Test will show whether there are any reasonably available sites for the type and scale of proposed development in a lower flood risk zone or at a lower flood risk than the application site.

4.27 'Reasonably available' alternative sites can be identified from evidence based documents which feed into the development of the LDDs e.g. Strategic Housing Land Availability Assessments required by PPS3.

4.28 As the process of RFRAs/SFRAs is completed and LDDs are reviewed applying the Sequential Test, the need to apply the Sequential Test at the planning application level will reduce. However, there will still be instances where the Sequential Test will need to be applied at the planning application stage e.g. where windfall sites are not in accordance with LDD plans and polices.

4.29 The EA and stakeholders will work together on the application of the Sequential Test.

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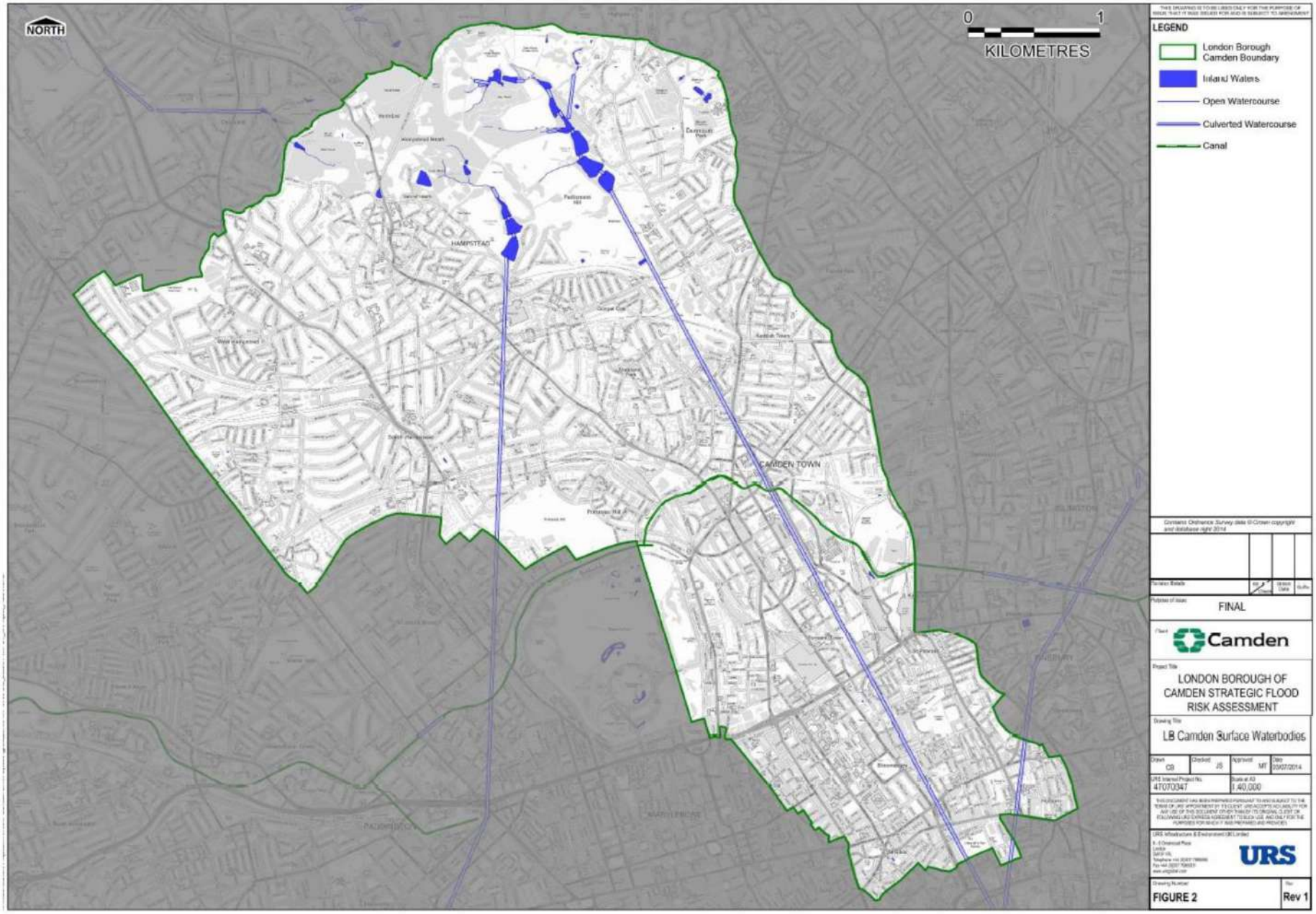
Appendix E – Extracts from Strategic Flood Risk Assessment



1790-FRA-1-A: Cleveland Road, Fitzrovia

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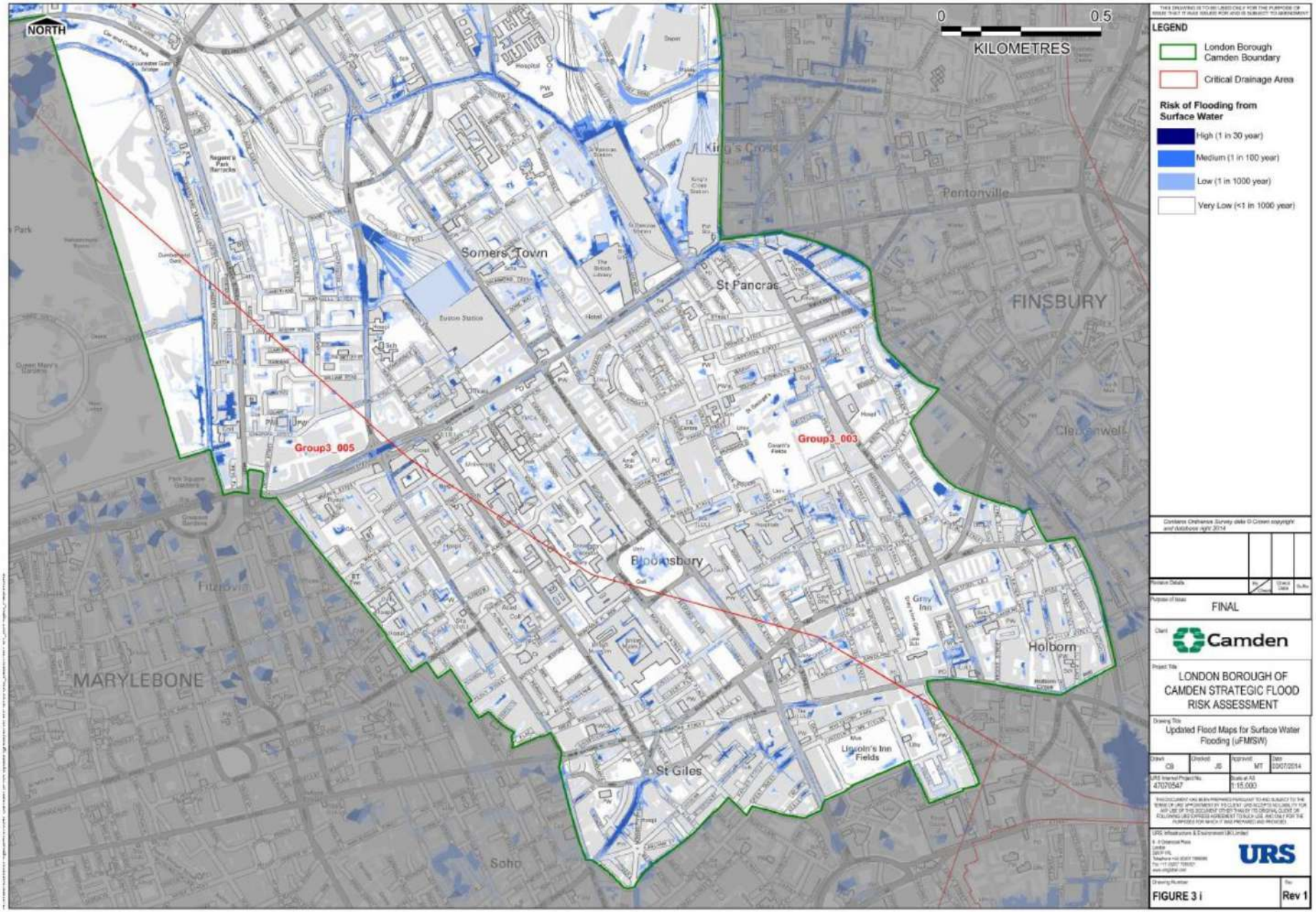
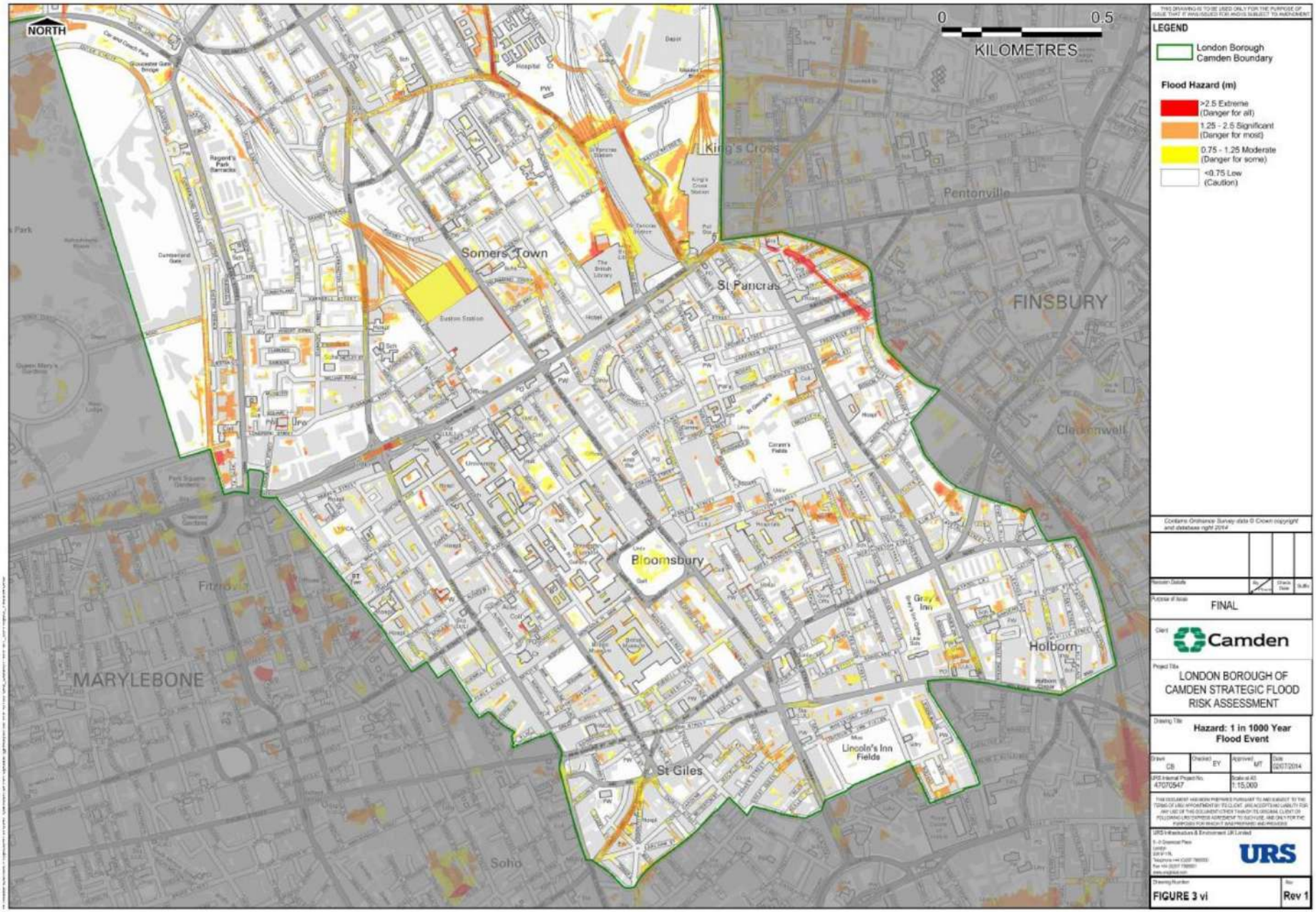


1790-FRA-1-A: Cleveland Road, Fitzrovia

Emma Kumar



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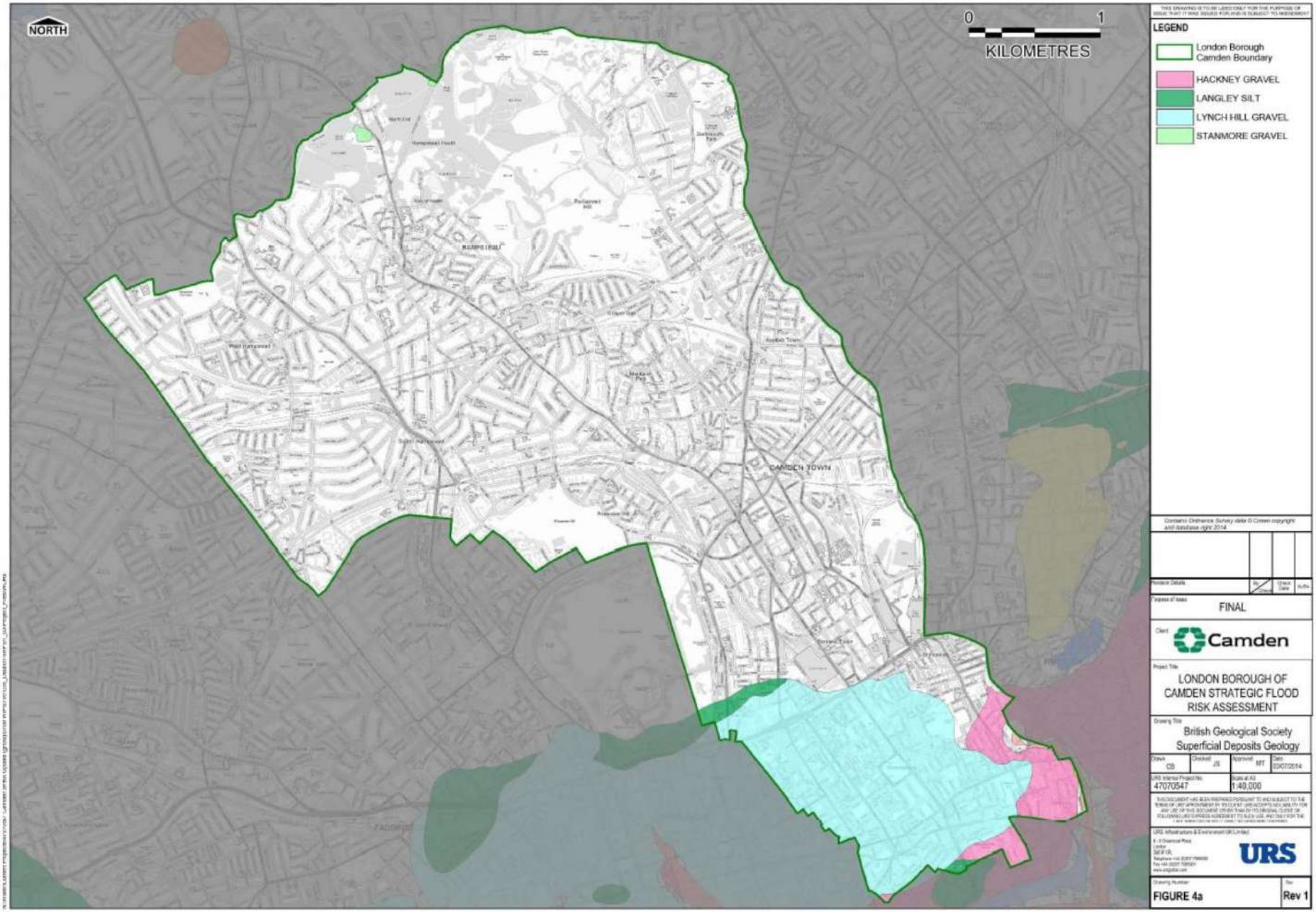
Emma Kumar



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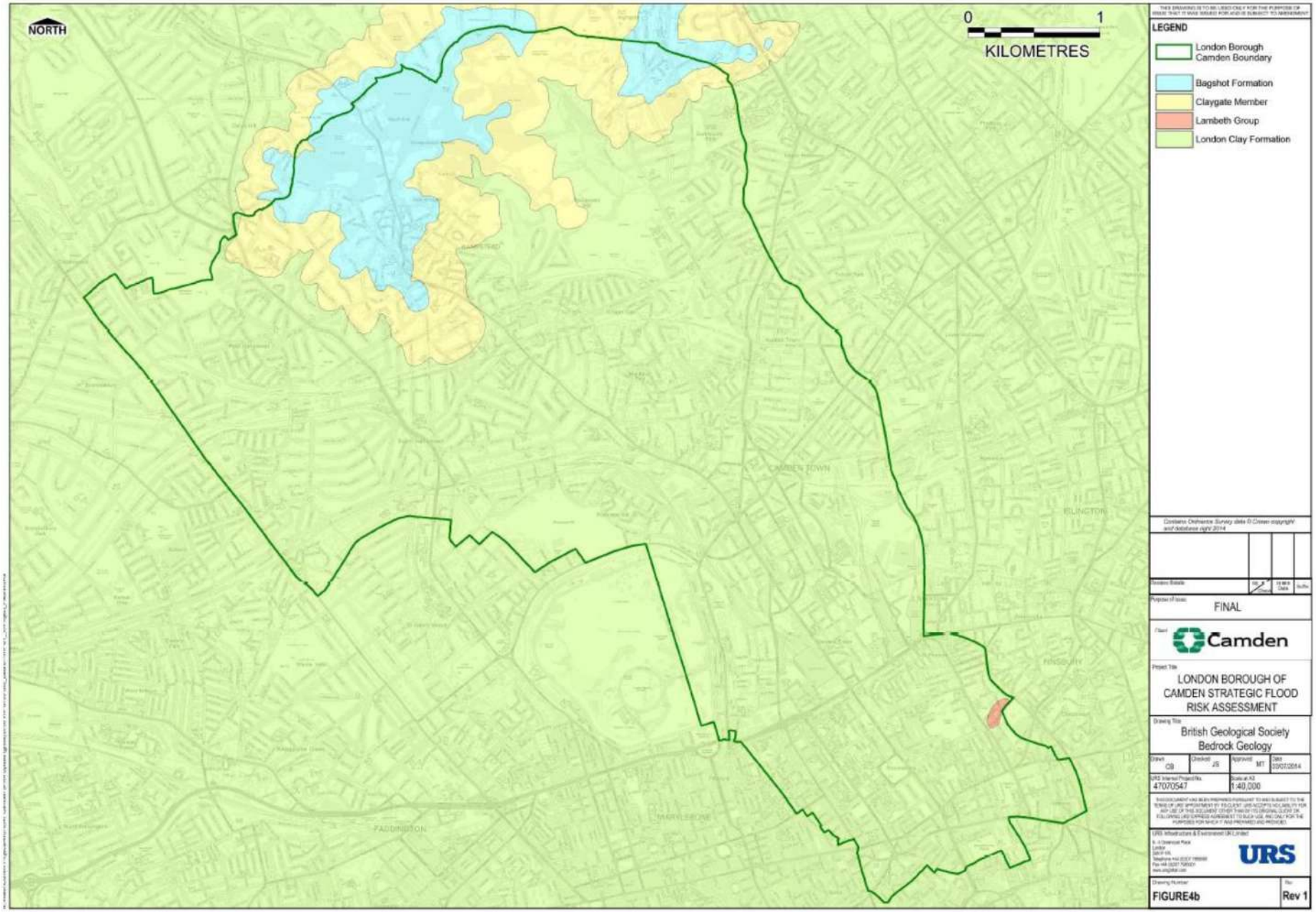
Emma Kumar



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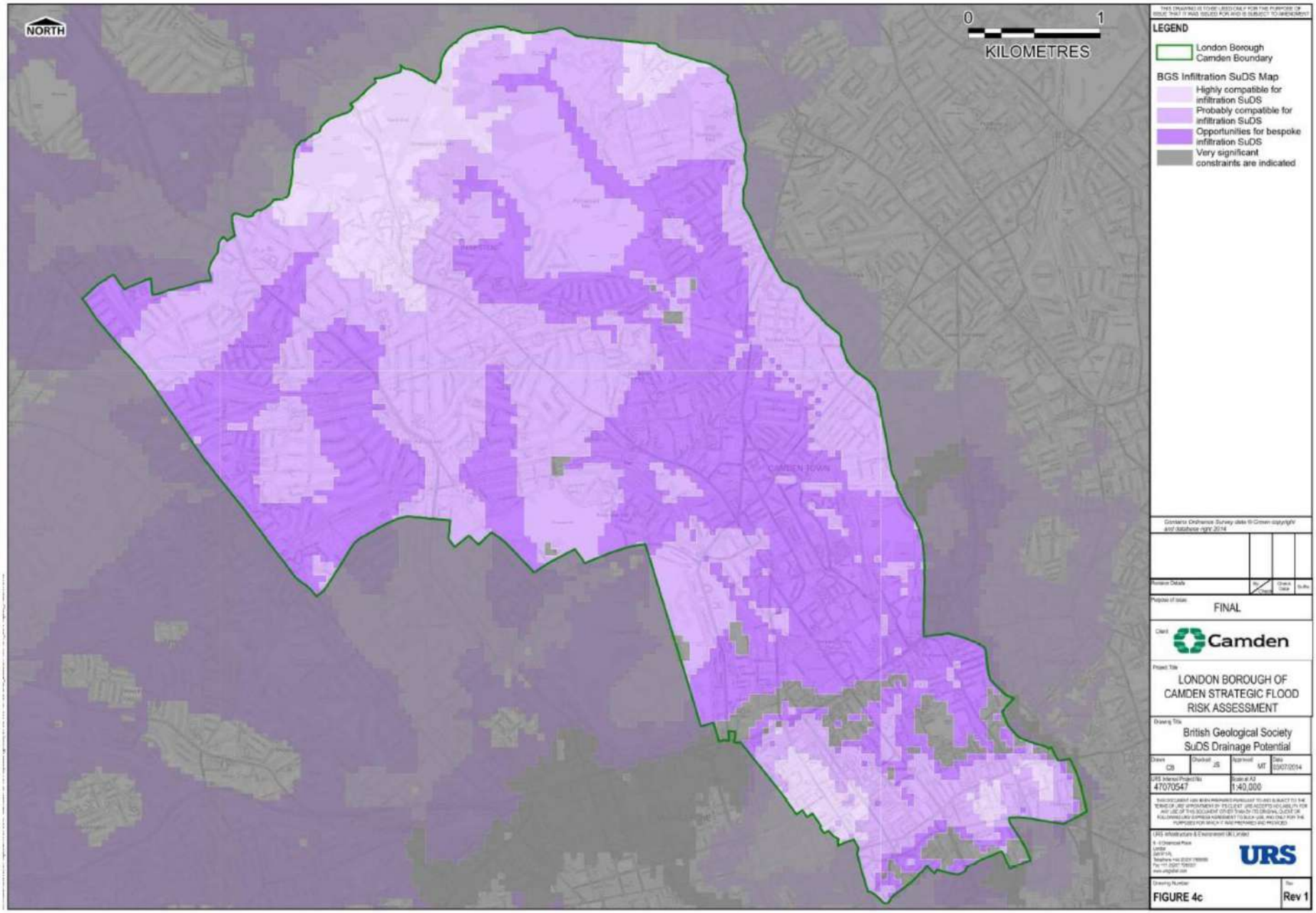
Emma Kumar



1790-FRA-1-A: Cleveland Road, Fitzrovia

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1790-FRA-1-A: Cleveland Road, Fitzrovia

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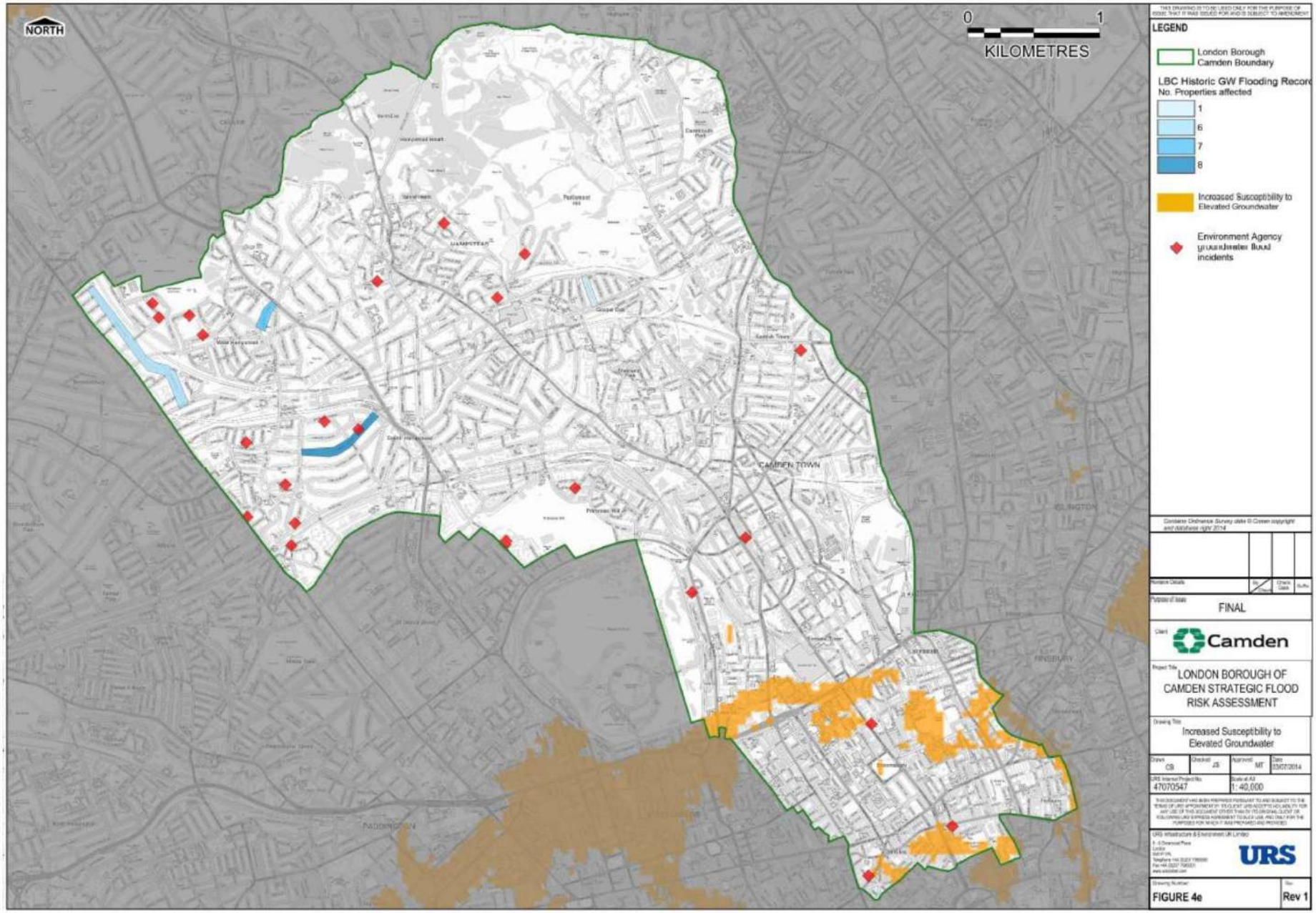

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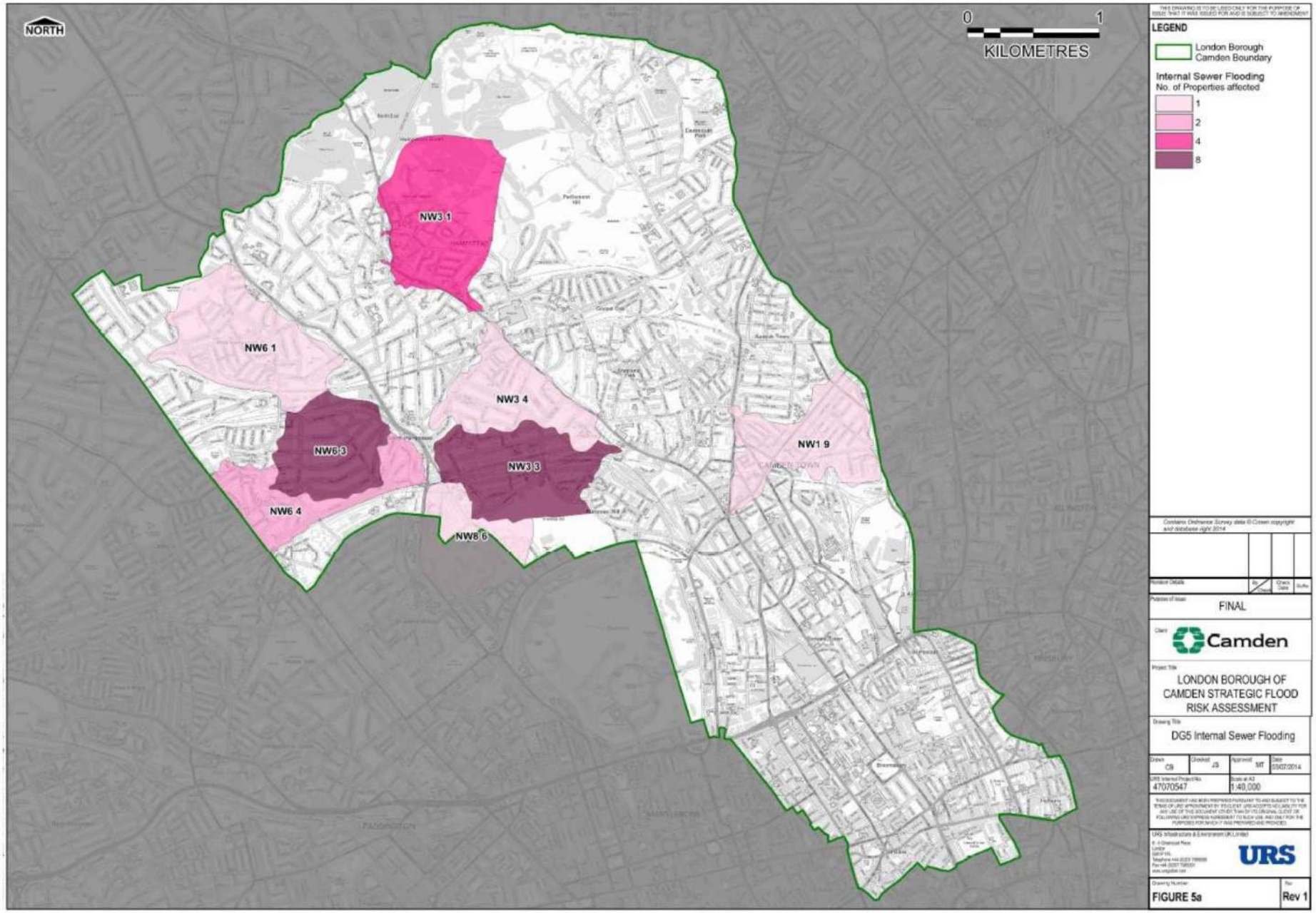

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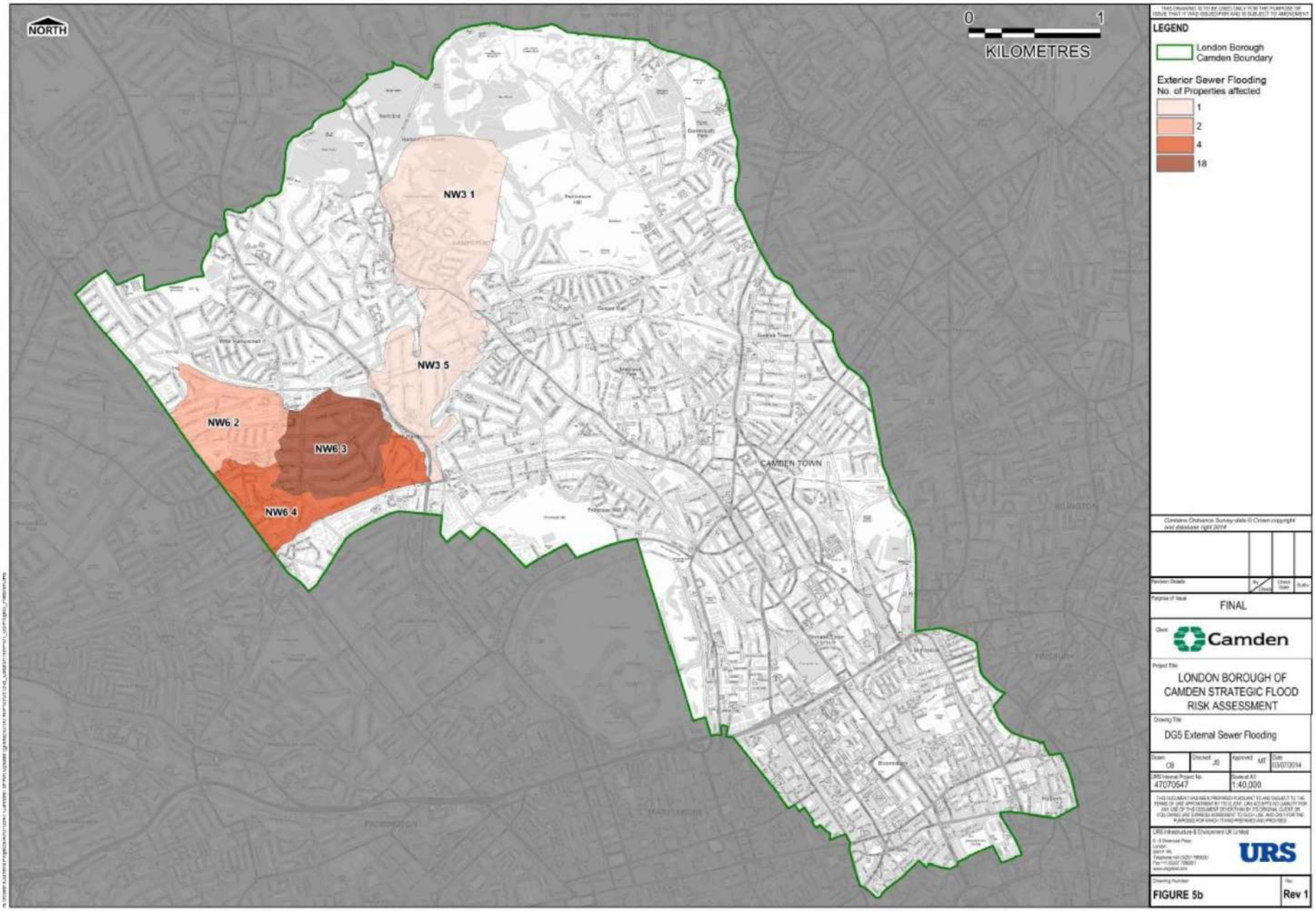

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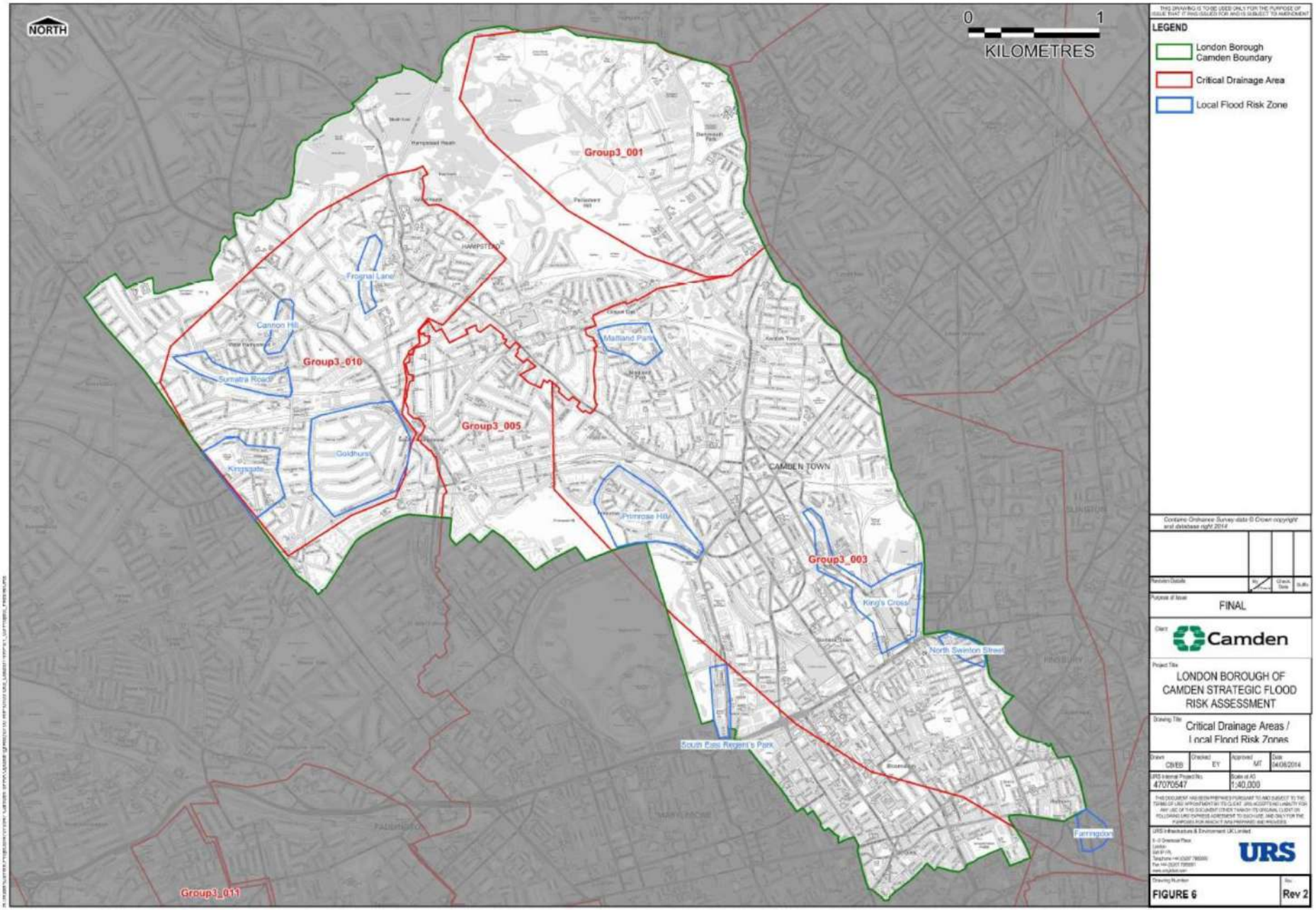

1790-FRA-1-A: Cleveland Road, Fitzrovia

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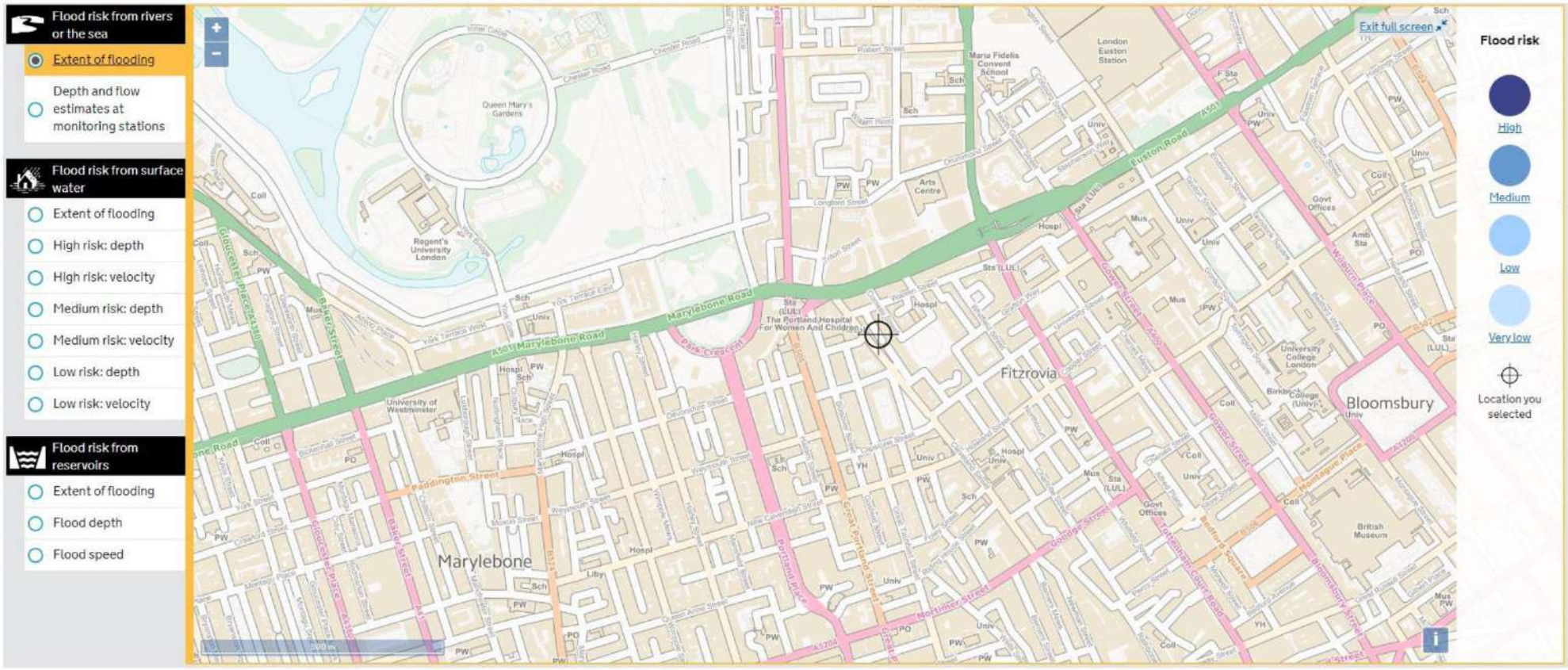
Appendix F – Environment Agency Information



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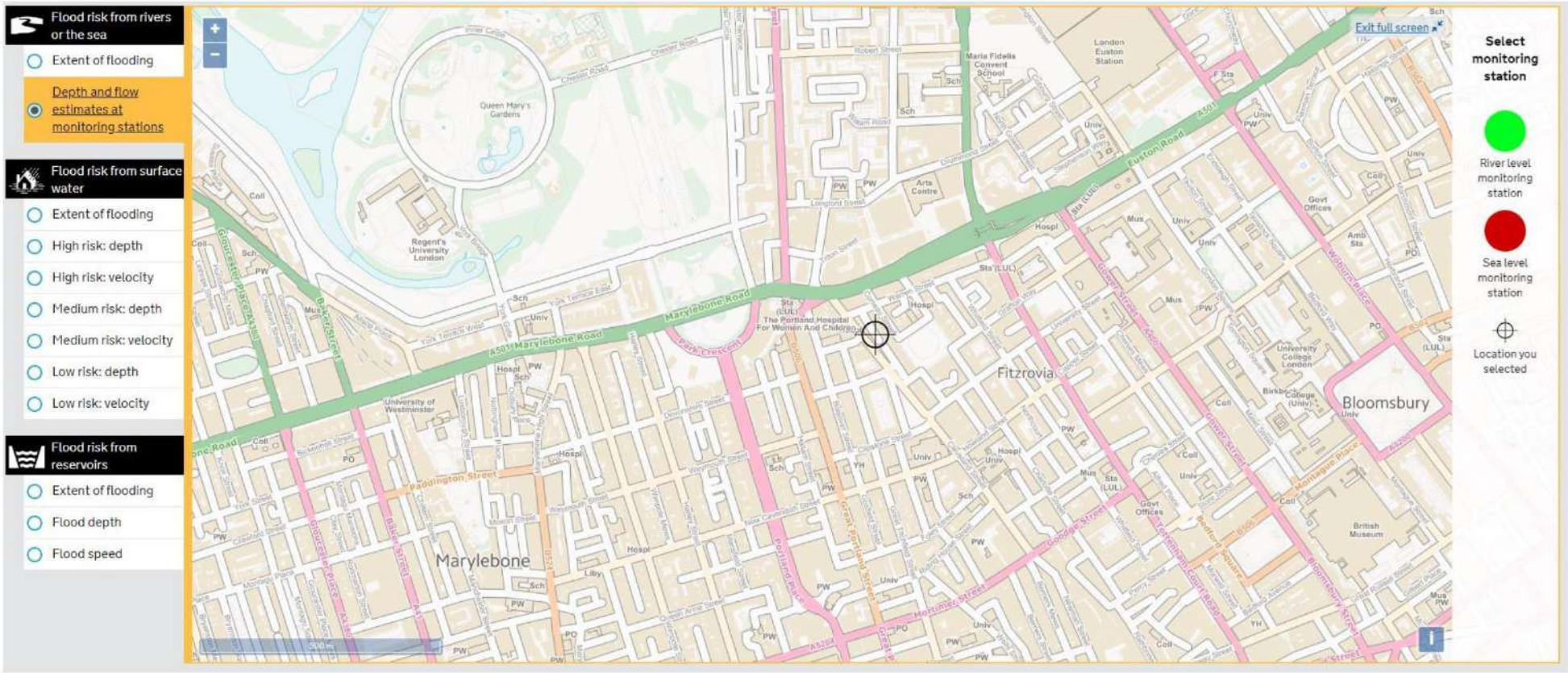

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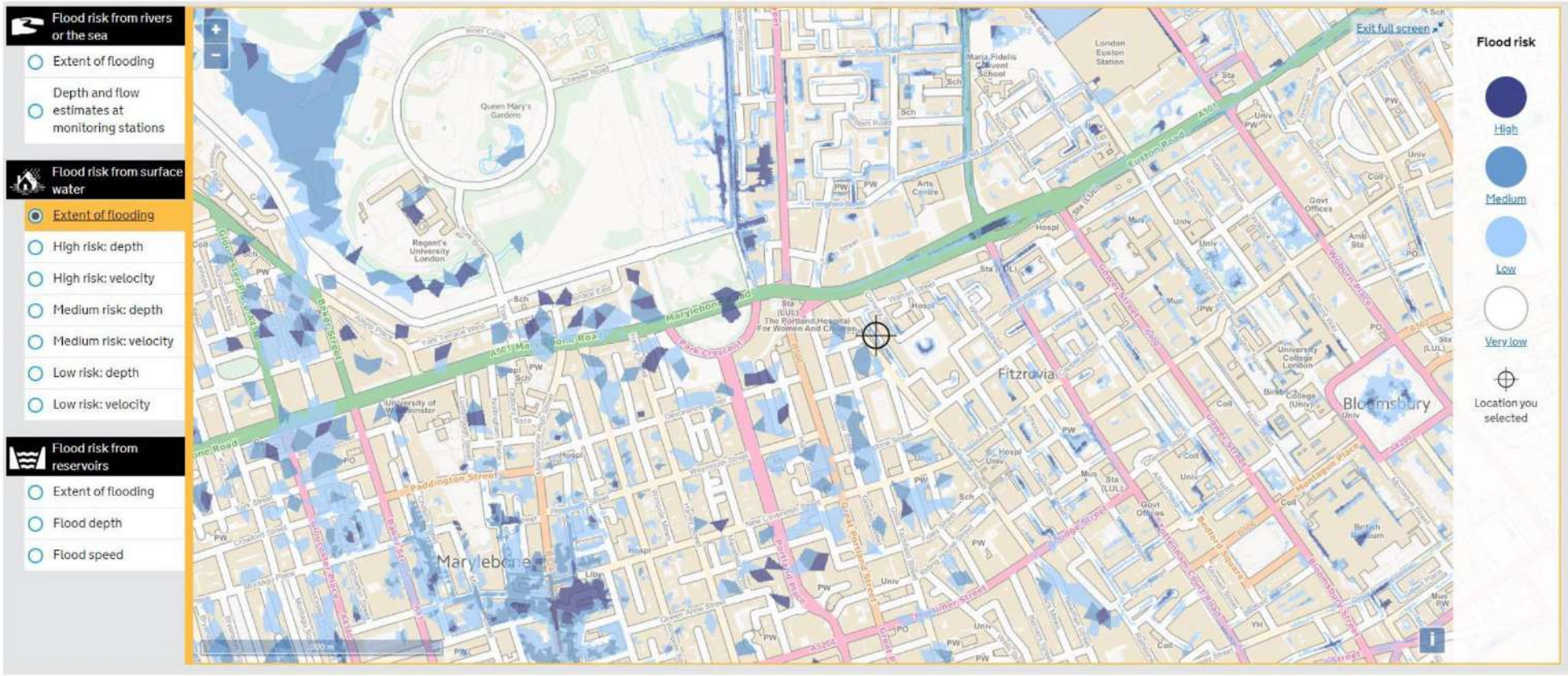

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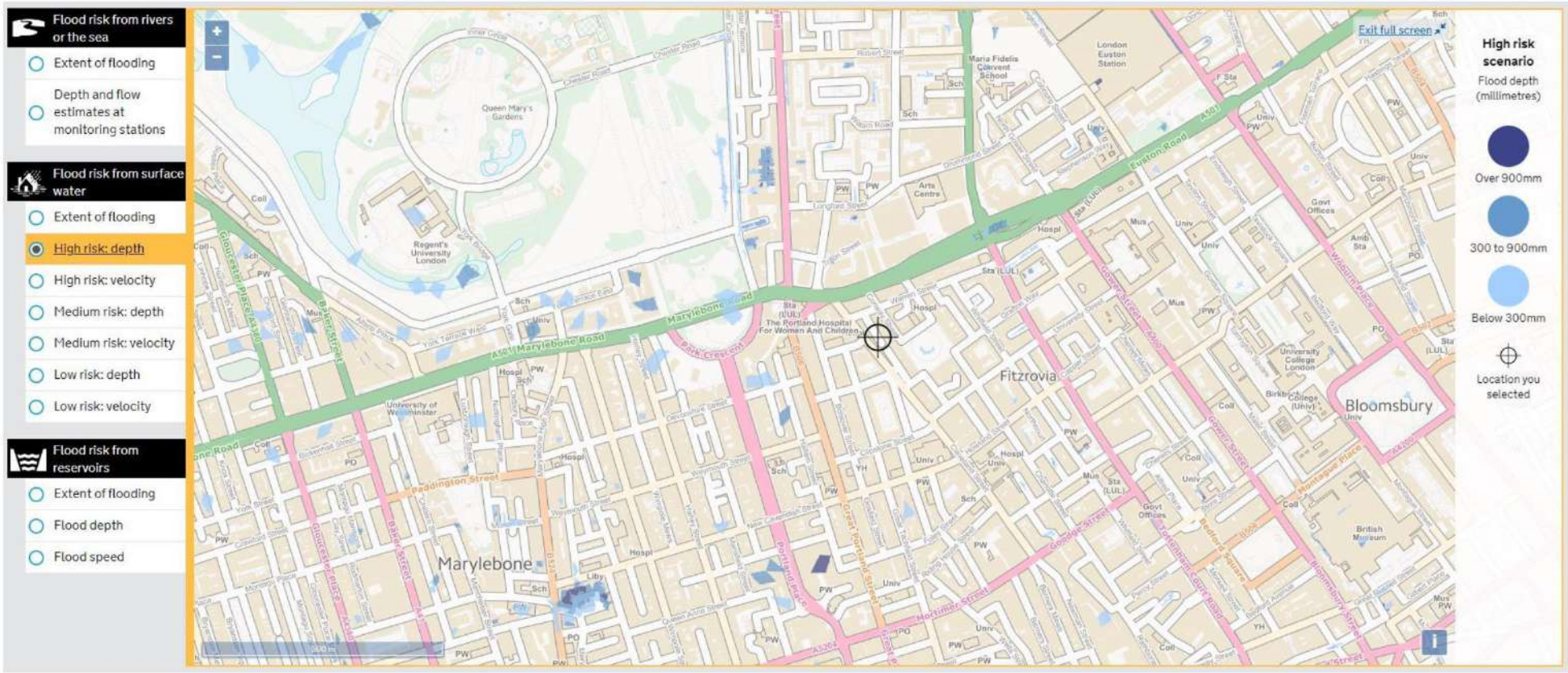

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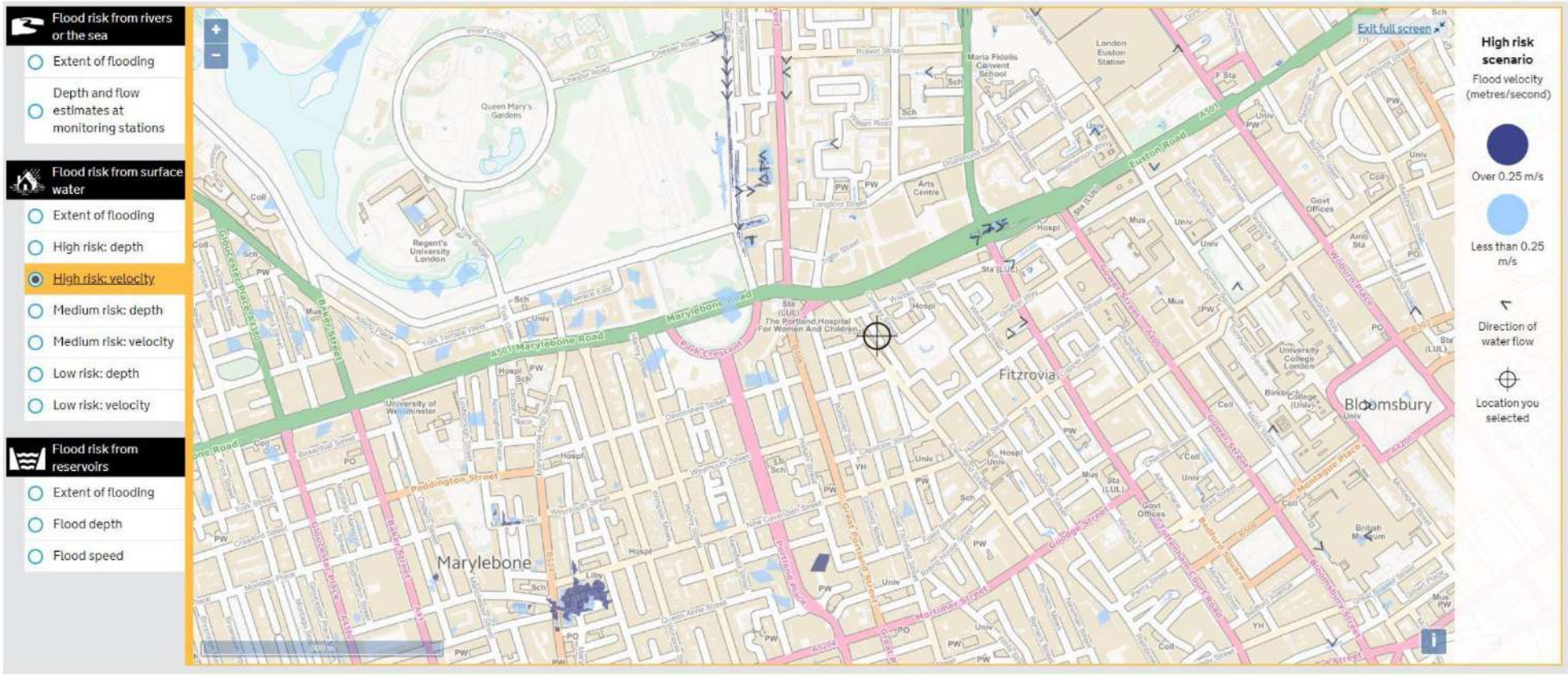

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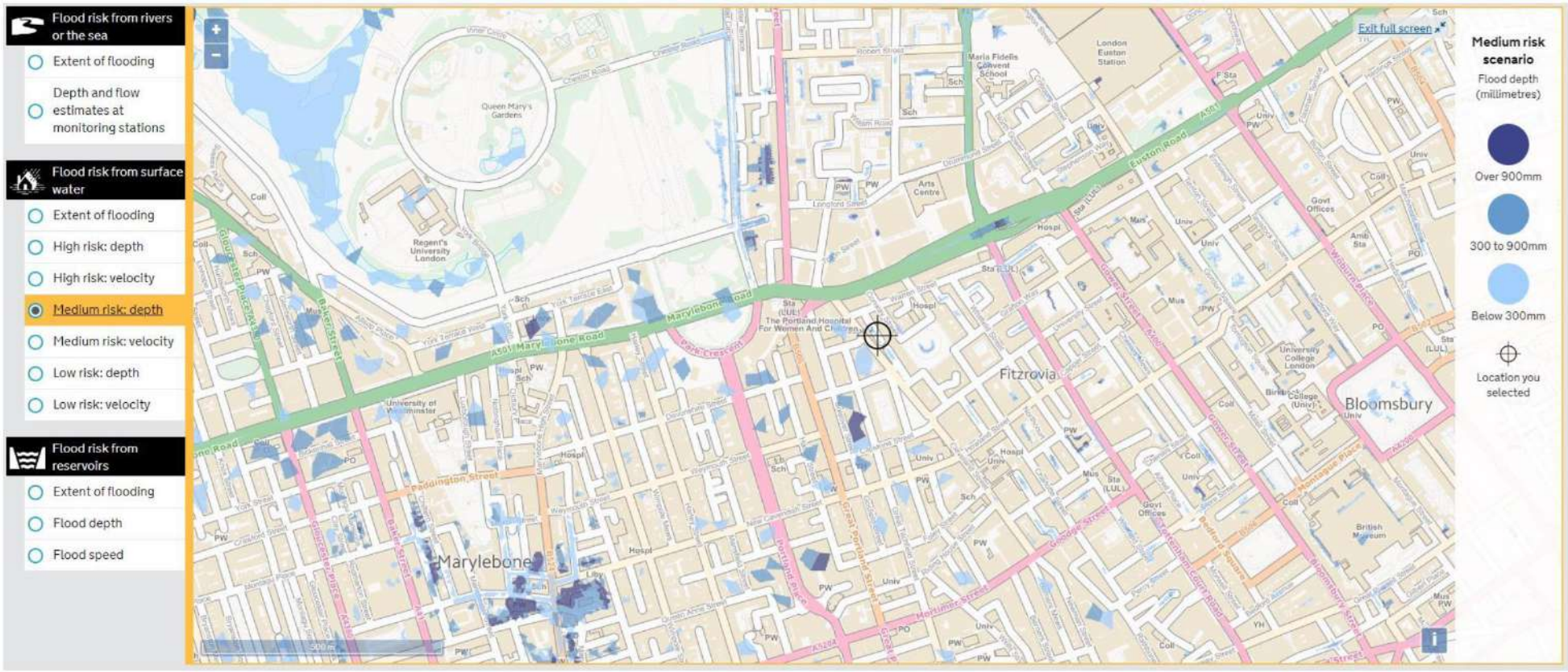

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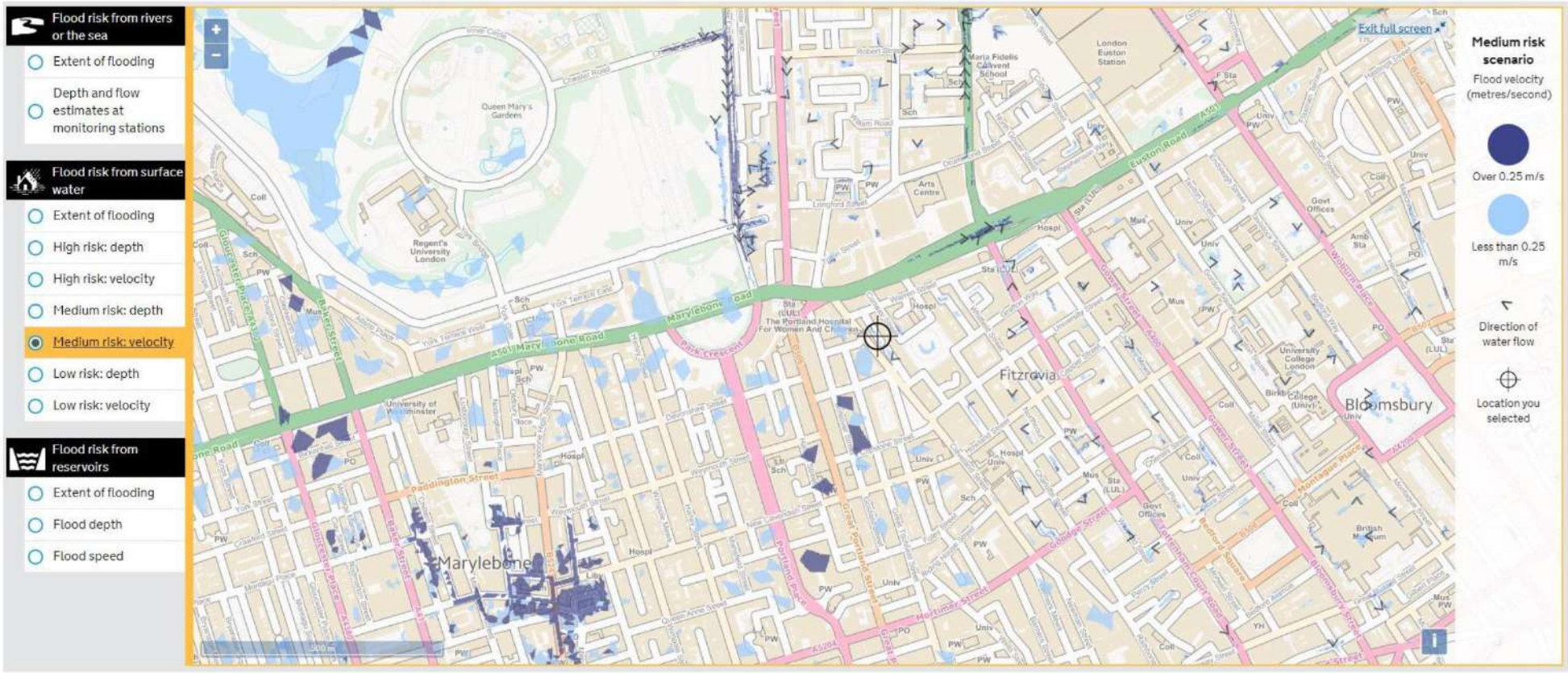

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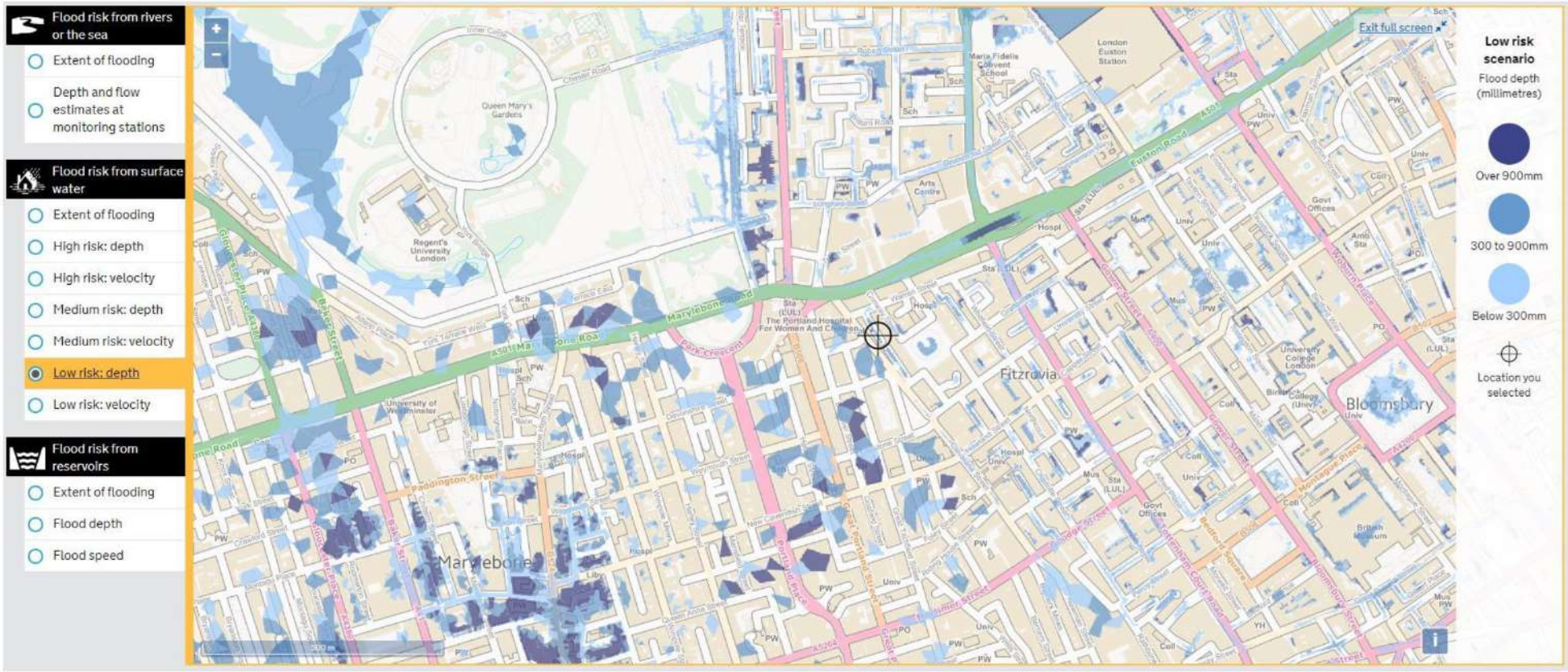
Emma Kumar



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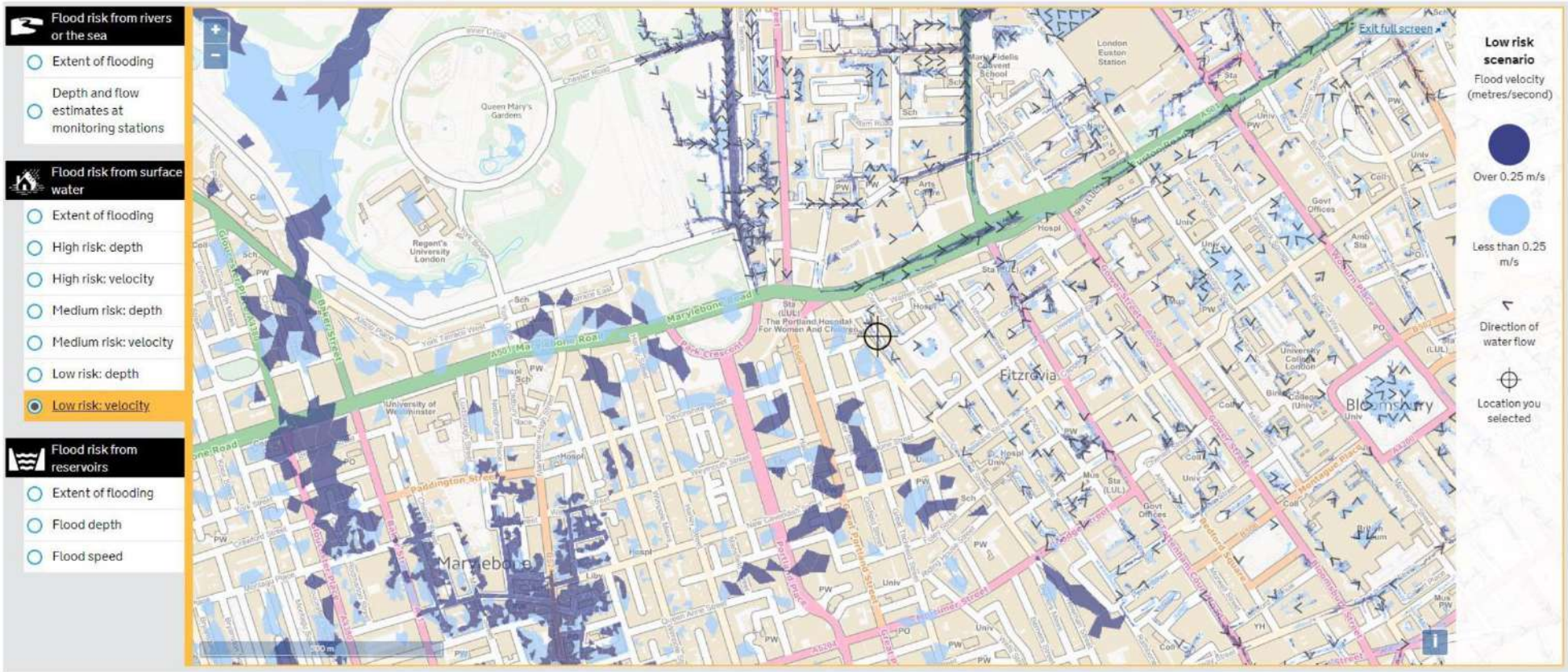

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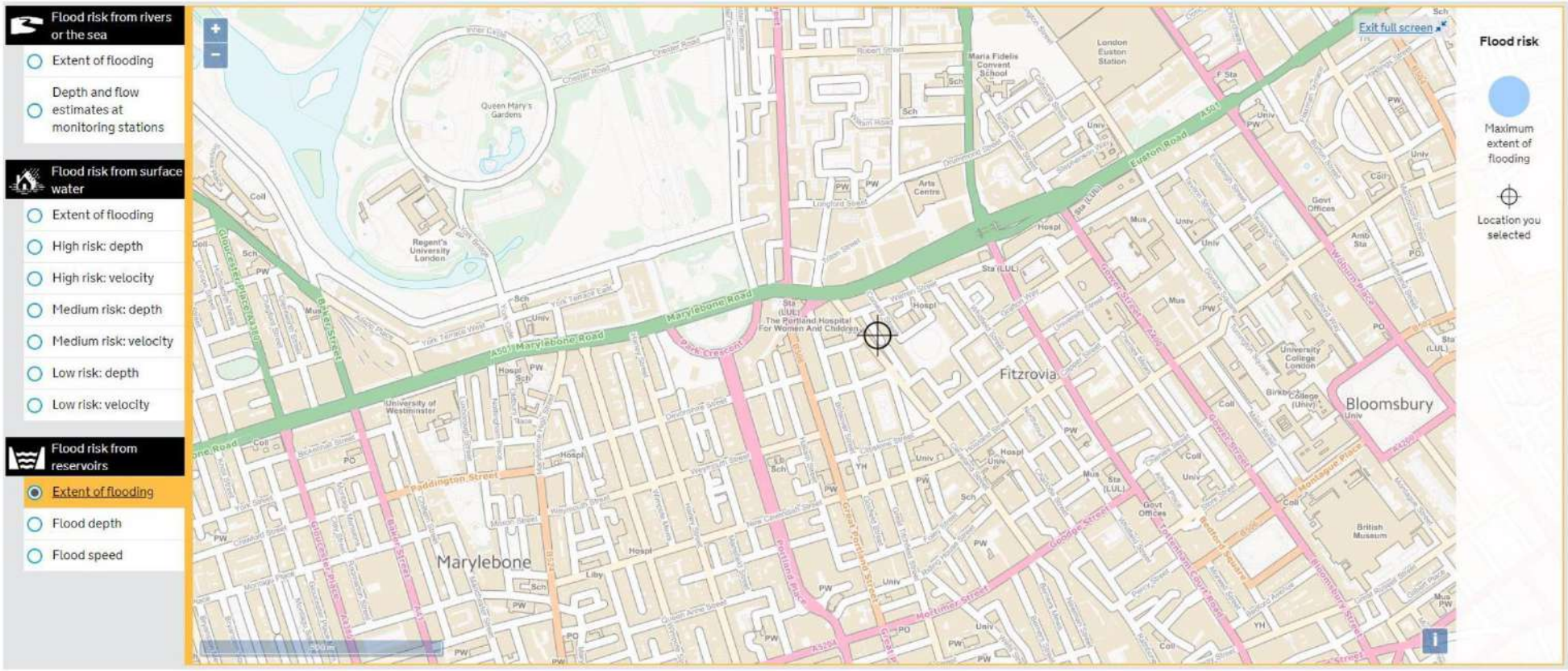

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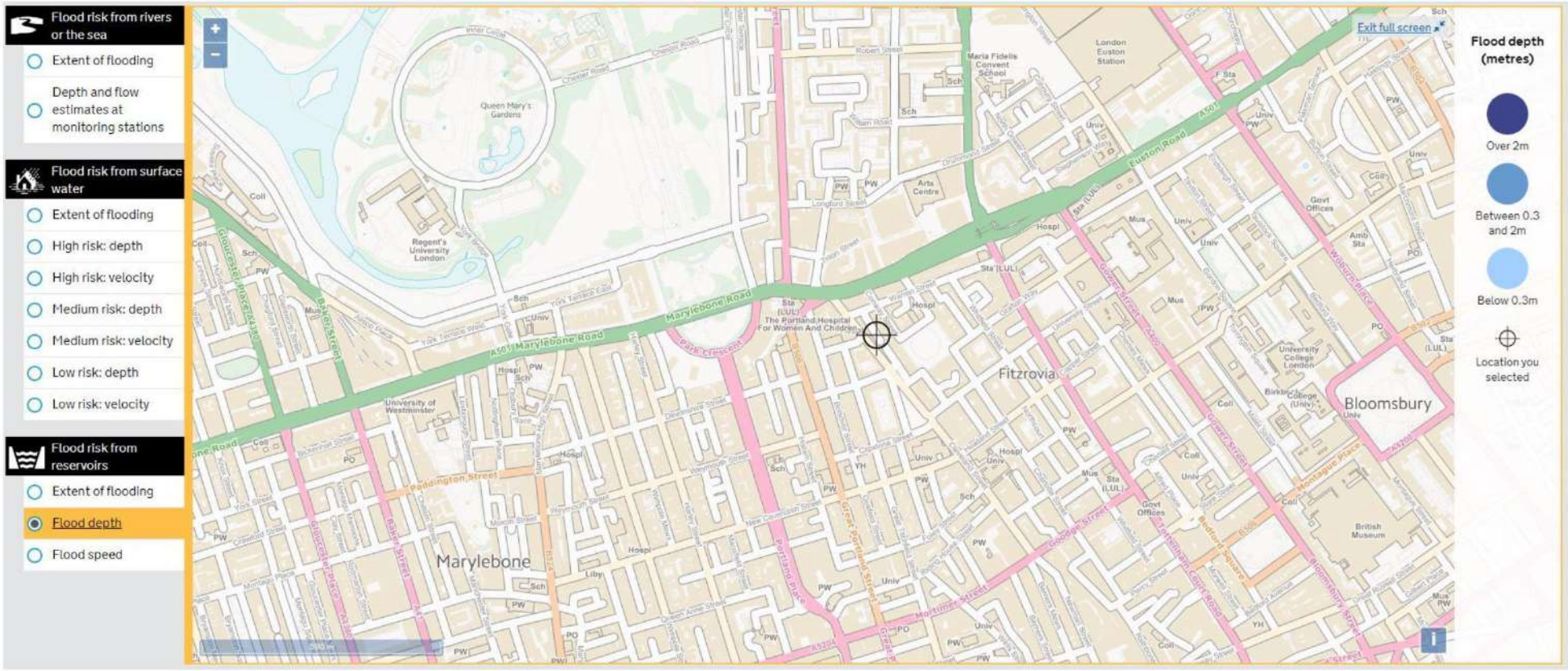

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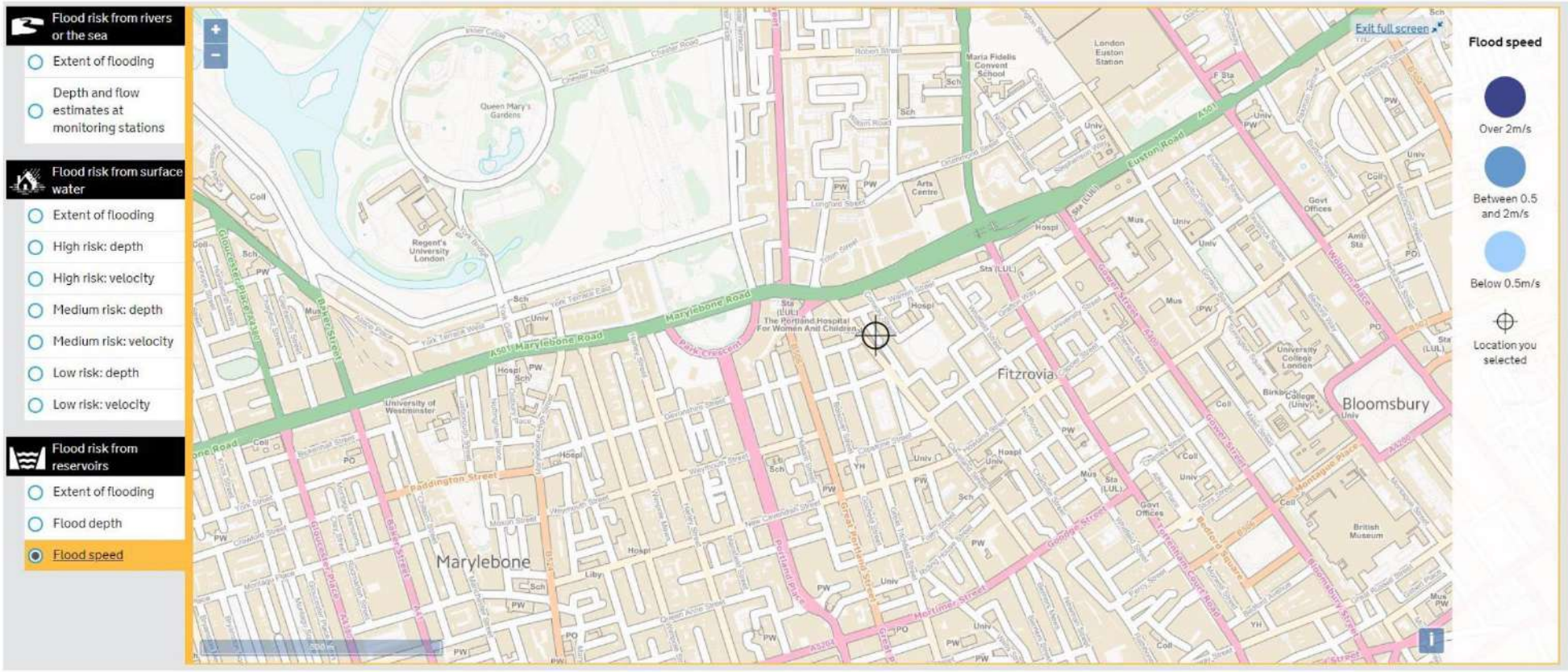

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Emma Kumar

Appendix G – Magic Defra Information

MAGiC

Superficial Aquifer Designation

Legend

Aquifer Designation Map (Superficial Drift) (England)

- Principal
- Secondary A
- Secondary B
- Secondary (undifferentiated)
- Unknown (lakes+landslip)
- Unproductive

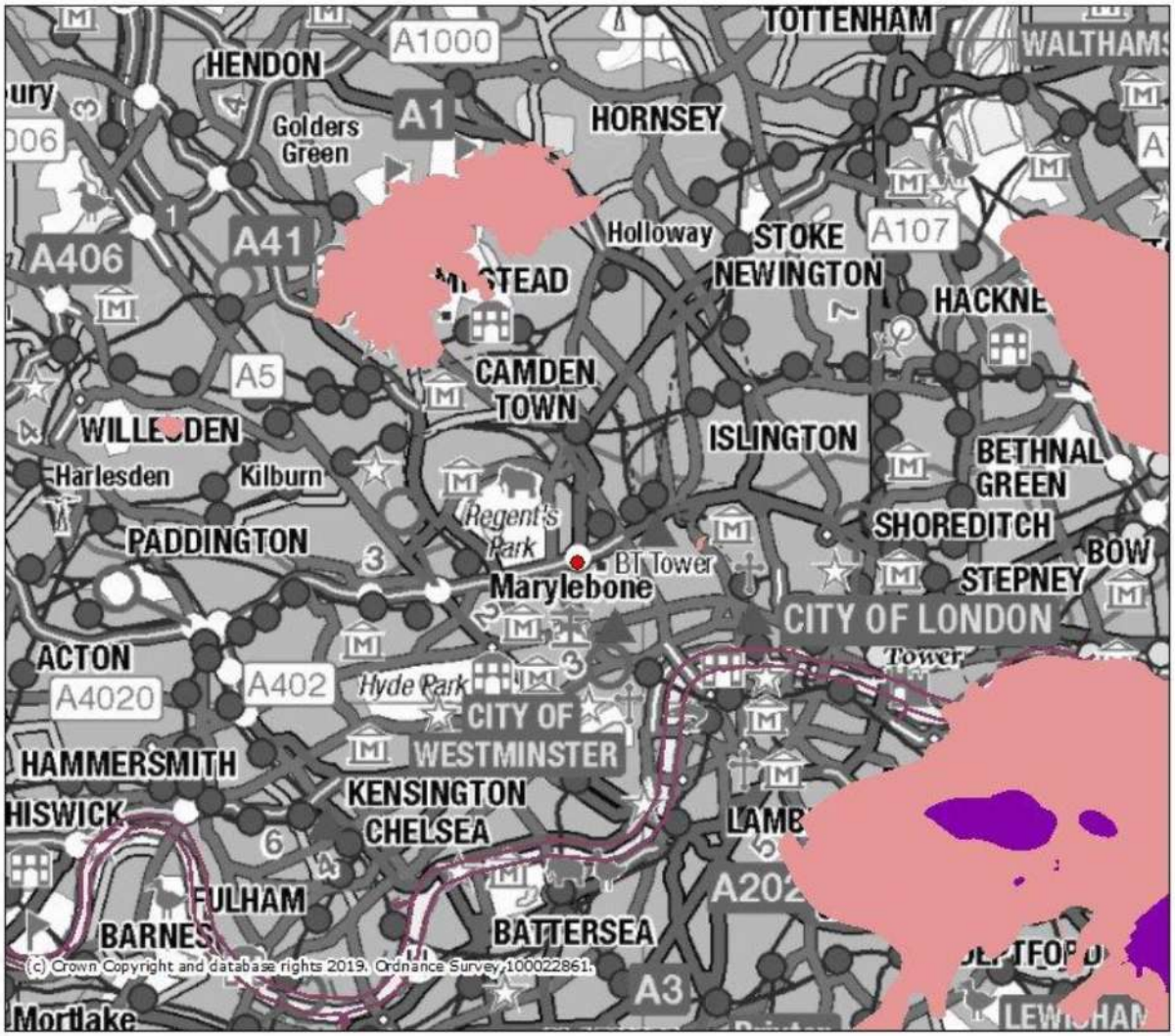
Projection = OSGB36
xmin = 506900
ymin = 171900
xmax = 551400
ymax = 193700

0 1.5 3
km

Map produced by MAGIC on 16 December, 2019.

MAGiC

Bedrock Aquifer Designation



Legend

Aquifer Designation Map (Bedrock) (England)

- Principal
- Secondary A
- Secondary B
- Secondary (undifferentiated)
- Unproductive

Projection = OSGB36
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Map produced by MAGIC on 16 December, 2019.
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MAGiC

Source Protection Zones

Legend

Source Protection Zones merged (England)

- Zone I - Inner Protection Zone
- Zone I - Subsurface Activity
- Zone II - Outer Protection Zone
- Zone II - Subsurface Activity
- Zone III - Total Catchment
- Zone III - Subsurface Activity
- Zone of Special Interest

Projection = OSGB36
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ymax = 193700

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km

Map produced by MAGIC on 16 December, 2019.
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Appendix H – Local Authority Information

Dear Matthew

Your enquiry has been forwarded to me.

Local Plan Policy A5 states:

The Council will not permit basement schemes which include habitable rooms and other sensitive uses in areas prone to flooding.

Para 6.135 in the supporting text to A5 confirms:

The Council will not allow habitable rooms and other sensitive uses for self-contained basement flats and other underground structures in areas at risk of flooding.

The supporting text to CC3 at para 8.58 confirms:

Areas considered at risk from flooding are: Local Flood Risk Zones; and previously flooded streets (shown on “Map 6: Historic flooding and Local Flood Risk Zones”).

I hope this is of use.

Please refer to our CPG on Flooding and Water for further information and SFRA documents for maps of LRFZ and previously flooded streets.

If you require any further or site specific information then please refer to our pre application advice service Pre-planning application advice - Camden Council

Kind regards

Katherine

Katherine Frost

Senior Sustainability Officer (Planning)

Tel: 020 7974 5922

The majority of Council staff are continuing to work at home through remote, secure access to our systems. Where possible please communicate with us by telephone or email.

From: Matthew Mayes <mjm@gosolve.co.uk>

Sent: 13 August 2021 11:15

To: GreenCamden <Smallsteps@lbcamden.mail.onmicrosoft.com>

Subject: Flood Risk Assessment - Habitable Basement

[EXTERNAL EMAIL] Beware – This email originated outside Camden Council and may be malicious Please take extra care with any links, attachments, requests to take action or for you to verify your password etc. Please note there have been reports of emails purporting to be about Covid 19 being used as cover for scams so extra vigilance is required.

Dear Flood Team,

We have complted a FRA for a site in Camden and our client has now opted to include a habitable area in the basement.

The Camden 2017 local plan refers to habitable or sensitive areas not being permitted in basements that are prone to flooding, however there is no indication of what 'prone to flooding' is. I.E. any thresholds or probabilities that would not permit a habitable room in a basemnt.

Our flood risk assessment has determinded that the risk of flooding on site is negligble and is in flood zone 1, therefore is a habitable room in the basement area considered acceptable in this case?

Kind regards,

Matthew Mayes

Environmental Consultant

BSc (Environ)

4 De Frene Rd, Sydenham, London, SE26 4AB

t 020 8291 1354 e mjm@gosolve.co.uk

Appendix I – Contacts

Local Authority	Building Control	020 7974 6941 building.control@camden.gov.uk
	Environmental Health	020 7974 4444 contaminatedland@camden.gov.uk
Environment Agency	National Customer Contact Centre PO Box 544 Rotherham S60 1BY	t 08708 506 506 f e enquiries@environment-agency.gov.uk
Coal Authority	Mining Reports Office 200 Lichfield Lane Berry Hill, Mansfield Notts, HG18 4RG	t f e www.coalminingreports.co.uk

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Emma Kumar