



Flood Risk Assessment AEG02328_N17_Tottenham_01

Site Address: Land rear of 23/25 Vicarage Road
Tottenham
Haringey
London
N17 0BB

UK Experts in Flood Modelling, Flood Risk
Assessments, and Surface Water Drainage Strategies



Document Issue Record

Project: Flood Risk Assessment

Prepared for: Mr Van Ly

Reference: AEG02328_N17_Tottenham_01

Site Location: Land rear of 23/25 Vicarage Road, Tottenham, Haringey, London, N17 0BB

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Summary

Development Description	Existing	Proposed
Development Type	Garden of residential dwelling	Construction of a residential dwelling in the existing garden.
EA Vulnerability Classification	Less Vulnerable	More Vulnerable
Ground Level	Ground levels across the site vary from approximately 10.09m AOD to 10.57m AOD based on 1m LiDAR.	No change.
Level of Sleeping Accommodation	None	Ground floor
Impermeable Surface Area	N/A ²	Majority of site to be considered impermeable post-development with introduction of footprint and paved courtyard/ external areas.
Surface Water Drainage	N/A ¹	Surface Water Drainage Strategy recommended to demonstrate compliance with Policy SI13 of the London Plan.
Site Size	Approximately 100m ²	No change
Risk to Development	Summary	Comment
EA Flood Zone	Flood Zones 1 and 2	
Flood Source	Fluvial	Moselle Brooke and Pymmes Brook
SFRA Available	Haringey Level 1 SFRA ¹ (2015)	
Management Measures	Summary	Comment
Ground floor level above extreme flood levels	Yes	Site unaffected in EA modelled 1:100 year +CC (20%) fluvial event and also the 1:100 year pluvial event.
Safe Access/Egress Route	Yes	EA modelled flood outlines suggest wider area unaffected in the modelled 1:100 year +CC (20%) fluvial event and thus safe access/ egress considered possible in this event. Safe access/ egress should be possible through areas of 'Low' hazard in modelled 1:100 year pluvial event. Hazard ratings may exceed 0.75 (Danger for

¹ https://www.haringey.gov.uk/sites/haringeygovuk/files/sfra_document_high_res_red_0.pdf

Flood Resilient Design Site Drainage Plan Flood Warning & Evacuation Plan		Some) in modelled 1:1000 year pluvial event, safe refuge on site may be required in extreme events.
	Yes	See Section 5 of this report.
	N/A ²	Surface Water Drainage Strategy recommended to demonstrate compliance with Policy SI13 of the London Plan.
	Yes	Safe access/ egress considered possible in EA modelled 1:100 year +CC (20%) fluvial event. Safe access/ egress should be possible through areas of 'Low' hazard in modelled 1:100 year pluvial event. In case of more extreme events, site owners and occupants should sign up to the EA Flood Warning Service <i>Pymmes Brook at Upper Edmonton and Tottenham</i> , and monitor Met Office Severe Weather Warnings.
Offsite Impacts	Summary	Comment
Displacement of floodwater	None	Site unaffected in EA modelled 1:100 year +CC (20%) fluvial event and also the 1:100 year pluvial event.
Increase in surface run-off generation	N/A ²	Surface Water Drainage Strategy recommended to demonstrate compliance with Policy SI13 of the London Plan.
Impact on hydraulic performance of channels	None	Nearest mapped watercourse approximately 300m from site.

¹ not required for this assessment

² data not available.

1. Introduction

- 1.1. Aegaea were commissioned by Mr Van Ly to undertake a Flood Risk Assessment (FRA) to facilitate a planning application for the proposed development. This FRA has been prepared in accordance with the requirements set out in the National Planning Policy Framework (NPPF) and the associated Planning Practice Guidance.
- 1.2. This FRA is intended to support a full planning application and as such the level of detail included is commensurate and subject to the nature of the proposals.

Site Overview

- 1.3. The site of the proposed development is Land rear of 23/25 Vicarage Road, Tottenham, Haringey, London, N17 0BB (Figure 1). The site is currently an empty garden space associated with 23 and 25 Vicarage Road.



Figure 1: Site Location (Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © <https://www.openstreetmap.org> and contributors)

- 1.4. The proposed development is for the construction of a two-storey, three-bedroom dwelling in the rear garden space. A bedroom is proposed at the ground floor of the dwelling.
- 1.5. In the absence of a topographical survey, Environment Agency Light Detection and Ranging (LiDAR) data Digital Terrain Model has been used to review the topography of the site. The LiDAR data shows the ground elevation of the site varies between approximately 10.09mAOD (metres Above Ordnance Datum) and 10.57mAOD. Analysis of topographic levels indicates that the site is generally flat, with a gentle slope to the south-east.

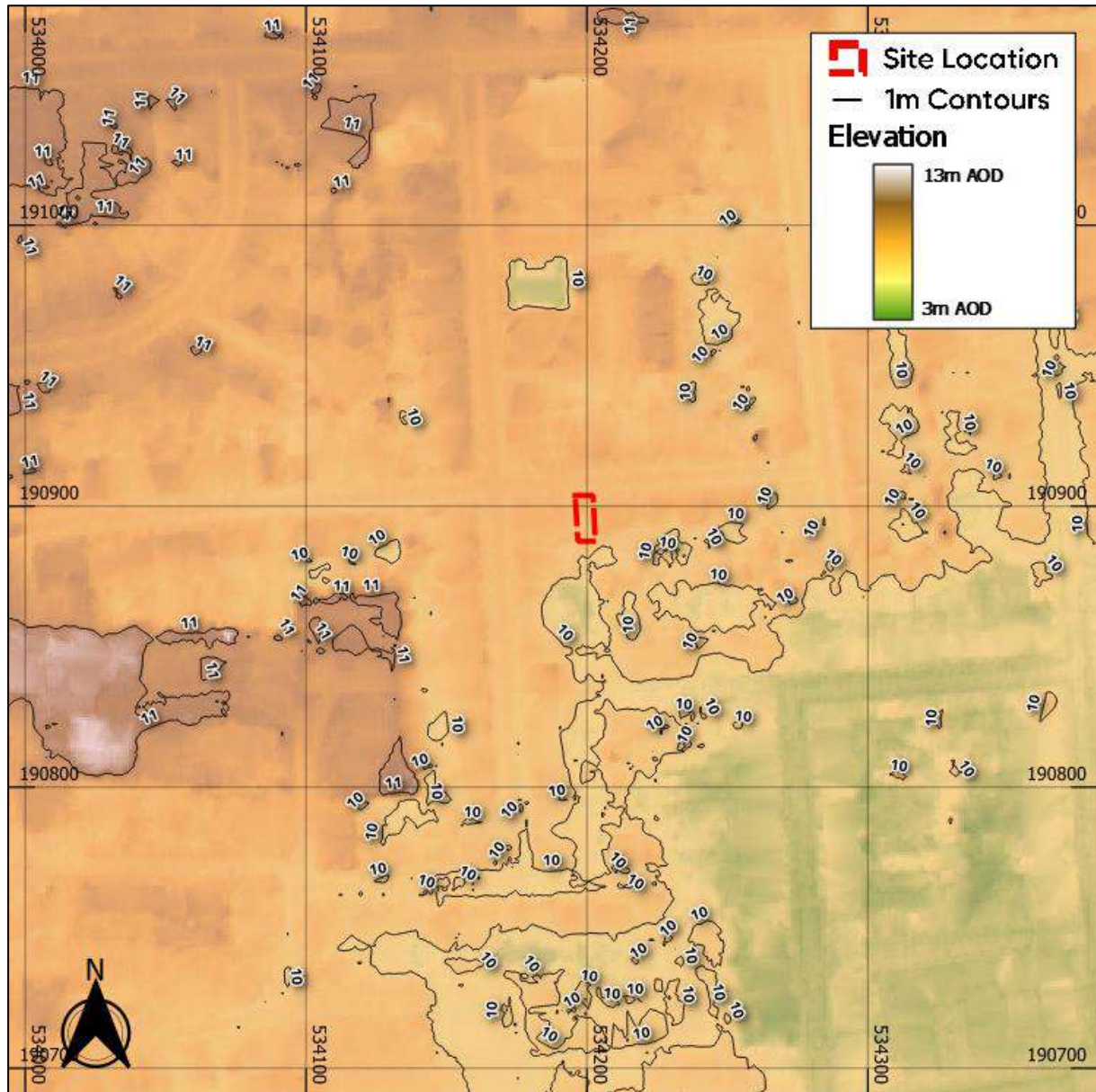


Figure 2: EA 1m LiDAR (Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © <https://www.openstreetmap.org> and contributors. Contains public sector information licensed under the Open Government Licence v3.0)

- 1.6. Haringey Council is the Local Planning Authority (LPA) for the site, and also the designated Lead Local Flood Authority (LLFA). The site sits within the Environment Agency's Hertfordshire and North London region.

Planning Policy and Guidance

- 1.7. UK government planning guidance states² that an FRA is required for developments which are:

- *in flood zone 2 or 3 including minor development and change of use*
- *more than 1 hectare (ha) in flood zone 1*
- *less than 1 ha in flood zone 1, including a change of use in development type to a more vulnerable class (for example from commercial to residential), where they could be affected by sources of flooding other than rivers and the sea (for example surface water drains, reservoirs)*
- *in an area within flood zone 1 which has critical drainage problems as notified by the Environment Agency*

- 1.8. The site is located partially within Flood Zone 2 and therefore an FRA is required in accordance with the NPPF.

- 1.9. The objective of this FRA is to demonstrate that the proposals are acceptable in terms of flood risk. This report summarises the findings of the study and specifically addresses the following issues in the context of the current legislative regime:

- Fluvial flood risk
- Surface water flood risk
- Risk of flooding from other sources

² <https://www.gov.uk/guidance/flood-risk-assessment-for-planning-applications#when-you-need-an-assessment>

2. Planning Policy

- 2.1. Inappropriate development in a flood risk area could pose significant risk in terms of personal safety and damage to property for the occupiers of the development or for people elsewhere. The approach taken in the assessment of flood risk at the planning stage is set out in national, regional, and local planning policy and associated guidance. This section summarises the key policies and guidance relevant to the proposed development.

National Planning Policy Framework (NPPF)

- 2.2. The National Planning Policy Framework³ (NPPF) (DLUHC, 2021) which includes UK Government policy on development and flood risk states:

"159. Inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk (whether existing or future). Where development is necessary in such areas, the development should be made safe for its lifetime without increasing flood risk elsewhere.

167. 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 such that, in the event of a flood, it could be quickly brought back into use without significant refurbishment;*
- c) it incorporates sustainable drainage systems, unless there is clear evidence that this would be inappropriate;*

³ <https://www.gov.uk/guidance/national-planning-policy-framework>, last updated July 2021

- d) *any residual risk can be safely managed; and*
- e) *safe access and escape routes are included where appropriate, as part of an agreed emergency plan.*

2.3. Footnote 55 of the NPPF states:

"A site-specific flood risk assessment should be provided for all development in Flood Zones 2 and 3. In Flood Zone 1, an assessment should accompany all proposals involving: sites of 1 hectare or more; land which has been identified by the Environment Agency as having critical drainage problems; land identified in a strategic flood risk assessment as being at increased flood risk in future; or land that may be subject to other sources of flooding, where its development would introduce a more vulnerable use."

2.4. Flood Zones in England are defined as follows:

Table 1: Flood Zone Definitions

Flood Zone	Definition
Zone 1 Low Probability	Land having less than 1 in 1,000 annual probability of river or sea flooding (all land outside Zones 2 and 3).
Zone 2 Medium Probability	Land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding; or land having between a 1 in 200 and 1 in 1,000 annual probability of sea flooding.
Zone 3a High Probability	Land having a 1 in 100 or greater annual probability of river flooding; or Land having a 1 in 200 or greater annual probability of sea flooding.
Zone 3b The Functional Floodplain	This zone comprises land where water from rivers or the sea has to flow or be stored in times of flood. The identification of functional floodplain should take account of local circumstances and not be defined solely on rigid probability parameters. Functional floodplain will normally comprise: land having a 3.3% or greater annual probability of flooding, with any existing flood risk management infrastructure operating effectively; or land that is designed to flood (such as a flood attenuation scheme), even if it would only flood in more extreme events (such as 0.1% annual probability of flooding). Local planning authorities should identify in their Strategic Flood Risk Assessments areas of functional floodplain and its boundaries accordingly, in agreement with the Environment Agency. (Not separately distinguished from Zone 3a on the Flood Map)

- 2.5. An FRA should be appropriate to the scale, nature, and location of the development. It should identify and assess the risk from all sources of flooding to and from the development and demonstrate how any flood risks will be managed over the lifetime of the development.

The London Plan

- 2.6. The London Plan prepared by the Greater London Authority in 2021 sets out the policies for development in the region.

2.7. Policy SI 12 Flood risk management outlines the requirements for new development within the region. It states:

- 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 cooperate 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.

2.8. Policy SI 13 Sustainable drainage outlines the requirements for new development within the region. It states:

- 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 run-off 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, improved water quality, and enhanced biodiversity, urban greening, amenity and recreation.

Local Plan

- 2.9. The Local Plan – Strategic Policies⁴ (2013) prepared by the Local Planning Authority, Haringey Council, sets out the policies for development in the local area.
- 2.10. Policy SP5 Water Management and Flooding outlines the requirements for new development within the area. It states:

The Council will require all development in Haringey to be water efficient during construction and operation and to reduce all forms of flood risk. All development shall:

- Improve the water environment, water quality and drainage systems;*
- Minimise water use and illustrate how development would contribute to general and flash flooding;*
- Take account of flood risk vulnerability classification as set out in paragraph 100 of the NPPF and will apply the NPPF Sequential Test and Exception Test;*
- Implement measures to prevent (or mitigate as last resort) local surface water and downstream flooding;*
- Implement Sustainable Drainage Systems from strategic to individual site level to improve water attenuation, quality and amenity;*
- Restore and enhance the Blue Ribbon Network including Pymmes Brook, Moselle Brook, the River Lee and its tributaries, deculverting wherever feasible, to improve water quality and amenity of these waterways and to help reduce flood risk (in line with London River Action Plan); and*
- Require higher resilience and levels of flood protection for critical infrastructure to ensure the protection of essential services such as water and power.*

In order to facilitate this, the Council:

⁴ https://www.haringey.gov.uk/sites/haringeygovuk/files/final_haringey_local_plan_2017_online.pdf

- Has carried out a joint SFRA (Strategic Flood Risk Assessment) Stage 1 for the whole borough;

- Has carried out a Sequential Test for the Areas of Development (Growth Areas and Areas of Change);

- Is carrying out, in association with other north London boroughs in the Drain London sub-region, a Surface Water Management Plan to identify issues with drainage networks and the effects of new development.

Sequential and Exception Tests

2.11. The Sequential and Exception Tests are applied in specific cases defined by UK Government policy. Their purpose is to drive development to areas of low flood risk and to support developments which improve flood risk for developments in areas at risk of flooding.

Sequential Test

2.12. The site is partially in Flood Zones 1 and 2. As such, the proposed development may normally need to be subject to the Sequential Test.

2.13. However, the site is in the Tottenham Area Action Plan (AAP) as defined in the Haringey Local Plan⁵ (2017). As per the Local Plan:

The AAP identifies land capable of delivering 10,000 new homes and 5,000 new jobs. It provides a legal basis for developments including establishing a new retail centre at Tottenham Hale, the intensification and diversification of existing industrial estates, and mixed leisure development around Tottenham Hotspur stadium...

... The boundary of the AAP has been drawn to include the key neighbourhoods that have the capacity to accommodate growth (i.e. those with developable strategic brownfield sites, existing transport connections, and which can maximise the benefits that come from regeneration). It recognises that sites identified sit within and alongside other sites and neighbourhoods that are not intended to be subject to the

⁵ https://www.haringey.gov.uk/sites/haringeygovuk/files/final_haringey_tottenham_aap_dtp_online.pdf

same level of change, but will also benefit from targeted regeneration and proposals to improve physical connections, transport accessibility, employment creation and enhanced social infrastructure.

- 2.14. The AAP continues to state potential development sites to accommodate new residential units, some of which are at risk of flooding (such as NT4 Northumberland Park Estate Area, Tottenham, N17, which is partially in Flood Zone 2, similar to the development site). The AAP states that an FRA would be required to accompany any planning application.
- 2.15. As such, given that the site falls within the Tottenham Area Action Plan, and other sites have been identified also in Flood Zone 2, it is considered that the site should not be subject to the Sequential Test but that an FRA should still be submitted with the planning application.

Exception Test

- 2.16. The Exception Test is applied to sites based on the Flood Zone and the nature of the development. As the proposed development consists of a residential dwelling it would be classed as 'More Vulnerable' in line with government development use classes.
- 2.17. The Flood Risk Vulnerability Classification table⁶ provided below in Table 2 shows which vulnerabilities are appropriate in each Flood Zone.
- 2.18. Table 2 shows Flood Zone 2 is an appropriate location for 'More Vulnerable' uses without the need for an Exception Test.

⁶ <https://www.gov.uk/guidance/flood-risk-and-coastal-change#table2>

Table 2: Flood Risk Vulnerability Classification

Flood Zones	Flood Risk Vulnerability Classification				
	Essential Infrastructure	Highly Vulnerable	More Vulnerable	Less Vulnerable	Water Compatible
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	Exception Test required	✓	✓	✓
Zone 3a	Exception Test required	x	Exception Test required	✓	✓
Zone 3b	Exception Test required	x	x	x	✓

Summary

- 2.19. This flood risk assessment has been prepared with due consideration to the above local and national policy.

3. Consultation and Review

Consultation

- 3.1. The site is within the remit of Haringey Council as Lead Local Flood Authority (LLFA).
- 3.2. The EA have provided a Product 4 dataset to inform this FRA. This is included as Appendix B and reference is made to this in Section 4.

Documents and Online Mapping

- 3.3. Local Governments and Lead Local Flood Authorities provide documents which contain data and policies on flood risk and new development in their areas. These documents are introduced and briefly summarised below. For the purposes of this FRA, these documents have been reviewed for relevant information and any relevant data is discussed within the appropriate sub heading of this report.
- 3.4. The following sources of information have been reviewed for this assessment:
 - Flood Map for Planning on the Environment Agency website <https://flood-map-for-planning.service.gov.uk/>
 - Long Term Flood Risk Information on the Environment Agency website <https://www.gov.uk/check-long-term-flood-risk>
 - National Planning Policy Framework (NPPF) (Department for Levelling Up, Housing and Communities, 2021)
 - Planning Practice Guidance - Flood Risk and Coastal Change (Department for Levelling Up, Housing and Communities, 2022)
 - Geoindex Onshore (British Geological Survey, 2022)
 - The London Plan (Greater London Authority, 2021) and Strategic Policies 2013 - 2026 (Haringey Council, 2017)
 - Preliminary Flood Risk Assessment⁷ (Haringey Council, 2011)

⁷ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/698632/PFRA_London_Borough_of_Haringey_2017.pdf

- Strategic Flood Risk Assessment (Haringey Council, 2015)

Preliminary Flood Risk Assessment (PFRA)

- 3.5. The PFRA, published in 2011, is a high-level appraisal of flood risk across Lead Local Flood Authority Haringey Council. The flood risk from all sources, including fluvial, surface water, groundwater and surcharged sewers is evaluated. It is the basis upon which the Local Flood Risk Management Strategy is produced.
- 3.6. The PFRA summarises historical flood incidents in Haringey Council. The site is not recorded as having been affected by any flood event.

Strategic Flood Risk Assessment (SFRA)

- 3.7. The SFRA, published in 2015, provides the evidence base for the Local Planning Authority Haringey Council Local Plan and guidance for consideration when determining planning applications. The SFRA seeks to place new development into areas of lower flood risk taking into account current flood risk, future flood risk, and the effect a proposed development would have on the risk of flooding.
- 3.8. The SFRA mapping provided by Haringey Council has been used throughout production of this report as a source of information, particularly pertaining to historical flood incidents.

4. Sources of Flood Risk

Fluvial

- 4.1. Flooding from watercourses arises when flows exceed the capacity of the channel, or where a restrictive structure is encountered, resulting in water overtopping the banks into the floodplain.
- 4.2. The site is located within Flood Zones 1 and 2 (Figure 3 and 4). Flood Zone 1 denotes a risk of flooding from fluvial sources less than 1 in 1,000 (0.1%). Flood Zone 2 denotes a risk of flooding from fluvial sources between a 1 in 100 (1%) and 1 in 1,000 (0.1%).

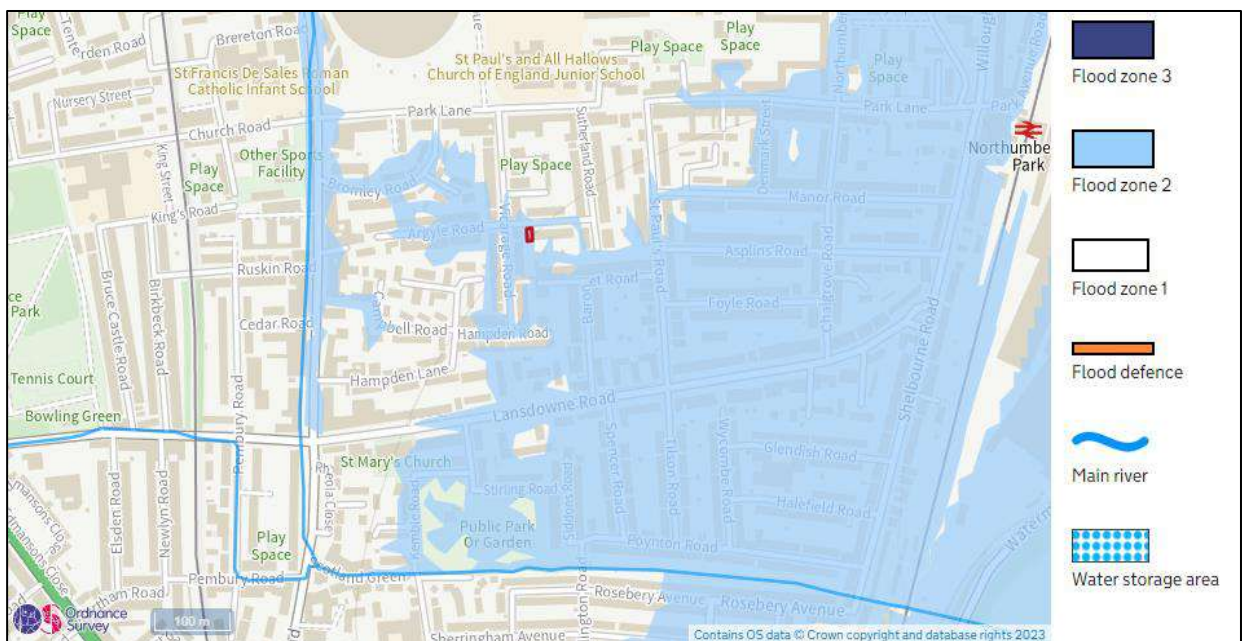


Figure 3: EA Flood Map for Planning

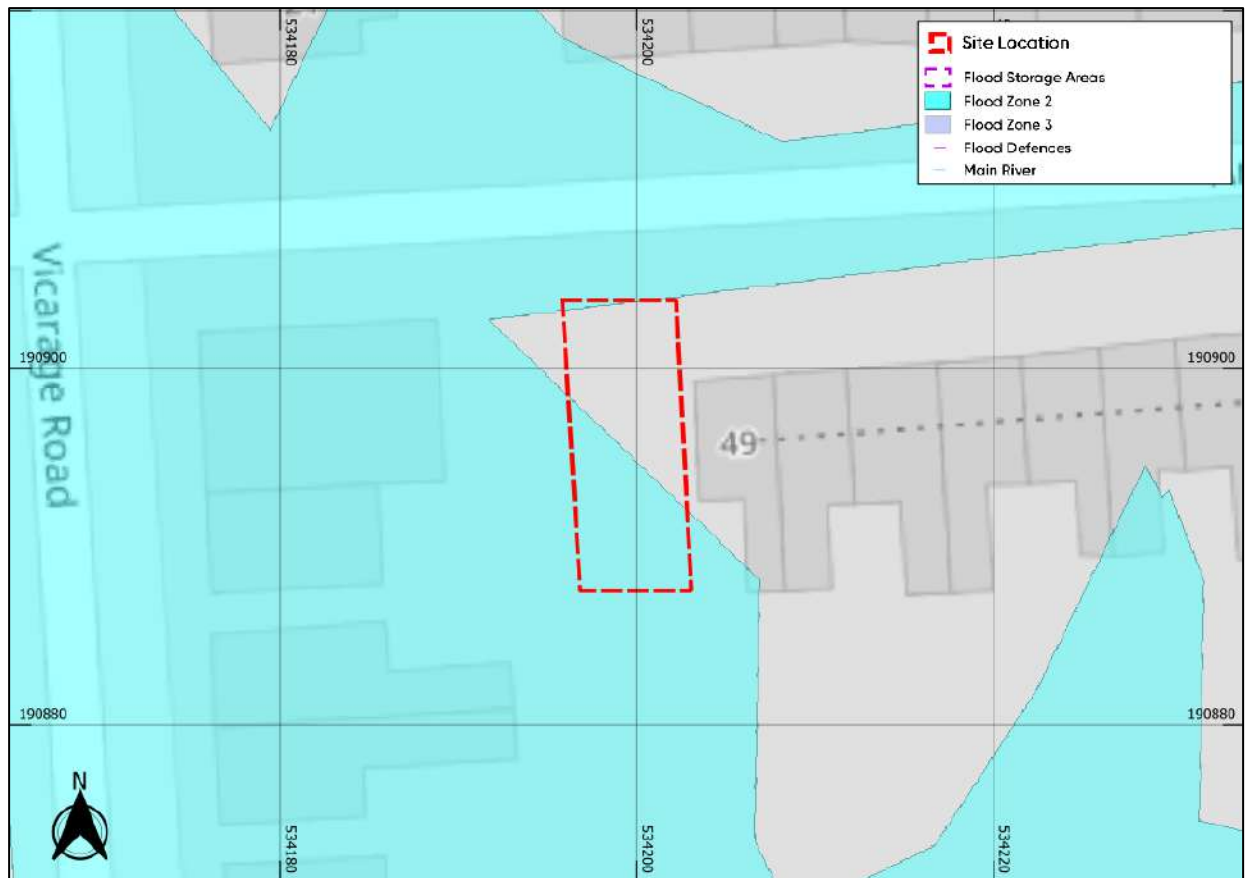


Figure 4: EA Flood Zones (Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © <https://www.openstreetmap.org> and contributors. Contains public sector information licensed under the Open Government Licence v3.0)

Main Rivers

- 4.3. The Moselle Brook flows north to south approximately 300m west of the site, and is culverted for much of its length. The Moselle Brook flows into the Pymmes Brook approximately 1.2km southeast of the site. The Pymmes Brook itself flows north to south adjacent to the River Lea Navigation, approximately 1km southeast of the site.

Ordinary Watercourses

- 4.4. There are no other mapped watercourses in the vicinity of the site.

Historical Fluvial Flooding

- 4.5. The site is approximately 650m from the nearest recorded flood outlined provided by the EA (Figure 5).

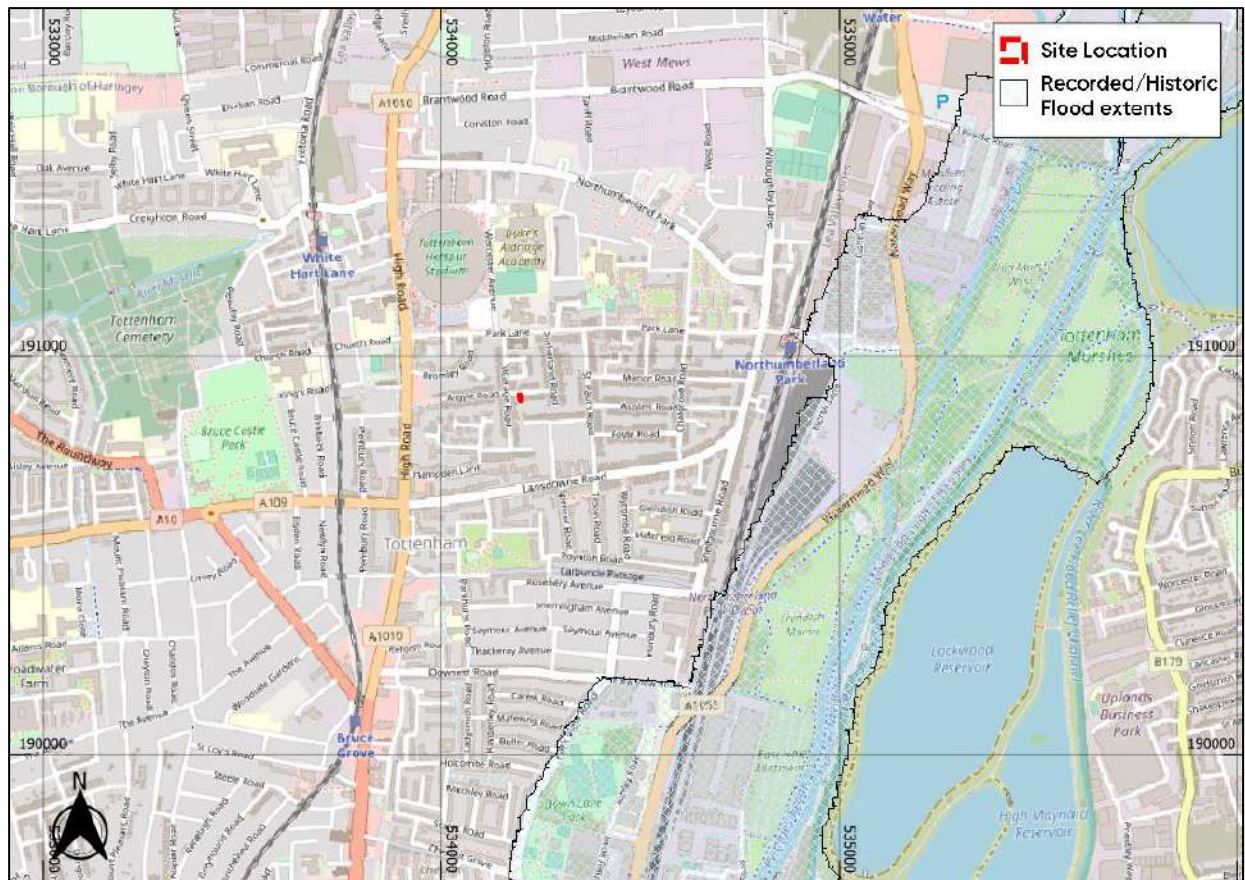


Figure 5: EA Historic Flood Mapping (Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © <https://www.openstreetmap.org> and contributors. Contains public sector information licensed under the Open Government Licence v3.0)

EA Data

- 4.6. The EA have provided a Product 4 dataset to inform this FRA. This is included as Appendix B and reference is made to this below.
- 4.7. The dataset provided by the EA includes modelled flood outlines, in-channel flood levels on the Moselle Brook, Pymmes Brook, and River Lea (Lea), and 2D floodplain flood levels at the site, for a range of return periods.
- 4.8. Under the EA's July 2021 climate change guidance, a More Vulnerable development in the London Management Catchment should consider a 17% allowance for climate change on the 1:100 year event. The EA data provided includes a 1:100 year +CC (20%) event and thus this is considered for this FRA, adopting a conservative approach.
- 4.9. The modelled flood outlines provided indicate that the site is unaffected in the modelled 1:100 year +CC (20%) event (Figure 6).

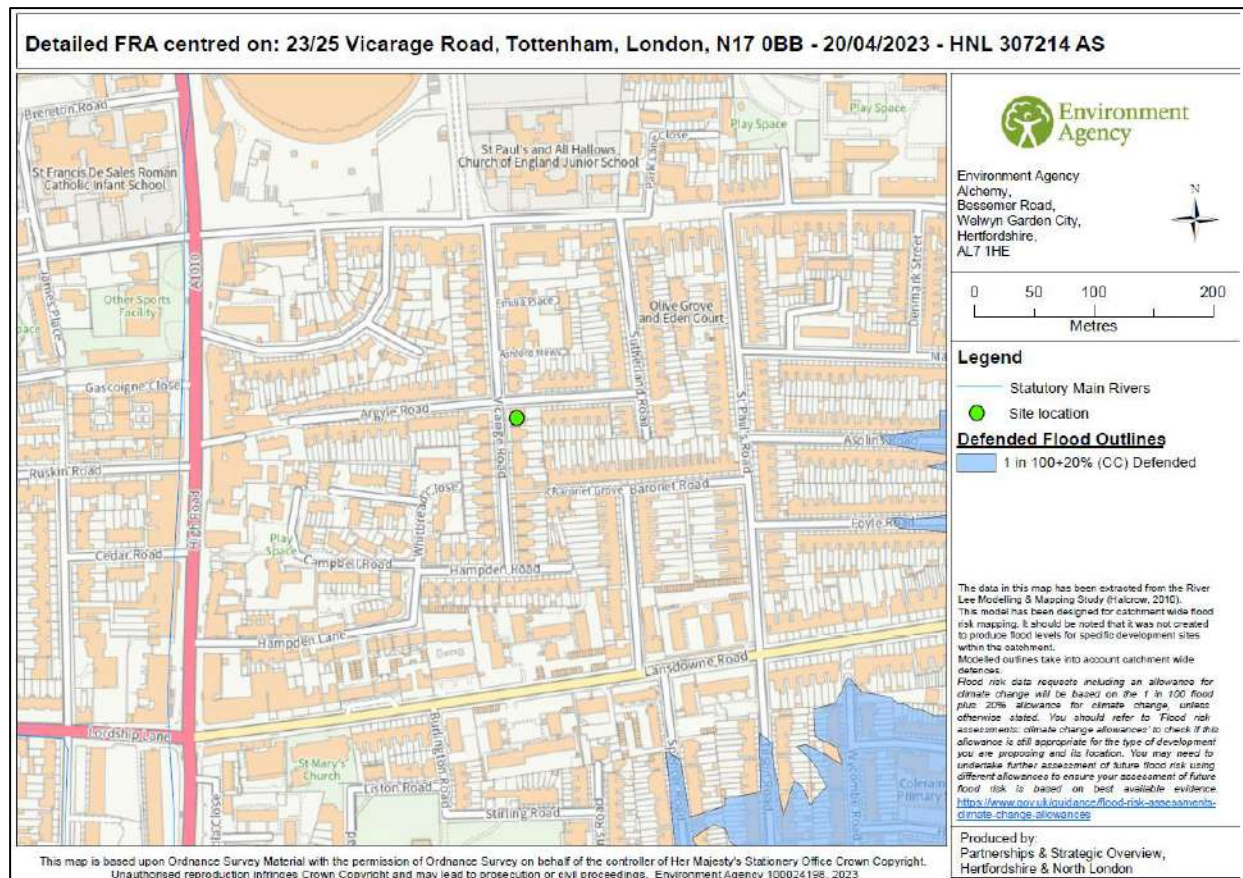


Figure 6: EA Modelled 1:100 year +CC (20%) flood outline

- 4.10. However, the site could be affected in the modelled 1:1000 year event (Figure 7). The EA have subsequently also provided modelled 2D flood levels at the site for this event (Figure 8). Figure 8 indicates that the maximum modelled 1:1000 year flood level within the site could be 10.24m AOD.
- 4.11. Based on 1m LiDAR, the ground elevation of the site varies between approximately 10.09m AOD and 10.57m AOD.
- 4.12. As such, the site could experience flood depths of up to 0.15m in the modelled 1:1000 year event, although some of the site is above this flood level.

Summary

- 4.13. Analysis in the above section indicates that the site could remain unaffected in the modelled 1:100 year +CC (20%) fluvial event. However, the site could experience flood depths of up to 0.15m in the modelled 1:1000 year event, although some of the site is above this flood level.
- 4.14. The risk of flooding from fluvial sources is considered relatively low to moderate.

Tidal

- 4.15. Tidal flooding occurs when a high tide and high winds combine to elevate sea levels. An area behind coastal flood defences can still flood if waves overtop the defences or break through them. Tidal flooding can also occur a long way from the coast by raising river levels. Water may overtop the river bank or river defences when tide levels are high.
- 4.16. The site is a significant distance from any tidal source and above the anticipated extreme tidal levels, even when considering the impacts of climate change.
- 4.17. The risk of flooding from tidal sources is considered low.

Canals

- 4.18. The Canal and River Trust (CRT) generally maintains canal levels using reservoirs, feeders, and boreholes and manages water levels by transferring it within the canal system.
- 4.19. The site is approximately 1,065m from the River Lee Navigation.
- 4.20. Water in a canal is typically maintained at predetermined levels by control weirs. When rainfall or other water enters the canal, the water level rises and flows out over the weir. If the level continues rising it will reach the level of the storm weirs. Control weirs and storm weirs are normally designed to take the water that legally enters the canal under normal conditions. However, it is possible for unexpected water to enter the canal or for the weirs to become obstructed. In such instances the increased water levels could result in water overtopping the towpath and flowing onto the surrounding land.
- 4.21. Given the distance between the site and the canal, the risk of flooding from this source is considered low unless fluvial flooding were to occur concurrently, discussed in the fluvial section.

Pluvial

- 4.22. Pluvial flooding can occur during prolonged or intense storm events when the infiltration potential of soils, or the capacity of drainage infrastructure is overwhelmed leading to the accumulation of surface water and the generation of overland flow routes.
- 4.23. Annual surface water flood risk is labelled by the EA as:
- 'High Risk'; >3.3% AEP (annual probability greater than 1:30).
 - 'Medium Risk'; 1.1% to 3.3% AEP (annual probability between 1:100 and 1:30).
 - 'Low Risk'; 0.1% to 1% AEP (annual probability between 1:1000 and 1:100).
 - 'Very Low Risk'; <0.1% AEP (annual probability less than 1:1000).
- 4.24. Examination of the EA's Flood Risk from Surface Water mapping for High Risk, Medium Risk, and Low Risk AEP flood events shows the site is at risk of flooding in 'Low' surface water flood events (Figure 9).

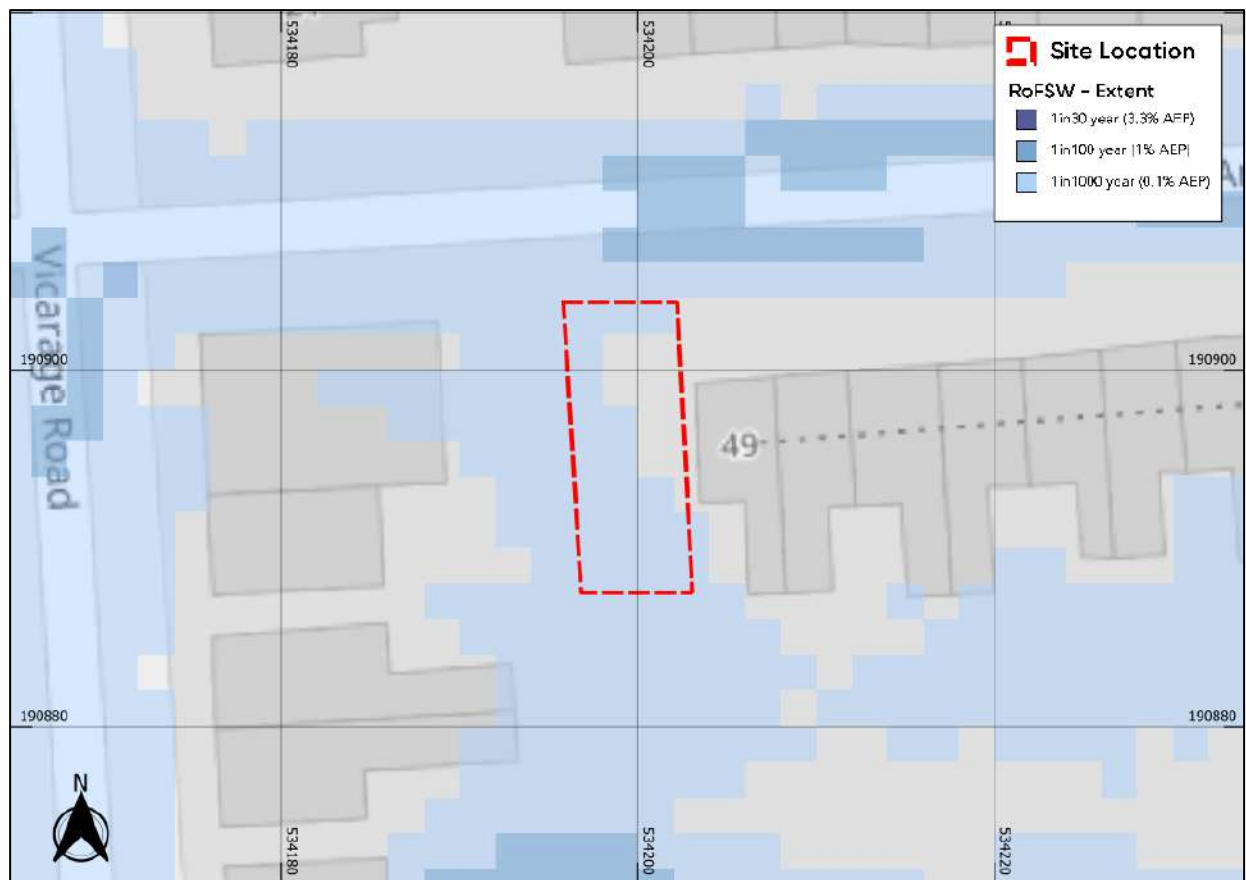


Figure 9: EA Surface Water Flood Risk Mapping - © Environment Agency copyright and/or database right 2015. All rights reserved. Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © <https://www.openstreetmap.org> and contributors.)

- 4.25. In the modelled Medium risk event (equivalent to the 1:100 year event), the site would remain unaffected (Figure 10). The adjacent road network could experience flood depths of up to 150mm to 300mm in this event.
- 4.26. In the modelled Low risk event (equivalent to the 1:1000 year event), the site could experience flood depths of up to 150mm to 300mm (Figure 11). Depths on the adjacent road networks could reach 300mm to 600mm in this event.
- 4.27. As such, the risk of flooding from pluvial sources is considered low.

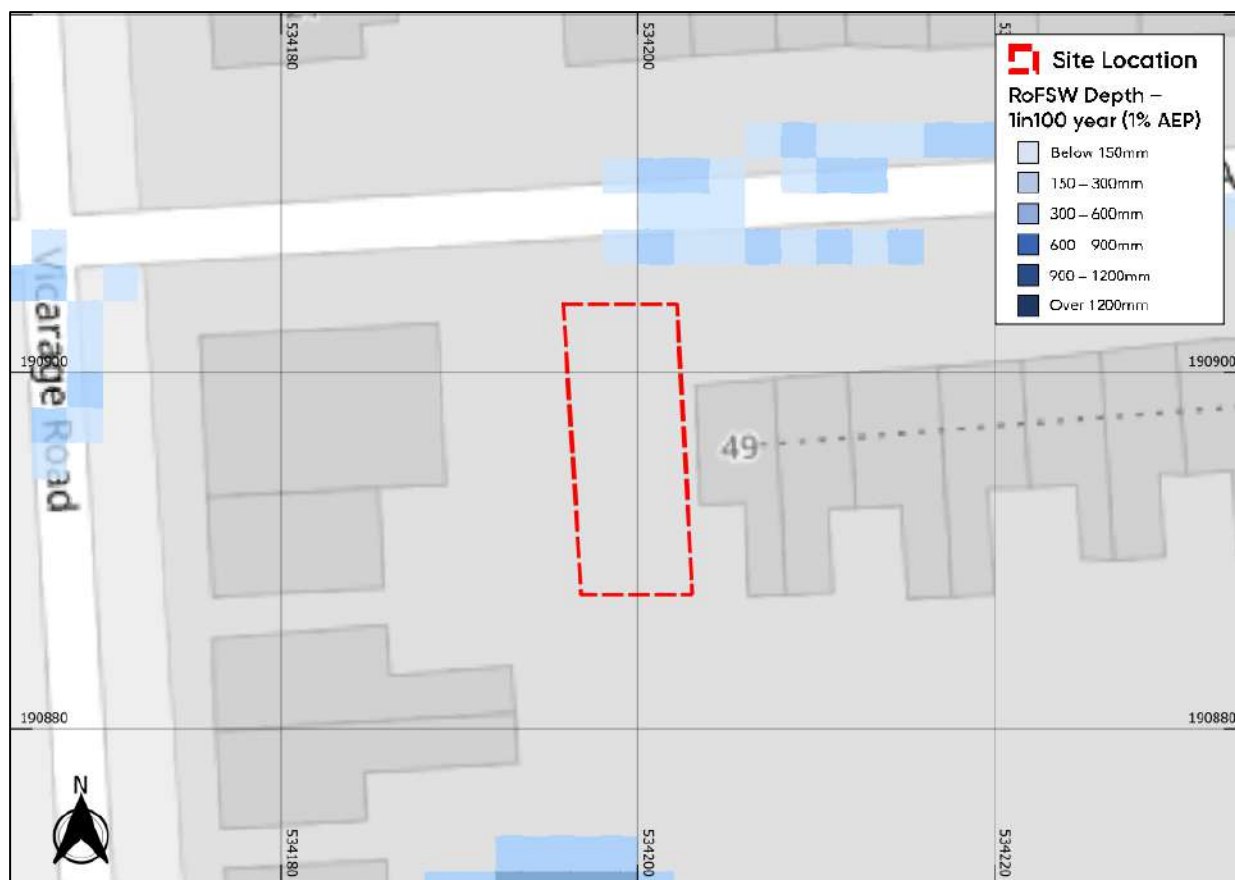


Figure 10: EA Modelled 1:100 year (1% AEP) flood depths - © Environment Agency copyright and/or database right 2015. All rights reserved. Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © <https://www.openstreetmap.org> and contributors.)

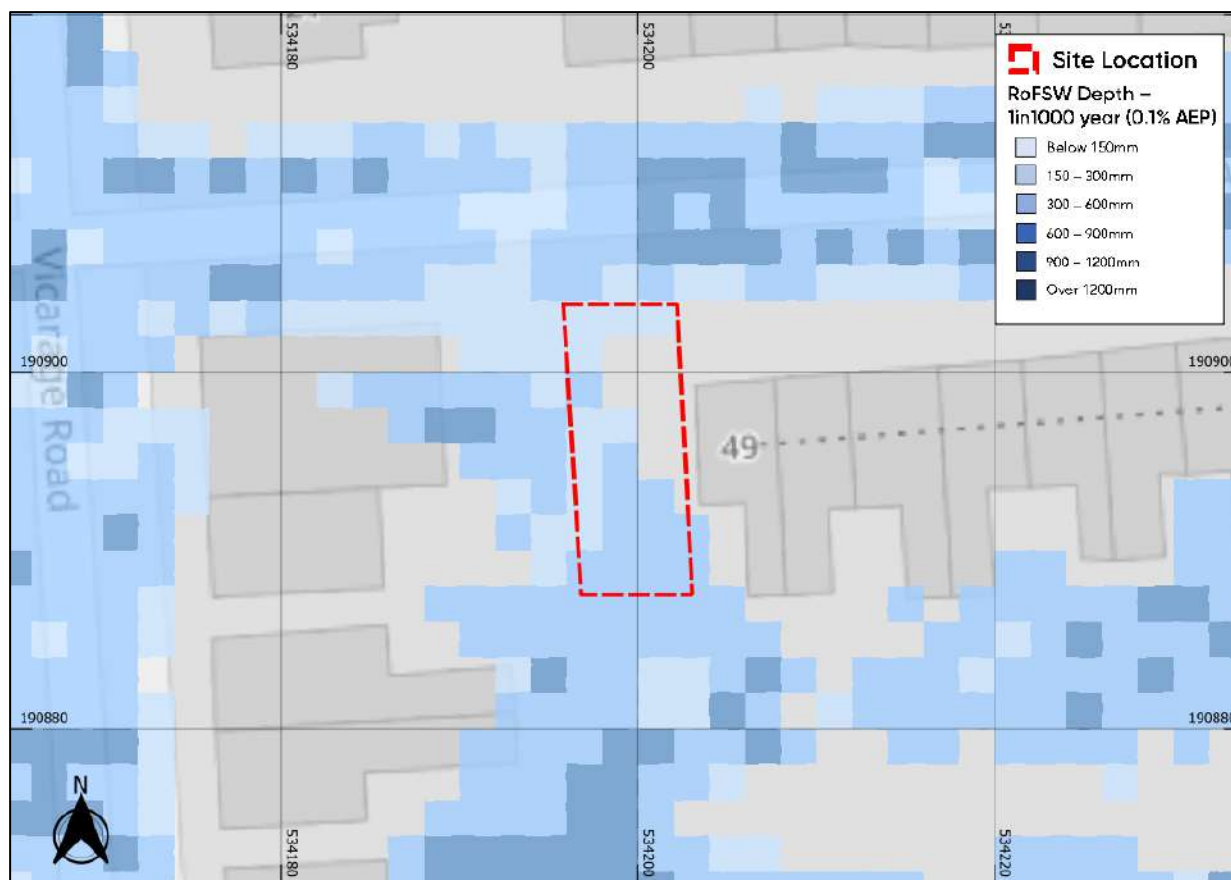


Figure 11: EA Modelled 1:1000 year (0.1% AEP) flood depths - © Environment Agency copyright and/or database right 2015. All rights reserved. Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © <https://www.openstreetmap.org> and contributors.)

Access/ Egress

- 4.28. The EA RoFSW dataset indicates that the hazard ratings on Vicarage Road should not exceed 0.75 (Figure 12) and thus safe access/ egress should be possible in this event by travelling north on Vicarage Road to Park Lane and then turning right (east) on Park Lane.

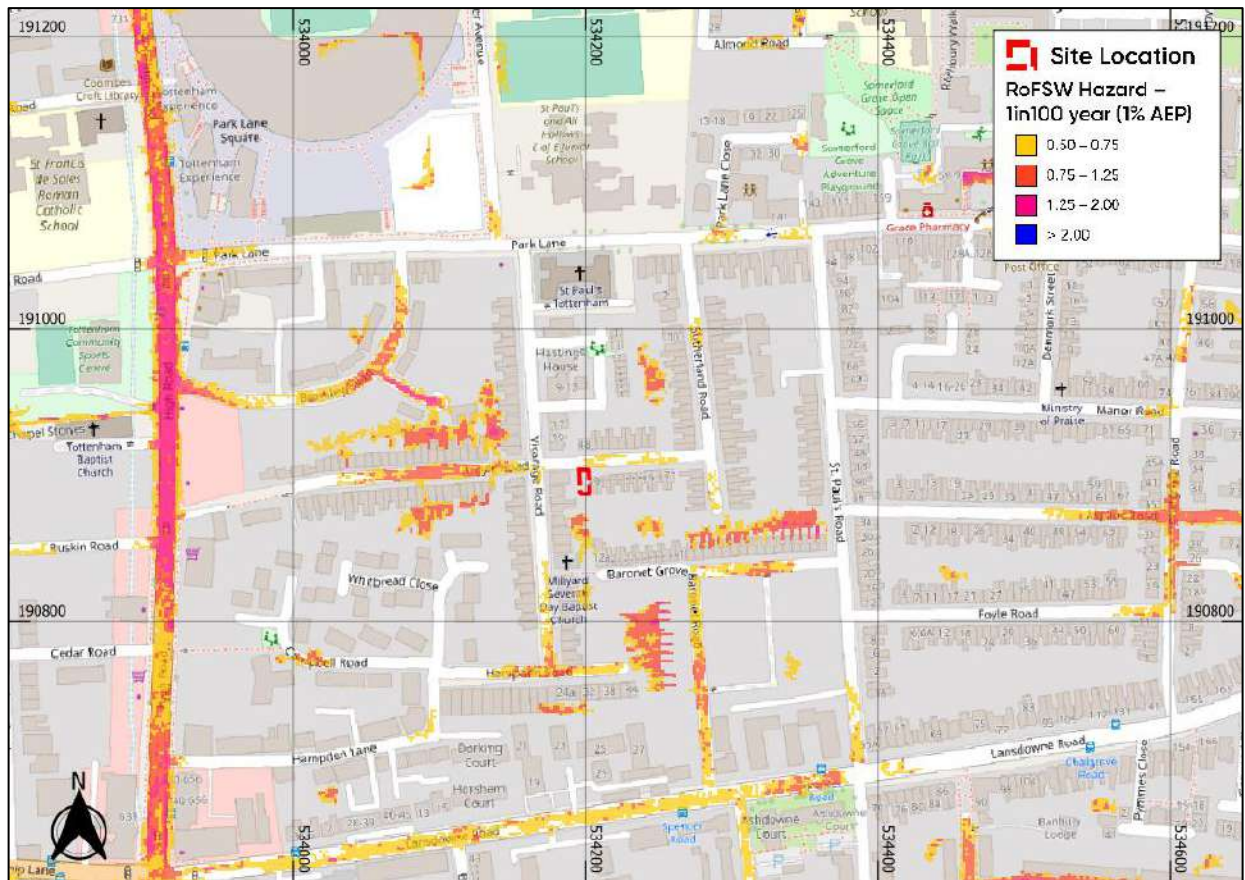


Figure 12: EA Modelled 1:100 year (1% AEP) flood hazard ratings - © Environment Agency copyright and/or database right 2015. All rights reserved. Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © <https://www.openstreetmap.org> and contributors.)

- 4.29. However, in the modelled 1:1000 year event, hazard ratings on Argyle Road and Vicarage Road could reach 1.25-2.00 (Danger for Most) and thus safe access/ egress may not be possible in this event if flooding has already occurred.

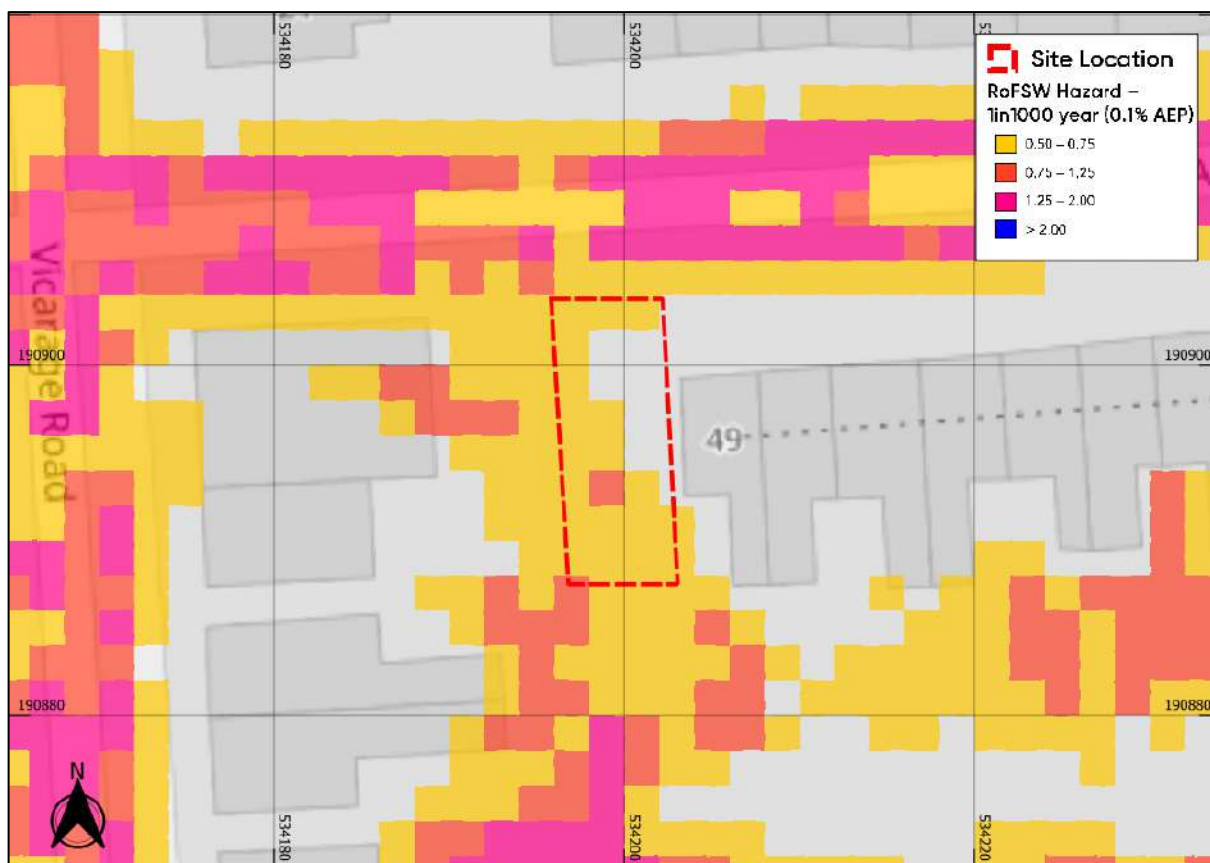


Figure 13: EA Modelled 1:1000 year (0.1% AEP) flood hazard ratings - © Environment Agency copyright and/or database right 2015. All rights reserved. Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © <https://www.openstreetmap.org> and contributors.)

4.30. As such, safe refuge on site may be required in extreme events.

Summary

4.31. As such, the risk of flooding from pluvial sources is considered low. Safe access/ egress could be possible in the modelled 1:100 year event based on the RoFSW dataset but not in the modelled 1:1000 year event. Prior evacuation should be sought where possible upon receipt of a Flood Warning or Severe Weather Warning, but if flooding has already occurred on the highway, then safe refuge should be sought within the site.

Reservoirs

4.32. Flooding can occur from large waterbodies or reservoirs if they are impounded above the surrounding ground levels or are used to retain floodwater. Although unlikely, reservoirs and

large waterbodies could overtop or breach leading to rapid inundation of the downstream floodplain.

- 4.33. According to the EA's Flood Risk from Reservoirs mapping the site is at risk of flooding in the event of a breach at the King George V and William Girling reservoirs (Figure 14). The worst reservoir failure model is a 'dry day' scenario meaning that it could be caused by reservoir walls failing due to old age, accident, or because excess flood water has been added to the reservoir.

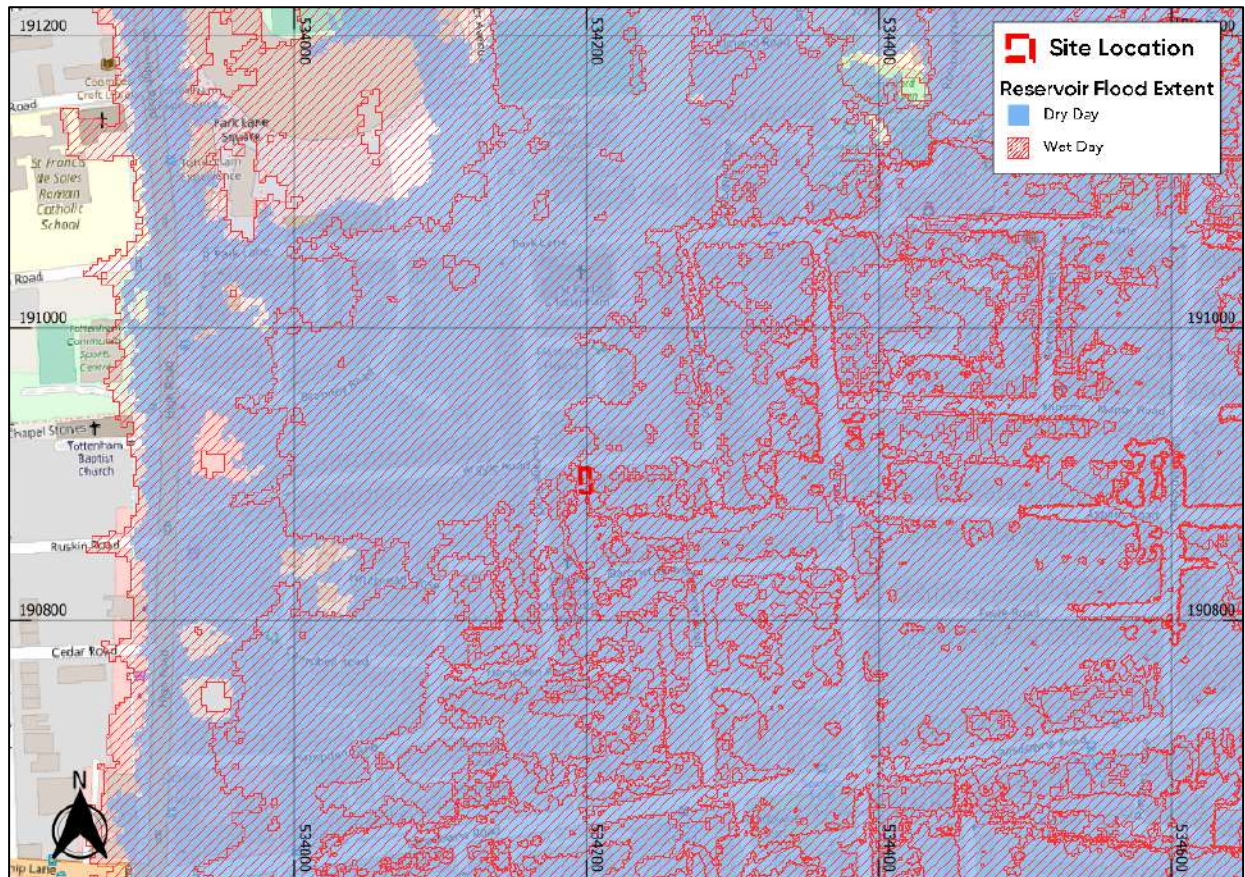


Figure 14: EA Reservoir Flood Risk Mapping © Environment Agency copyright and/or database right 2015. All rights reserved. Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © <https://www.openstreetmap.org> and contributors.

- 4.34. All large reservoirs must be inspected and supervised by reservoir panel engineers as detailed by the Reservoirs Act 1975 in England and Wales. The EA are responsible to ensure that reservoirs are inspected regularly, and essential safety work carried out. As reservoirs are highly managed the maximum flood extent provided in the EA Risk of Flooding from Reservoirs mapping is considered a worst case scenario. As reservoir flooding is unlikely and the modelled flood depths are based on the worst-case scenario, flooding from this source may be considered

as a relatively low risk. Although to be precautionary flood resilient design and building practices could be implemented to further reduce risk.

Groundwater

- 4.35. Groundwater flooding occurs in areas where underlying geology is permeable and water can rise within the strata sufficiently to breach the surface.
- 4.36. The British Geological Survey's (BGS) mapping shows superficial deposits of Enfield Silt Member - Clay and Silt underlying the area. The bedrock underlying the area is mapped as London Clay Formation consisting of Clay, Silt and Sand.
- 4.37. BGS borehole TQ39SW381 (approximately 275m north of the site), struck groundwater 5 ft (1.5m) below ground level.
- 4.38. The Haringey SFRA (2015) states:

It was concluded in the North London SFRA that Haringey was at risk from fluvial, sewer and pluvial flooding but not groundwater or tidal flooding.

- 4.39. Given the underlying clay geology and silty superficial deposits, this may act as a barrier to groundwater rising from depths. However perched groundwater or waterlogged soils may be an issue in the area.
- 4.40. As the development proposals do not include any proposed basements, the risk from groundwater to the development is considered to be low.

Sewers

- 4.41. Foul or surface water sewers can be a cause of flooding if the drainage network becomes overwhelmed, either by blockage or due to local development beyond the designed capabilities of the drainage system.
- 4.42. As per Figure 2-6 of the Haringey SFRA (2015) the site is within the Group4_061 Critical Drainage Area (CDA). An extract is provided in Figure 15.

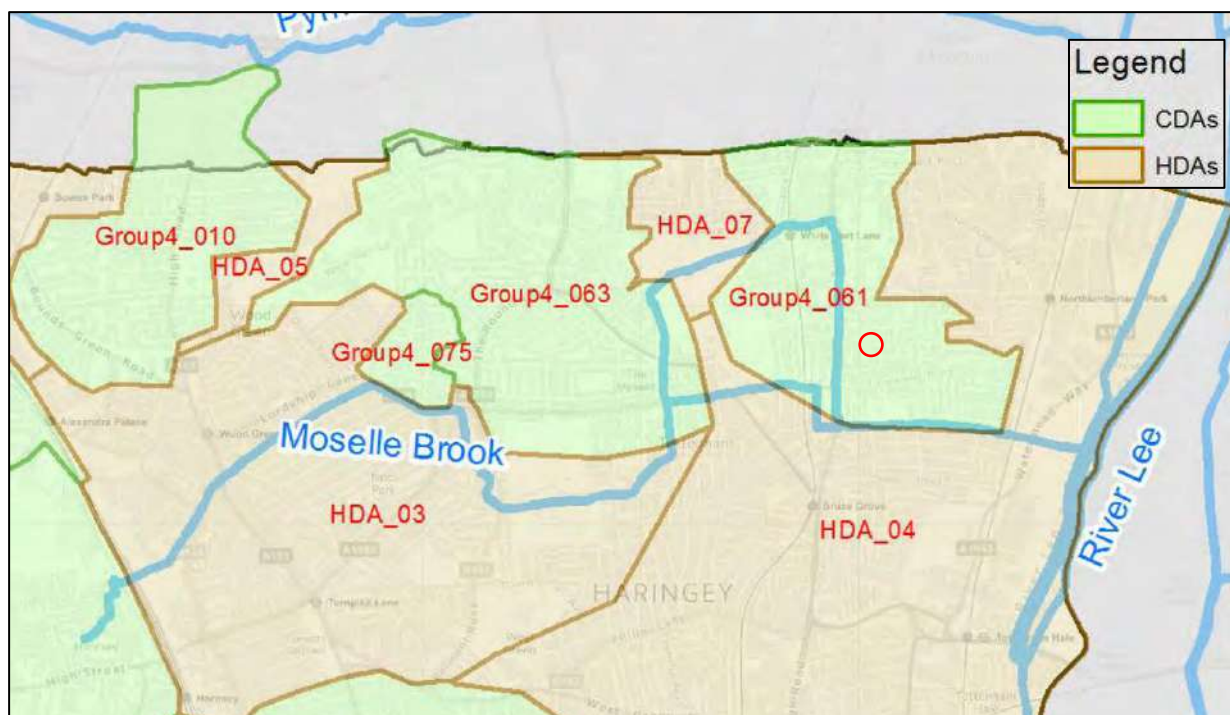


Figure 15: Extract of CDAs within Haringey. Approx Site Location Indicated with Red Circle – Source: Haringey SFRA, 2015. Contains Ordnance Survey data © Crown copyright and database right 2012

4.43. The Haringey SFRA (2015) states:

The LB of Haringey SWMP collated data from Thames Water with regard to the mechanisms of sewer flooding. The data provided was at a high level, where incidents of sewer related flooding were reported at a broad scale. Locations of sewer flooding were identified using a four digit post code e.g. N15 4. Data showed that the majority of the incidents of sewer flooding were located in the south of the borough, around southeast Tottenham and Crouch End extending through to Highgate and Muswell Hill.

Southeast Tottenham is located at the low point of the catchment, which drains into the River Lee. Restricted free flow, from surface water sewer outfalls, when the river level is higher than the soffit of the sewer outfalls would result in surcharging/ backing up of the sewer system. This could provide an explanation for the number of recorded incidents of sewer flooding incidents in this area. It should also be noted that the number of incidents were recorded at postcode level. Further details are provided within Table 3.5 of the LB of Haringey SWMP.

- 4.44. Table 3.5 of the Haringey SWMP⁸ (2011) states that the N17 0 postcode area (area of the site) only has 1 property listed as having flooded from sewer sources based on Thames Water records.
- 4.45. The development is therefore considered to be at low risk of flooding from sewers.

⁸ https://www.haringey.gov.uk/sites/haringeygovuk/files/haringey_swmp_draft_v2.pdf

5. Flood Risk Mitigation

Fluvial

- 5.1. Analysis in Section 4 indicates that the site could remain unaffected in the modelled 1:100 year +CC (20%) fluvial event. However, the site could experience flood depths of up to 0.15m in the modelled 1:1000 year event, although some of the site is above this flood level.
- 5.2. The risk of flooding from fluvial sources is considered relatively low to moderate.
- 5.3. Given that the site is unaffected in the modelled 1:100 year +CC (20%) event, it is not proposed to raise the FFLs of the dwelling.
- 5.4. However, given the residual risk in the extreme modelled 1:1000 year event, it is recommended that the proposed dwelling is constructed in a flood resilient manner, in accordance with CLG Report *Improving the Flood Performance of New Buildings Flood Resilient Construction (2007)*. The following mitigation measures are recommended:
 - Floor doors provided at entrance thresholds to adopt water exclusion strategy (given maximum modelled depth of 0.15m in 1:1000 year event).
 - Solid (i.e. concrete floors) with waterproof screed.
 - Raised wiring and power outlets at ground level.
 - Units to be raised on legs above plinth.
 - Waterproof plasterboard used at ground floor.
 - Air brick covers to be installed.
 - Damp Proof Membranes (d.p.m.) should be included in any design to minimise the passage of water through ground floors.

Pluvial

- 5.5. The risk of flooding from pluvial sources is considered low.
- 5.6. No additional specific measures are recommended for pluvial flooding.

Reservoirs, Groundwater and Sewers

- 5.7. Flood risk from other sources is considered to be low, therefore no additional specific measures are recommended.

Increase to Flood Risk Elsewhere

- 5.8. Based on the analysis in Section 4 of this report, the proposed development site is outside the modelled 1:100 year +CC (20%) fluvial, and 1:100 year pluvial, flood extents.
- 5.9. As such, the proposed development should not increase flood risk elsewhere through displacement of flood water.

EA Flood Warning Service

- 5.10. As a further precaution and risk reduction, the owners and occupants of the site should sign up the EA flood warning service. This service allows site owners to register an address, which is at risk of flooding, along with contact details so that in the event of a flood being forecast, the site owner will be sent an alert directly to their chosen method of contact.
- 5.11. Flood warnings/alerts can be enforced at any time of the day or night. Signing up for this service provides site owners some notice before a flood event. The amount of time afforded before a flood occurs depends on the site specific location (e.g. proximity to the source of flooding, topography of the surrounding area) and the flood mechanism (e.g. bank over topping versus a breach event). Flood alerts and warnings provide site managers with time to take necessary action, e.g. communication of the risk of flooding to occupants/employees etc, evacuation of occupants offsite or to a safe level, removal of valuable items out of reach of flooding and the mounting of site specific flood defences.
- 5.12. Due to the vicinity of the site being at a risk of pluvial flooding, it is recommended that site owners/tenants should sign up to the Met Office Severe Weather Warning Service. The Met Office National Severe Weather Warning Service (NSWWS) warns of the impacts caused by severe weather. Met Office weather warnings include a level of impact that the forecast weather is expected to bring and the likelihood of those impacts occurring. This will provide site managers with time to take necessary action, e.g. communication of the risk of flooding to occupants/employees etc, evacuation of occupants offsite or to a safe level, removal of valuable items out of reach of flooding and the mounting of site specific flood defences.

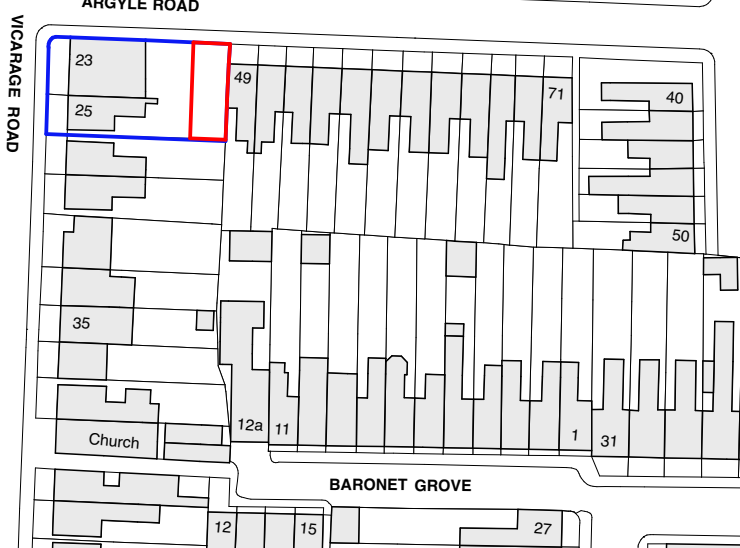
6. Conclusions

- 6.1. This FRA has been undertaken with reference to the requirements of NPPF and Planning Practice Guidance with respect to the development at Land rear of 23/25 Vicarage Road, Tottenham, Haringey, London, N17 0BB. It has been written to support a planning application and has been prepared with due consideration to the nature of the proposed development to provide the appropriate level of detail.
- 6.2. An assessment of the risk of flooding from all sources has been undertaken and is summarised in the table below:

Source of Flooding	Flood Risk Summary
Fluvial	Analysis in the report indicates that the site could remain unaffected in the modelled 1:100 year +CC (20%) fluvial event. However, the site could experience flood depths of up to 0.15m in the modelled 1:1000 year event, although some of the site is above this flood level. The risk of flooding from fluvial sources is considered relatively low to moderate. It is recommended that the proposed dwelling is constructed in a flood resilient manner, in accordance with CLG Report Improving the Flood Performance of New Buildings Flood Resilient Construction (2007).
Pluvial	The risk of flooding from pluvial sources is considered low. Safe access/ egress could be possible in the modelled 1:100 year event based on the RoFSW dataset but not in the modelled 1:1000 year event.
Tidal Reservoirs Groundwater Sewers Canals	The site is considered to be at low risk from other sources.

- 6.3. This Flood Risk Assessment should be submitted as part of the planning application to satisfy the requirements under NPPF.

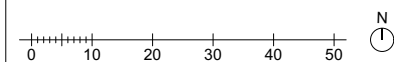
Appendix A - Development Proposals



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Job Title

Land rear of 23/25 Vicarage Road

Haringey
London
N17 0BB

Drawing Name

Existing location plan

Drawing Status

Information

Drawn by
RR

Date
21.04.23

Checked by
SJ

Date
21.04.23

Drawing Scale

1:1250 @A4

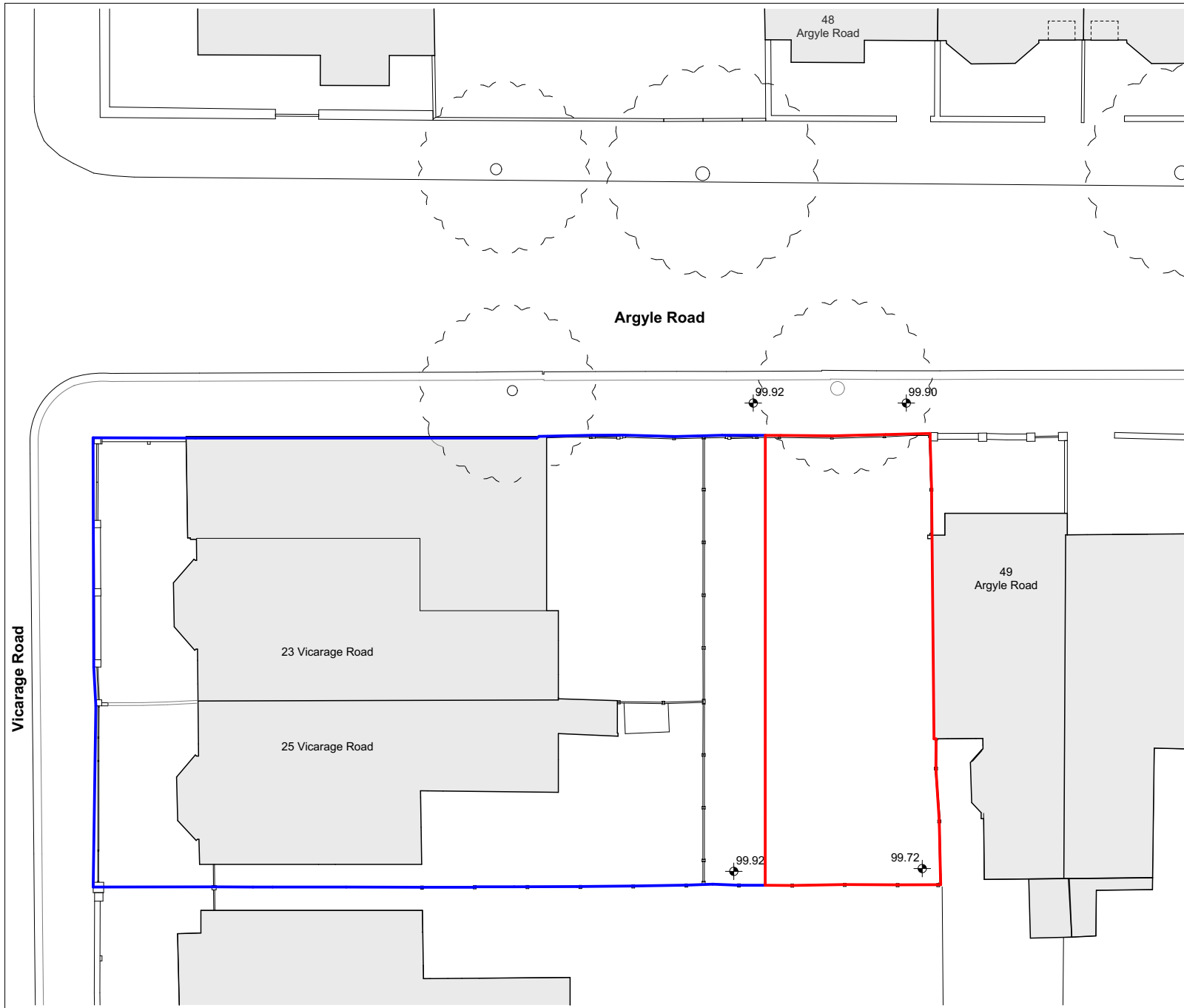
Layout ID

193-001-EX-LOC

Status

Revision

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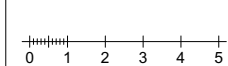
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Site area: 97sqm

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Drawing Name

Existing site plan

Drawing Status

Information

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Date
21.04.23

Checked by
SJ

Date
21.04.23

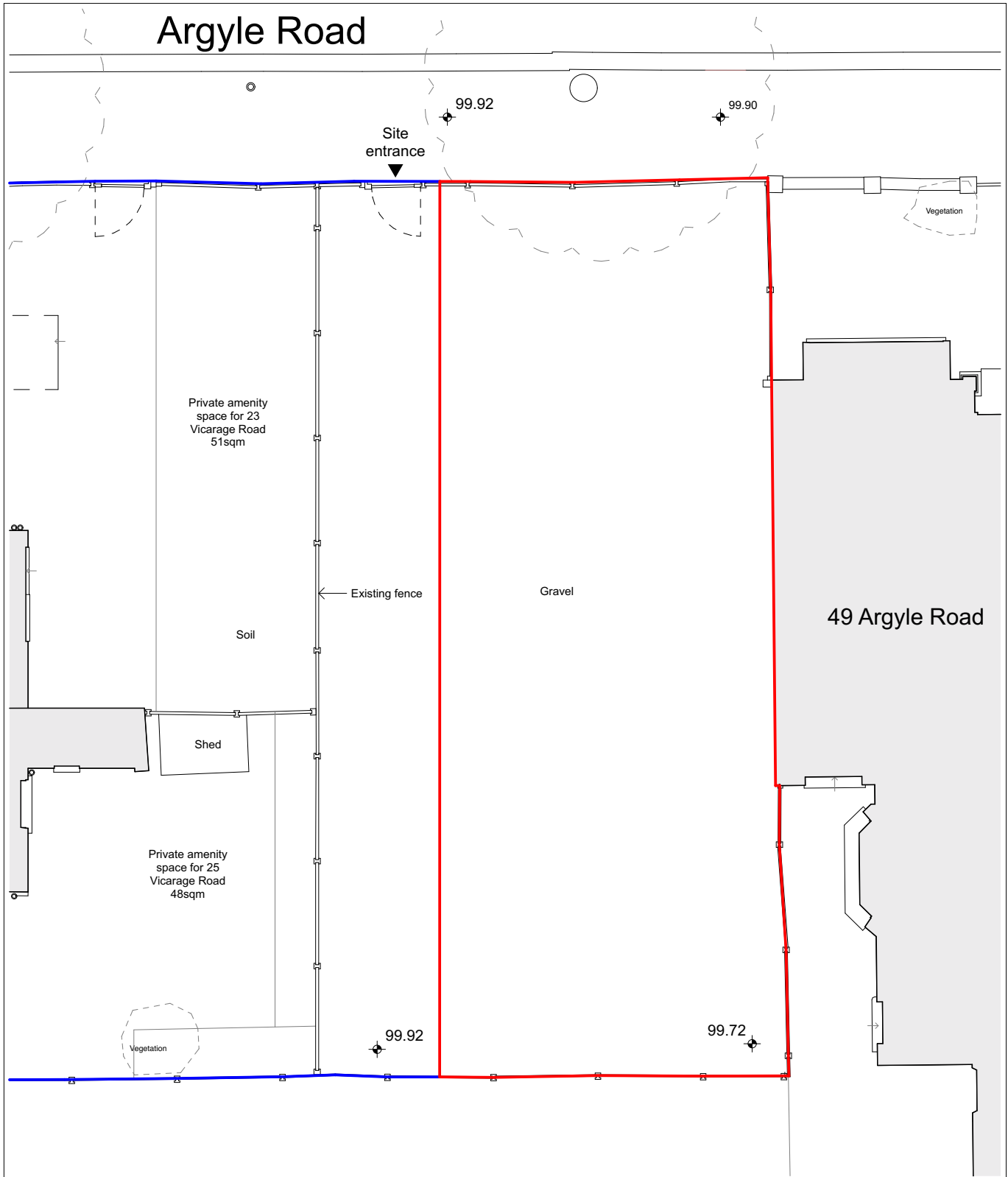
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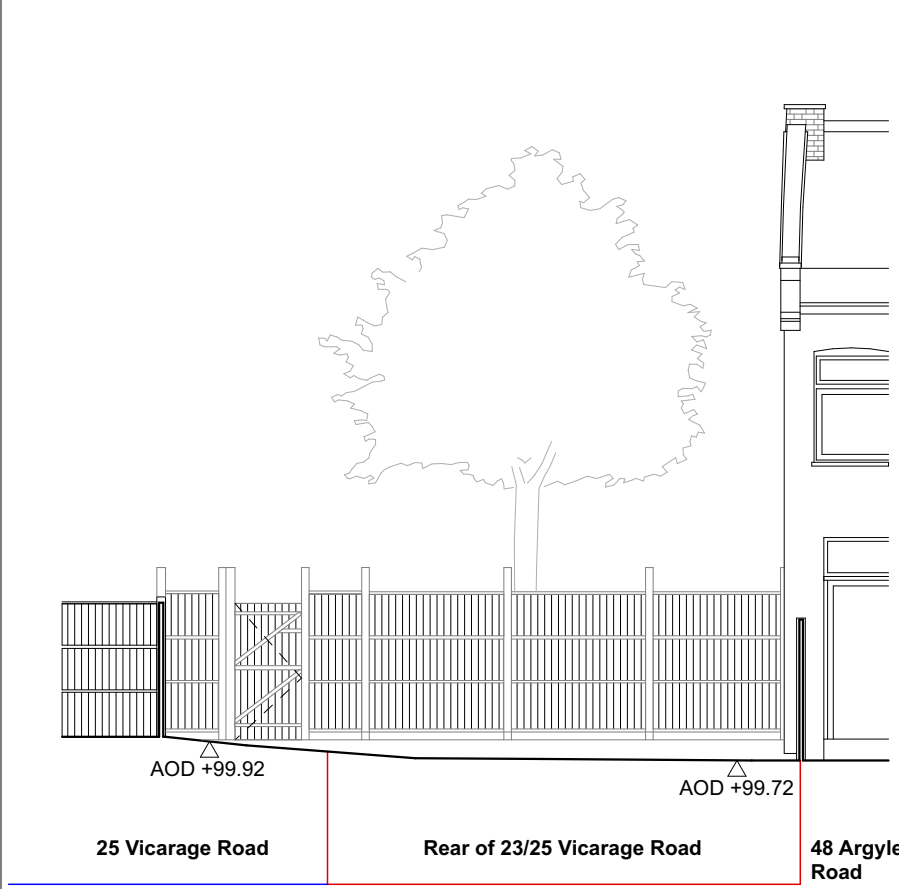
Revision
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Planning boundary Same ownership General notes All illustrated material is subject to copyright. Unless otherwise agreed in writing, all rights to use this document are subject to payment of Architect's charges.	Satish Jassal Architects 19 Wharfedale Road London N1 9SB contact@satishjassal.co.uk Tel: 0207 837 4511		Drawing Name Existing ground floor plan	
	Job Title Land rear of 23/25 Vicarage Road		Drawing Status Information	
	Haringey London N17 0BB		Drawn by RR	Date 21.04.23
			Checked by SJ	Date 21.04.23
			Drawing Scale 1:100 @A4	
		Layout ID 193-003-EX-PLN	Status	Revision 00



Existing North elevation (A-A)



Existing South elevation (C-C)



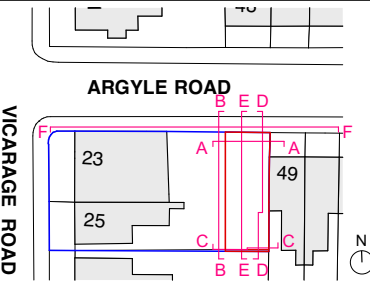
Existing East elevation (B-B)



Existing West elevation (D-D)

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Key

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Job Title

Land rear of 23/25 Vicarage Road

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London
N17 0BB

Drawing Name

Existing North, East, South and West elevations

Drawing Status

Information

Drawn by
RR

Date
21.04.23

Checked by
SJ

Date
21.04.23

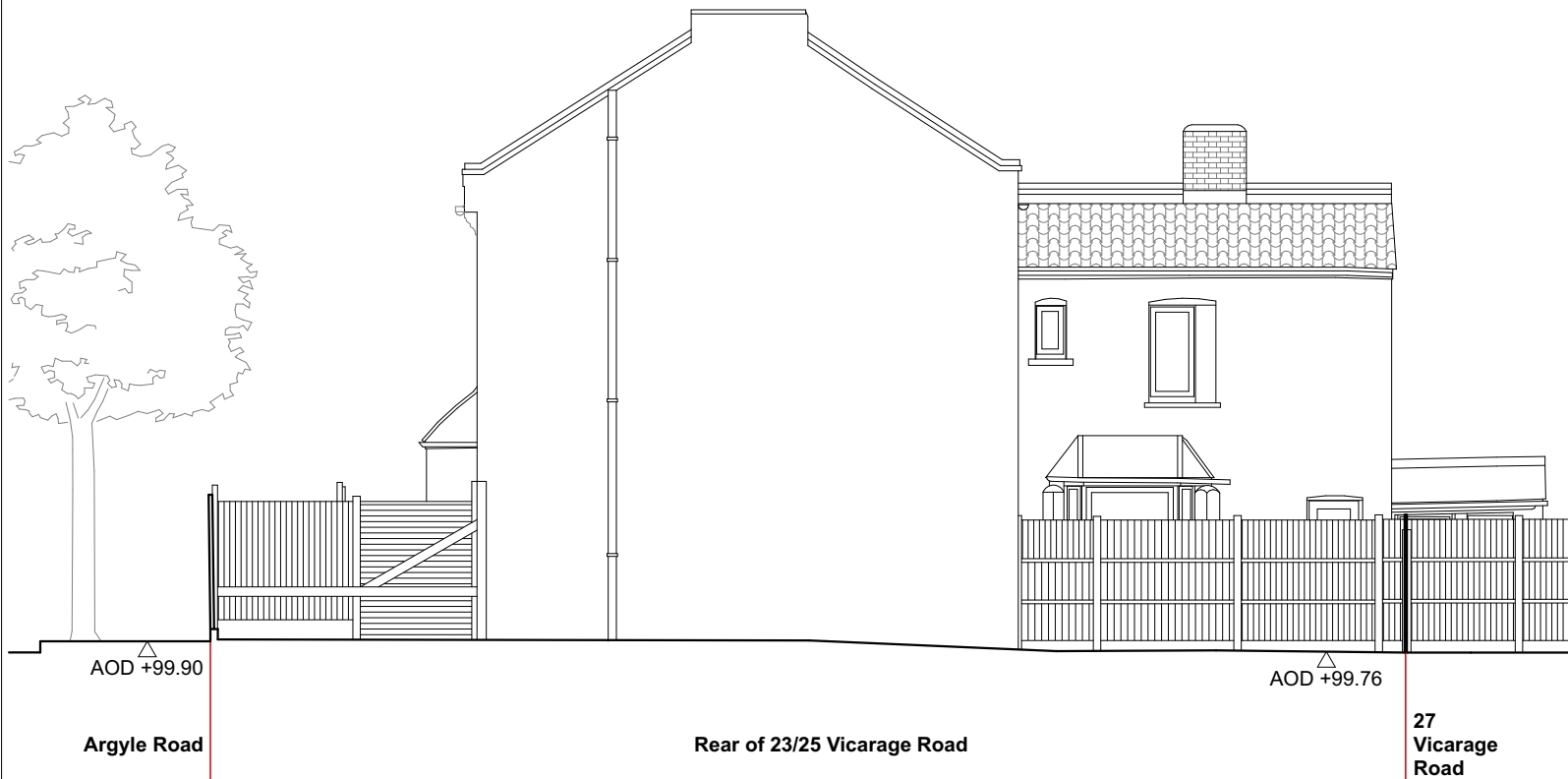
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Status
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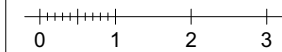
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Job Title

Land rear of 23/25 Vicarage Road

Haringey
London
N17 0BB

Drawing Name

Existing West section

Drawing Status

Information

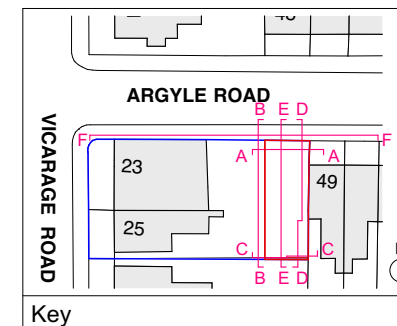
Drawn by RR Date 21.04.23

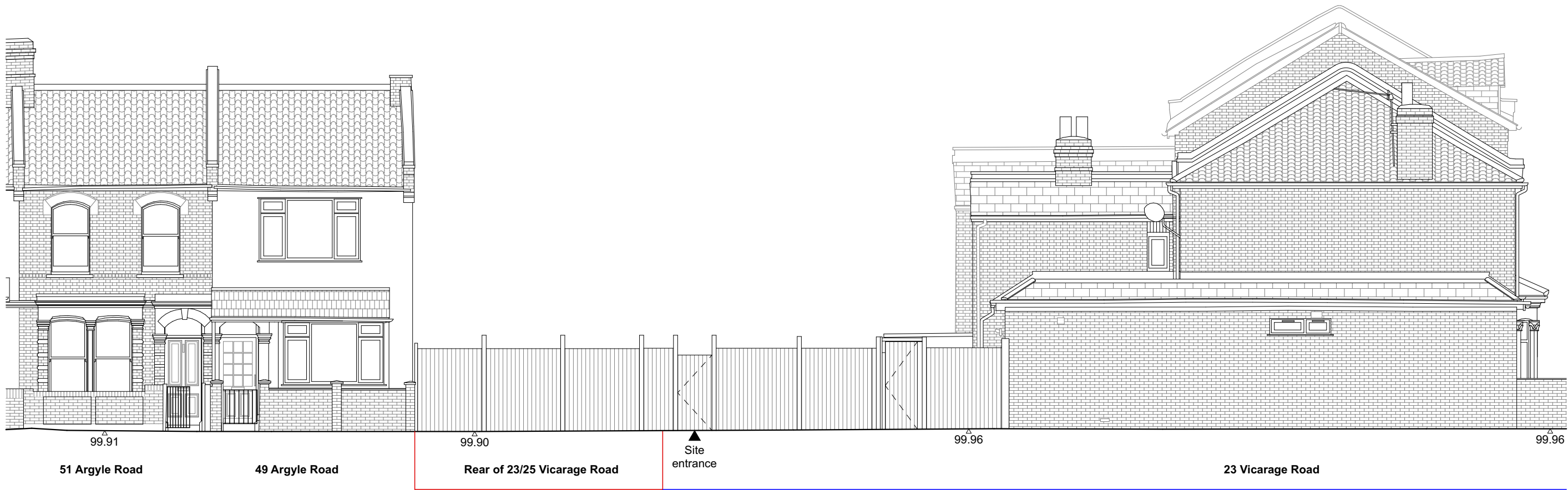
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Layout ID 193-005-EX-SEC Status Revision 00

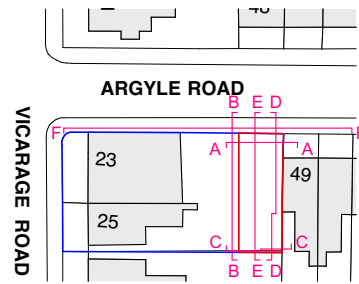




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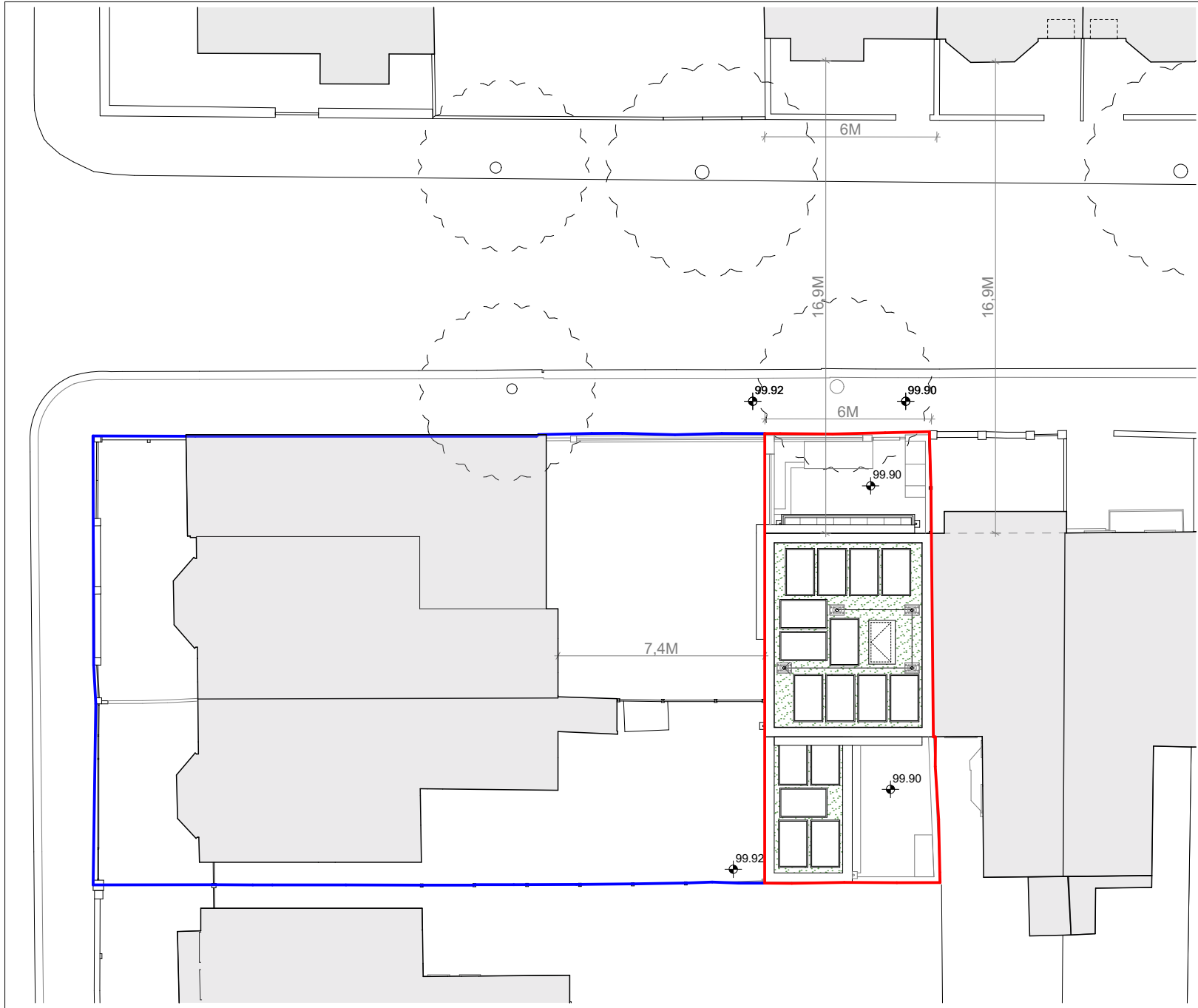
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Job Title
Land rear of 23/25 Vicarage Road

Haringey
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Drawing Name Existing street elevation		
Drawing Status Information		
Drawn by RR	Date 21.04.23	
Checked by SJ	Date 21.04.23	
Drawing Scale 1:100 @A3		
Layout ID 193-006-EX-ELE	Status	Revision 00



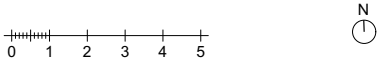
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Site area: 97sqm

□ Planning boundary

□ Same ownership



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Job Title

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Haringey
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N17 0BB

Drawing Name

Proposed site plan

Drawing Status

Information

Drawn by
RR

Date
21.04.23

Checked by
SJ

Date
21.04.23

Drawing Scale

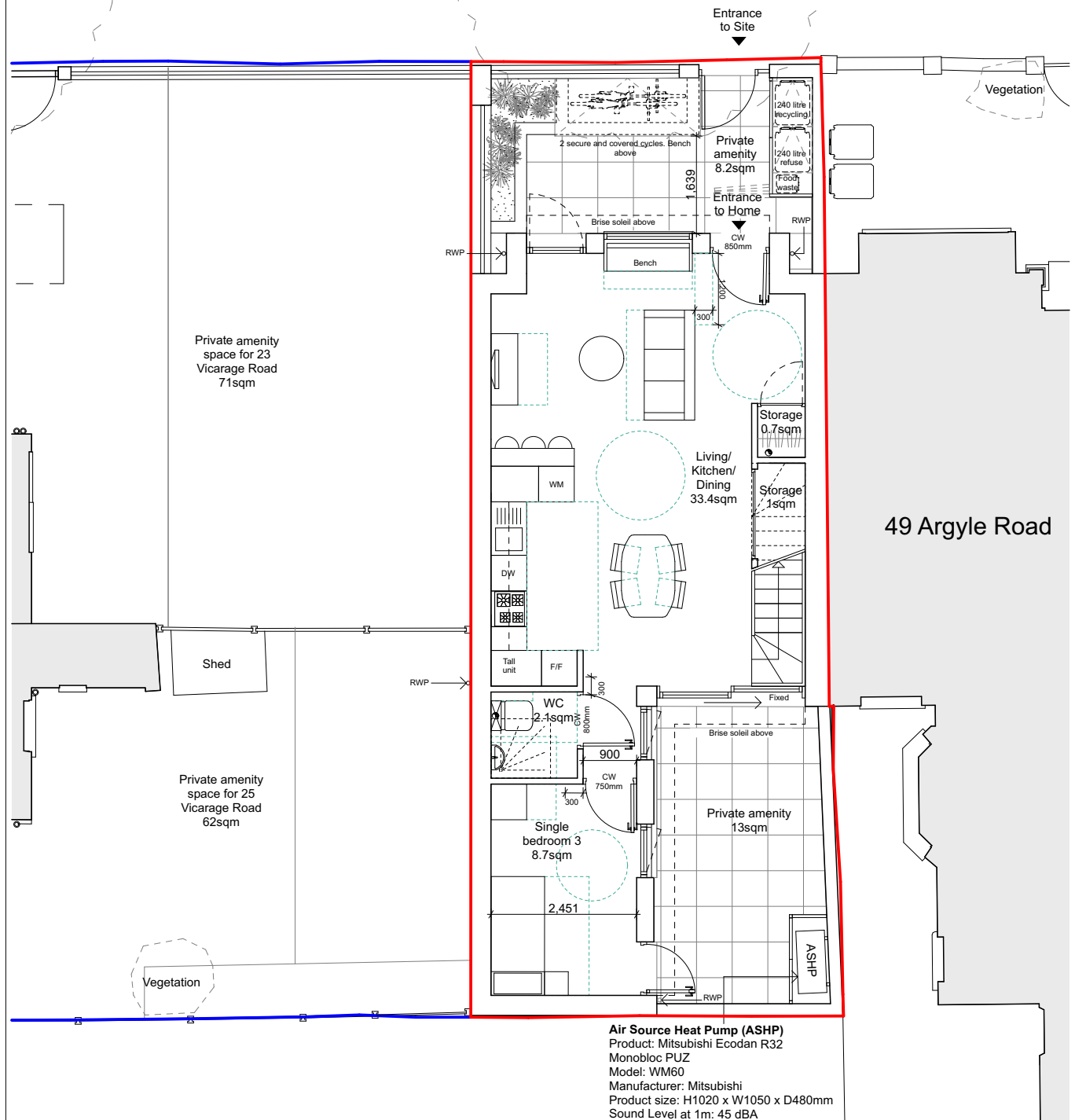
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Layout ID
193-007-GA-SIT

Status

Revision
00

Argyle Road



Housing standards - 3 bedrooms, 4 people			*As per National
Area	Proposed	Min standards*	Housing Standards,
GIA	85.3sqm	84sqm	London Plan,
Double bedroom 1	13.4sqm	11.5sqm	London Plan's
Single bedroom 2	9.2sqm	7.5sqm	Housing SPG and
Single bedroom 3	8.7sqm	7.5sqm	Haringey Waste
Storage	2.7sqm	2.5sqm	Standards
Private amenity	21.2sqm	7sqm	
Cycle spaces	2	2	
Refuse - recycling	240litre	240litre	
Refuse - general	240litre	240litre	
Refuse - food waste	std. caddy	std. caddy	

*As per National Housing Standards, London Plan, London Plan's Housing SPG and Haringey Waste Standards

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Job Title

Land rear of 23/25 Vicarage Road

Haringey
London
N17 0BB

Drawing Name

Proposed ground floor plan

Drawing Status

Information

Drawn by

DR

Date _____

Date
21 04 23

Checked by

SJ

Date _____

21.04.23

Drawing Scale

1:100 @A4

Layout ID

193-008-GA-PLN

Status

Revision

00

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Argyle Road

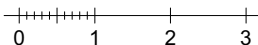
49 Argyle Road

Housing standards - 3 bedrooms, 4 people

Area	Proposed	Min standards*
GIA	85.3sqm	84sqm
Double bedroom 1	13.4sqm	11.5sqm
Single bedroom 2	9.2sqm	7.5sqm
Single bedroom 3	8.7sqm	7.5sqm
Storage	2.7sqm	2.5sqm
Private amenity	21.2sqm	7sqm
Cycle spaces	2	2
Refuse - recycling	240litre	240litre
Refuse - general	240litre	240litre
Refuse - food waste	std. caddy	std. caddy

*As per National Housing Standards, London Plan's London Plan's Housing SPG and Haringey Waste Standards

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Job Title

Land rear of 23/25 Vicarage Road

Haringey
London
N17 0BB

Drawing Name

Proposed first floor plan

Drawing Status

Information

Drawn by
RR

Date
21.04.23

Checked by
SJ

Date
21.04.23

Drawing Scale

1:100 @A4

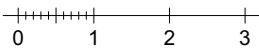
Layout ID	Status	Revision
193-009-GA-PLN		00



Solar panels
Provision: 16

Product: Maxeon 3
Manufacturer: Sunpower
Nominal power: 400W
Residential Solar Panel
Product size: L1690 x W1046 x
T40mm
Installation angle: 0° to the
horizontal

- Planning boundary
 Same ownership



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Job Title

Land rear of 23/25 Vicarage Road

Haringey
London
N17 0BB

Drawing Name

Proposed roof plan

Drawing Status

Information

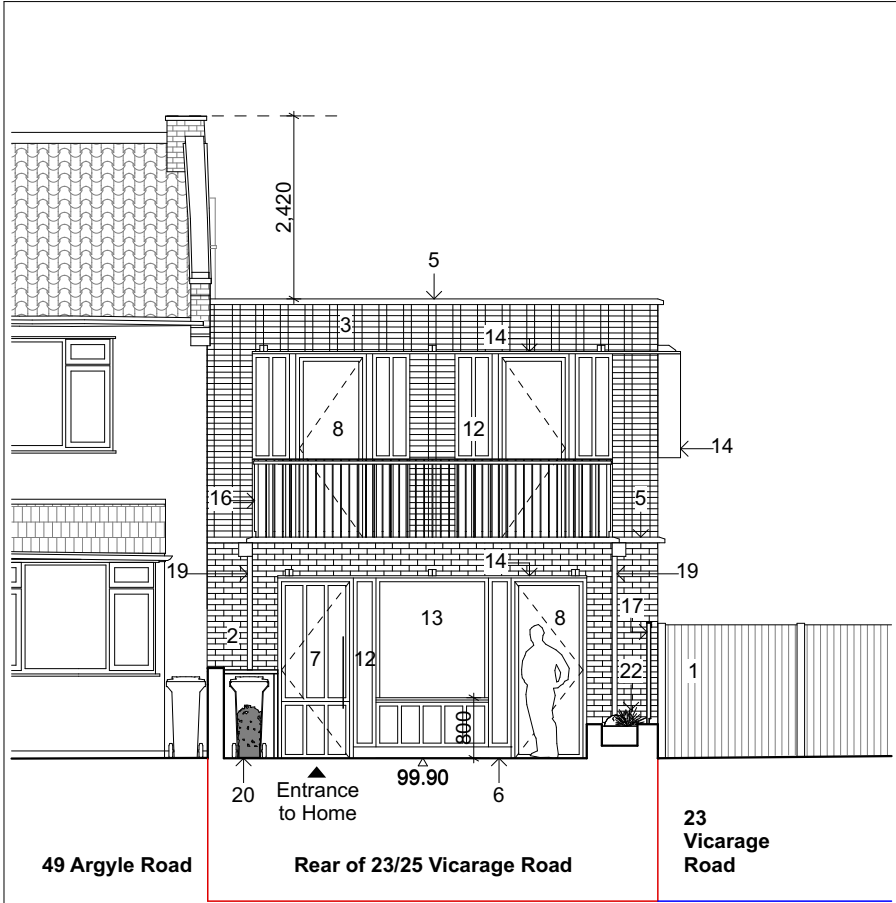
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Checked by: SJ Date: 21.04.23

Drawing Scale

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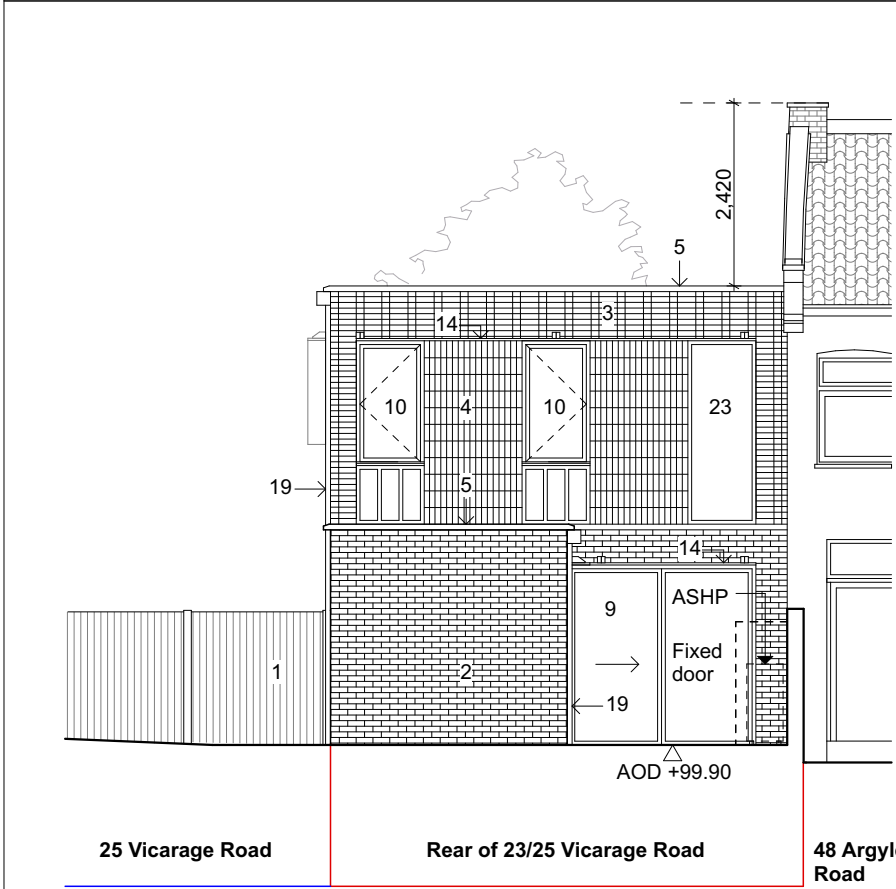
Layout ID: 193-010-GA-PLN Status: Revision: 00



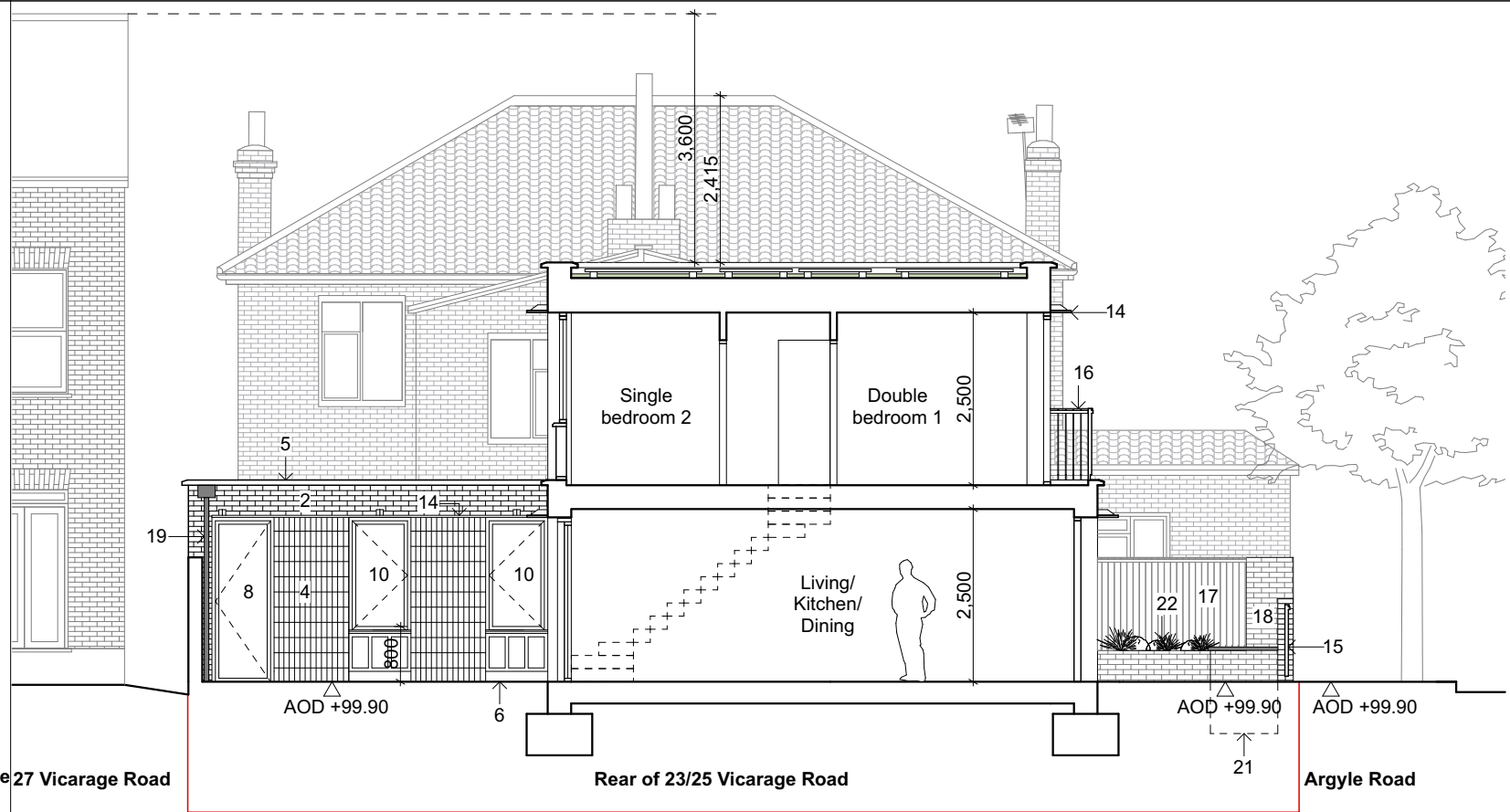
Proposed North elevation (A-A)



Proposed East elevation (B-B)



Proposed South elevation (C-C)



Proposed West elevation (D-D)

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ARGYLE ROAD

VICARAGE ROAD

Key

Material key

- Existing timber fence
- Horizontal running brick bond
- Horizontal stacked flintish brick bond
- Vertical stacked brick bond
- White precast coping stone with 85mm overhang
- White precast stone base sill
- Oak framed door
- Oak framed glazed door
- Oak framed glazed sliding door
- Oak framed glazed casement window with oak infill panel
- Oak framed obscure glazed casement window with oak infill panel
- Oak framed infill panels
- Oak framed glazed fixed window with oak infill panel
- PPC coloured aluminium brise soleil 10mm thick with bespoke brackets
- PPC coloured aluminium gate
- PPC coloured aluminium rails 10mm thick
- PPC coloured aluminium angled rails 10mm thick
- Brick wall
- PPC coloured RWP
- Bin enclosure with oak timber doors
- Horizontal running brick enclosure with sunken cycle store with oak bench above.
- Planting
- Oak framed glazed fixed window

PPC colour: TBC
Brickwork by Ibstock Cumberland Blend, Reference 2629

Planning boundary

Same ownership

0 1 2 3

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Job Title

Land rear of 23/25 Vicarage Road

Haringey
London
N17 0BB

Drawing Name

Proposed North, East, South and West elevations

Drawing Status

Information

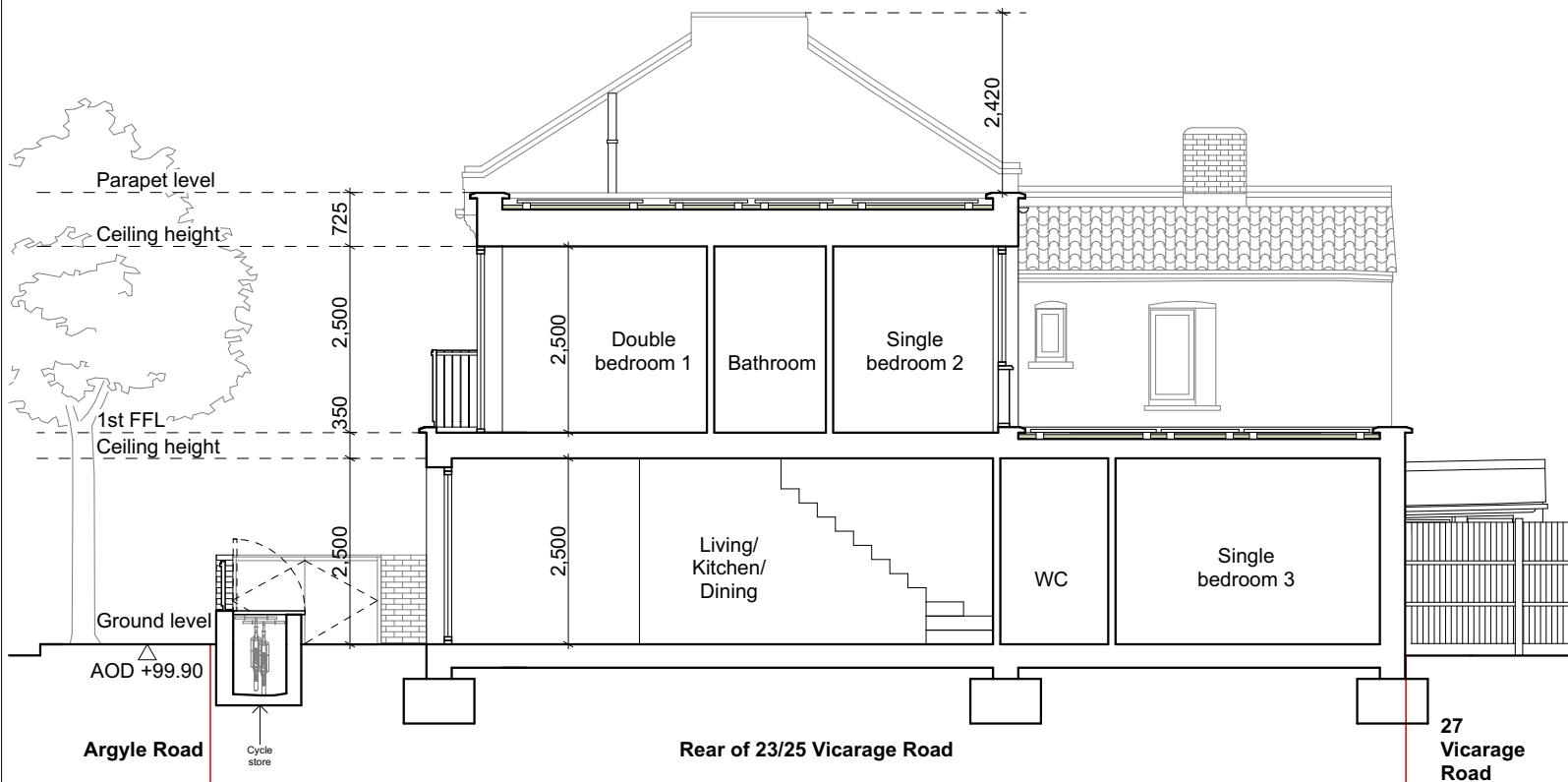
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Checked by: SJ Date: 21.04.23

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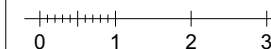
Layout ID: 193-011-GA-ELE Status: Revision: 00



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- Planning boundary
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Tel: 0207 837 4511

Job Title

Land rear of 23/25 Vicarage Road

Haringey
London
N17 0BB

Drawing Name

Proposed West section

Drawing Status

Information

Drawn by RR Date 21.04.23

Checked by SJ Date 21.04.23

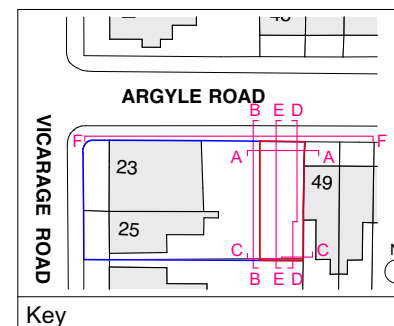
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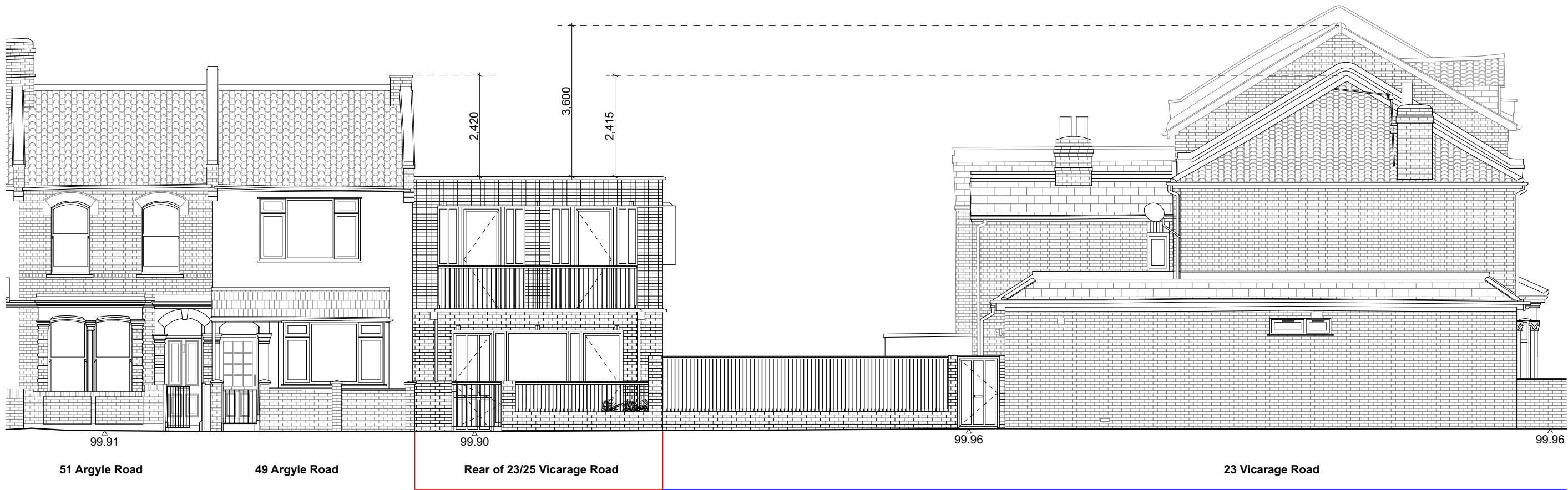
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Layout ID Status Revision

193-012-GA-SEC

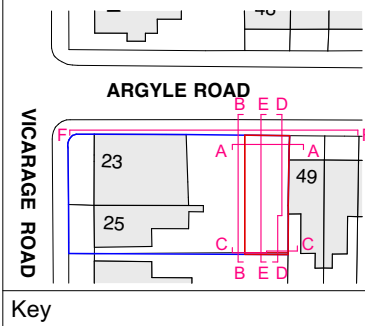
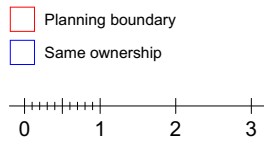
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Job Title
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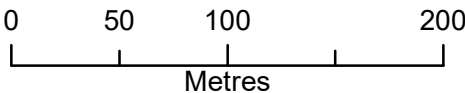
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Drawing Status Information		
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Checked by SJ	Date 21.04.23	
Drawing Scale 1:100 @A3		
Layout ID 193-013-GA-ELE	Status	Revision 00

Appendix B - EA Data

Detailed FRA centred on: 23/25 Vicarage Road, Tottenham, London, N17 0BB - 20/04/2023 - HNL 307214 AS



Environment Agency
Alchemy,
Bessemer Road,
Welwyn Garden City,
Hertfordshire,
AL7 1HE



Legend

- Statutory Main Rivers
- Site location

Defended Flood Outlines

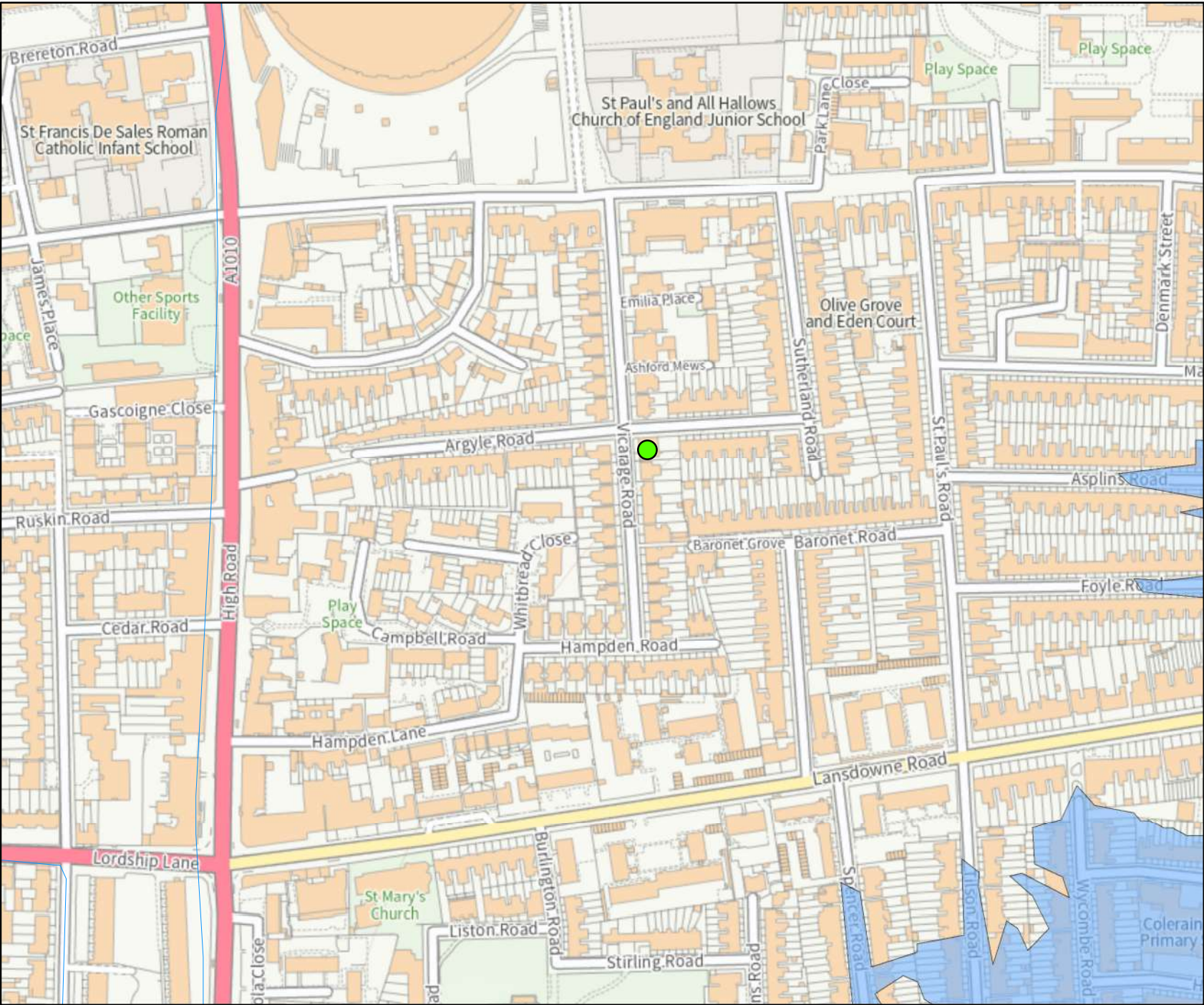
- 1 in 100+20% (CC) Defended

The data in this map has been extracted from the River Lee Modelling & Mapping Study (Halcrow, 2010). This model has been designed for catchment wide flood risk mapping. It should be noted that it was not created to produce flood levels for specific development sites within the catchment. Modelled outlines take into account catchment wide defences.

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<https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>

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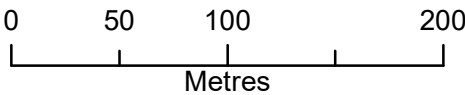


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Detailed FRA centred on: 23/25 Vicarage Road, Tottenham, London, N17 0BB - 20/04/2023 - HNL 307214 AS



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Alchemy,
Bessemer Road,
Welwyn Garden City,
Hertfordshire,
AL7 1HE



Legend

- Statutory Main Rivers
- Site location

Defended Flood Outlines

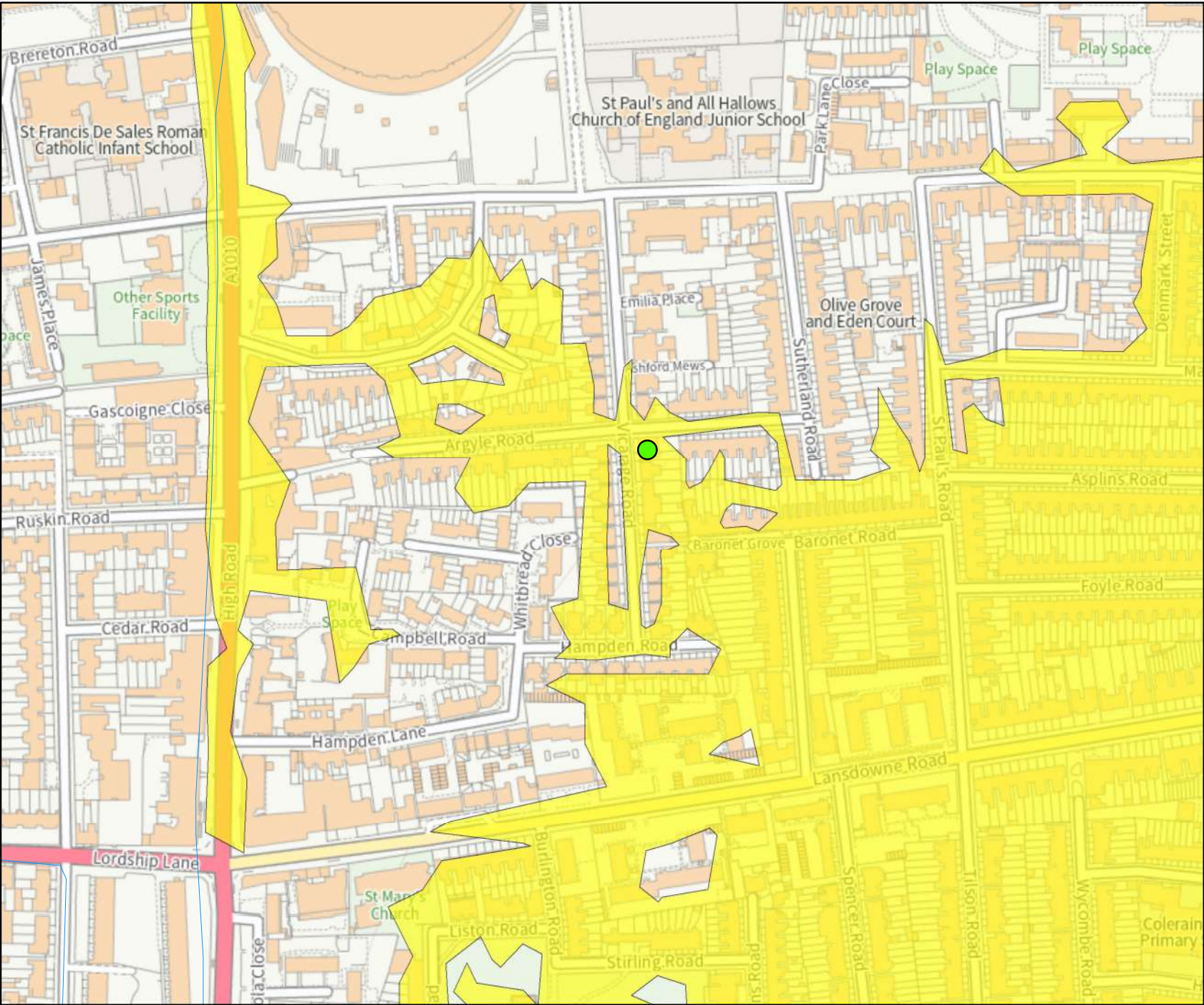
- 1 in 1000 (0.1%) Defended

The data in this map has been extracted from the River Lee Modelling & Mapping Study (Halcrow, 2010). This model has been designed for catchment wide flood risk mapping. It should be noted that it was not created to produce flood levels for specific development sites within the catchment. Modelled outlines take into account catchment wide defences.

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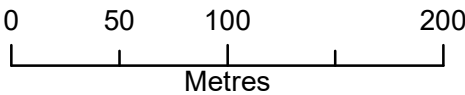
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Detailed FRA centred on: 23/25 Vicarage Road, Tottenham, London, N17 0BB - 20/04/2023 - HNL 307214 AS



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Hertfordshire,
AL7 1HE

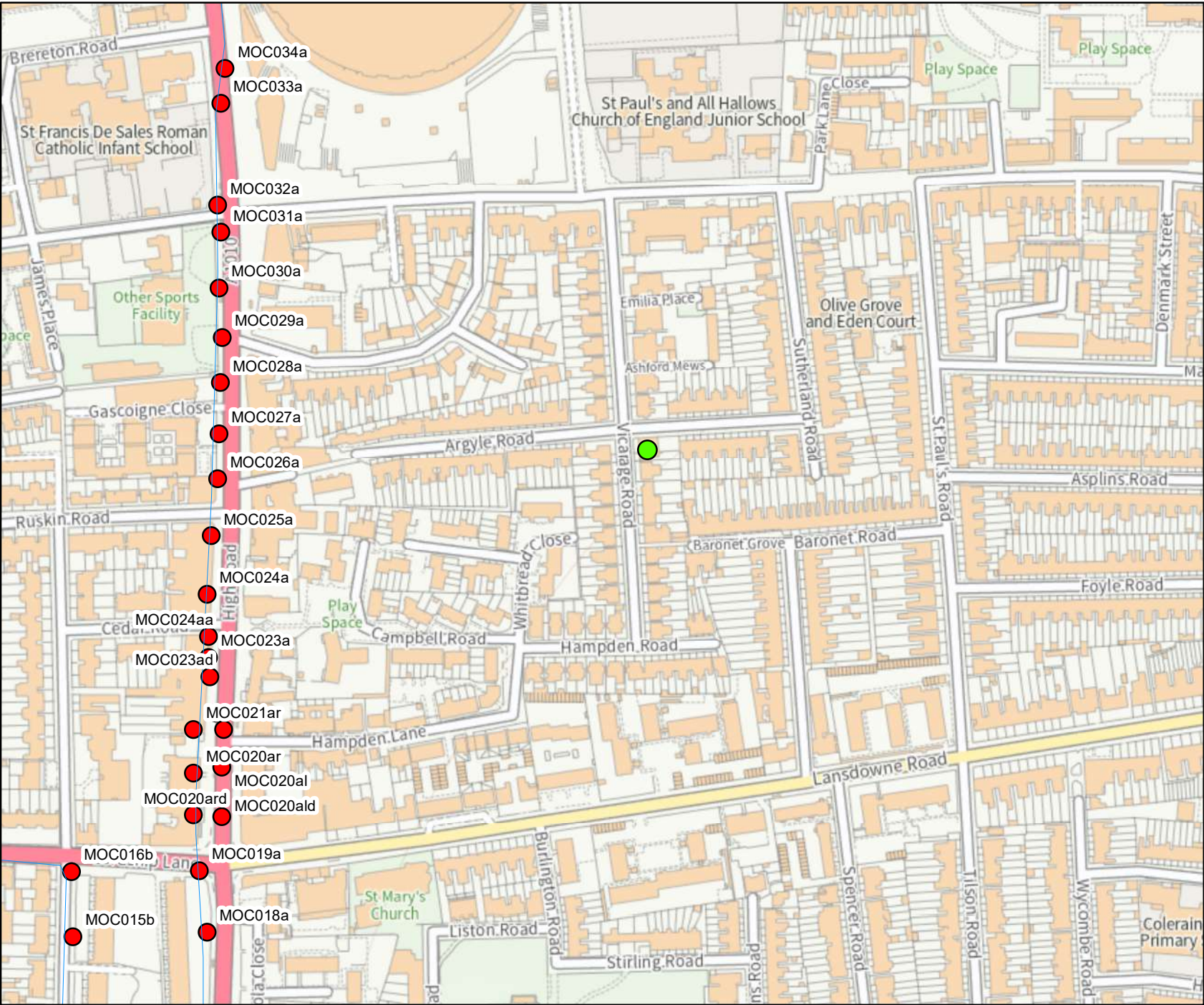


Legend

- Statutory Main Rivers
- Site location
- 1D Node Results**
- Node Results

The data in this map has been extracted from the River Lee Modelling & Mapping Study (Halcrow, 2010). This model has been designed for catchment wide flood risk mapping. It should be noted that it was not created to produce flood levels for specific development sites within the catchment. Modelled outlines take into account catchment wide defences. Flood risk data requests including an allowance for climate change will be based on the 1 in 100 flood plus 20% allowance for climate change, unless otherwise stated. You should refer to 'Flood risk assessments: climate change allowances' to check if this allowance is still appropriate for the type of development you are proposing and its location. You may need to undertake further assessment of future flood risk using different allowances to ensure your assessment of future flood risk is based on best available evidence. <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>

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Environment Agency ref: HNL 307214 AS

The following information has been extracted from the River Lee Modelling & Mapping Study (Halcrow, 2010)
Flood risk data requests including an allowance for climate change will be based on the 1 in 100 flood plus 20% allowance for climate change, unless otherwise stated. You should refer to 'Flood risk assessments: climate change allowances' to check if this allowance is still appropriate for the type of development you are proposing and its location. You may need to undertake further assessment of future flood risk using different allowances to ensure your assessment of future flood risk is based on best available evidence.

<https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>

Caution:

This model has been designed for catchment wide flood risk mapping. It should be noted that it was not created to produce flood levels for specific development sites within the catchment. Modelled outlines take into account catchment wide defences.

Each sub-model has been given a 'Model Confidence Limit' score (1-4) to give an indication of the level of confidence in the hydraulic model.

The confidence for this area is shown in the last column.

- 1 - Good Quality channel and floodplain survey and good calibration
- 2 - Old channel or floodplain survey or limited calibration
- 3 - Poor quality channel or floodplain survey

All flood levels are given in metres Above Ordnance Datum (mAOD)

All flows are given in cubic metres per second (cumecs)

MODELLED FLOOD LEVEL

			Return Period										
Node Label	Easting	Northing	2 yr	5 yr	10 yr	20 yr	25 yr	50 yr	100 yr	100 yr + 20%	200 yr	1000 yr	Confidence
MOC034a	533909	191141	10.22	10.39	10.47	10.51	10.54	10.61	10.69	11.42	11.24	11.90	3
MOC033a	533906	191118	10.22	10.38	10.46	10.51	10.54	10.60	10.69	11.42	11.24	11.90	3
MOC032a	533904	191052	9.97	10.16	10.25	10.30	10.34	10.41	10.51	11.28	11.11	11.74	3
MOC031a	533906	191035	9.94	10.14	10.24	10.29	10.32	10.40	10.49	11.28	11.10	11.73	3
MOC030a	533905	190999	9.94	10.14	10.24	10.29	10.32	10.40	10.49	11.27	11.10	11.72	3
MOC029a	533907	190967	9.87	10.08	10.18	10.23	10.27	10.34	10.44	11.21	11.04	11.65	3
MOC028a	533906	190937	9.86	10.07	10.17	10.22	10.26	10.34	10.43	11.20	11.03	11.64	3
MOC027a	533905	190904	9.84	10.05	10.15	10.20	10.24	10.32	10.42	11.16	11.00	11.59	3
MOC026a	533904	190875	9.83	10.04	10.14	10.19	10.23	10.31	10.41	11.13	10.97	11.56	3
MOC025a	533900	190838	9.78	9.98	10.08	10.13	10.17	10.24	10.34	11.06	10.90	11.47	3
MOC024a	533897	190801	9.77	9.97	10.07	10.12	10.16	10.24	10.33	11.03	10.88	11.44	3
MOC024aa	533898	190773	9.77	9.97	10.06	10.11	10.15	10.23	10.33	11.02	10.86	11.42	3
MOC023a	533898	190760	9.77	9.97	10.07	10.12	10.16	10.24	10.33	11.01	10.86	11.42	3
MOC023ad	533899	190747	9.77	9.97	10.07	10.12	10.16	10.23	10.33	11.01	10.85	11.41	3
MOC022al	533903	190724	9.77	9.97	10.07	10.12	10.16	10.23	10.33	11.01	10.85	11.41	3
MOC021al	533908	190713	9.68	9.86	9.95	10.00	10.02	10.10	10.19	10.88	10.74	11.27	3
MOC020al	533907	190689	9.54	9.72	9.80	9.85	9.87	9.95	10.05	10.71	10.58	11.07	3
MOC020ald	533907	190657	9.38	9.54	9.63	9.67	9.70	9.79	9.92	10.56	10.44	10.90	3
MOC021ar	533888	190713	9.77	9.97	10.07	10.12	10.16	10.23	10.33	11.01	10.85	11.41	3
MOC020ar	533888	190685	9.76	9.96	10.06	10.10	10.14	10.21	10.30	10.97	10.82	11.37	3
MOC020ard	533888	190658	9.38	9.54	9.63	9.67	9.70	9.79	9.92	10.56	10.44	10.90	3
MOC019a	533892	190622	9.38	9.54	9.63	9.67	9.70	9.79	9.92	10.56	10.44	10.90	3
MOC018a	533897	190582	9.20	9.36	9.45	9.50	9.56	9.71	9.95	10.56	10.43	10.89	3
MOC017a	533901	190523	8.91	9.12	9.25	9.35	9.42	9.63	9.90	10.42	10.30	10.72	3
MOC016b	533809	190621	10.81	10.97	11.02	11.08	11.12	11.17	11.21	11.30	11.24	11.54	3
MOC015b	533810	190579	10.33	10.49	10.54	10.59	10.63	10.67	10.70	10.98	10.85	11.36	3
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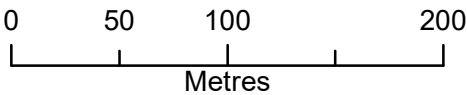
MODELLED FLOWS

				Return Period									
Node Label	Easting	Northing	2 yr	5 yr	010 yr	20 yr	25 yr	50 yr	100 yr	100 yr + 20%	200 yr	1000 yr	Confidence
MOC034a	533909	191141	2.32	3.59	4.22	4.56	4.80	5.29	5.90	6.50	6.62	7.39	3
MOC033a	533906	191118	2.32	3.59	4.22	4.56	4.80	5.29	5.90	6.50	6.62	7.38	3
MOC032a	533904	191052	2.31	3.58	4.22	4.56	4.80	5.27	5.90	6.45	6.58	7.16	3
MOC031a	533906	191035	2.31	3.58	4.22	4.56	4.80	5.27	5.90	6.44	6.58	7.13	3
MOC030a	533905	190999	2.31	3.58	4.22	4.56	4.79	5.26	5.90	6.44	6.58	7.13	3
MOC029a	533907	190967	2.30	3.58	4.22	4.56	4.79	5.25	5.90	6.41	6.55	6.99	3
MOC028a	533906	190937	2.30	3.58	4.22	4.56	4.78	5.25	5.90	6.41	6.55	6.98	3
MOC027a	533905	190904	2.29	3.57	4.22	4.56	4.78	5.24	5.90	6.39	6.53	6.98	3
MOC026a	533904	190875	2.29	3.57	4.22	4.56	4.78	5.24	5.90	6.38	6.51	6.98	3
MOC025a	533900	190838	2.28	3.56	4.21	4.56	4.77	5.22	5.89	6.35	6.45	6.98	3
MOC024a	533897	190801	2.27	3.56	4.21	4.56	4.77	5.22	5.89	6.34	6.43	6.98	3
MOC024aa	533898	190773	2.27	3.55	4.21	4.56	4.77	5.22	5.89	6.33	6.43	6.98	3
MOC023a	533898	190760	2.27	3.55	4.21	4.56	4.77	5.21	5.89	6.33	6.43	6.98	3
MOC023ad	533899	190747	2.27	3.55	4.21	4.56	4.76	5.21	5.89	6.33	6.43	6.98	3
MOC022al	533903	190724	1.10	1.71	2.02	2.18	2.26	2.55	2.89	3.15	3.20	3.47	3
MOC021al	533908	190713	1.11	1.71	2.02	2.18	2.26	2.54	2.89	3.14	3.18	3.46	3
MOC020al	533907	190689	1.11	1.70	2.02	2.18	2.26	2.54	2.88	3.13	3.12	3.43	3
MOC020ald	533907	190657	1.11	1.70	2.01	2.18	2.26	2.53	2.87	3.11	3.06	3.40	3
MOC021ar	533888	190713	1.17	1.84	2.19	2.37	2.50	2.67	3.00	3.33	3.23	3.72	3
MOC020ar	533888	190685	1.17	1.84	2.19	2.37	2.50	2.67	3.00	3.33	3.23	3.72	3
MOC020ard	533888	190658	1.18	1.83	2.18	2.37	2.50	2.66	2.99	3.33	3.19	3.72	3
MOC019a	533892	190622	2.30	3.52	4.20	4.55	4.75	5.18	5.86	6.27	6.24	6.98	3
MOC018a	533897	190582	2.30	3.52	4.19	4.55	4.75	5.17	5.84	6.26	6.18	6.98	3
MOC017a	533901	190523	2.30	3.51	4.19	4.54	4.74	5.15	5.79	6.26	6.12	6.98	3
MOC016b	533809	190621	3.63	4.74	5.11	5.50	5.78	6.14	6.44	6.81	6.62	7.11	3
MOC015b	533810	190579	3.63	4.75	5.12	5.51	5.79	6.14	6.43	6.79	6.62	7.10	3
MOC014b	533805	190518	3.64	4.75	5.12	5.53	5.80	6.13	6.40	6.78	6.59	7.10	3

Detailed FRA centred on: 23/25 Vicarage Road, Tottenham, London, N17 0BB - 20/04/2023 - HNL 307214 AS



Environment Agency
Alchemy,
Bessemer Road,
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Hertfordshire,
AL7 1HE



Legend

- Statutory Main Rivers
- Site location

2D Node Results: Heights

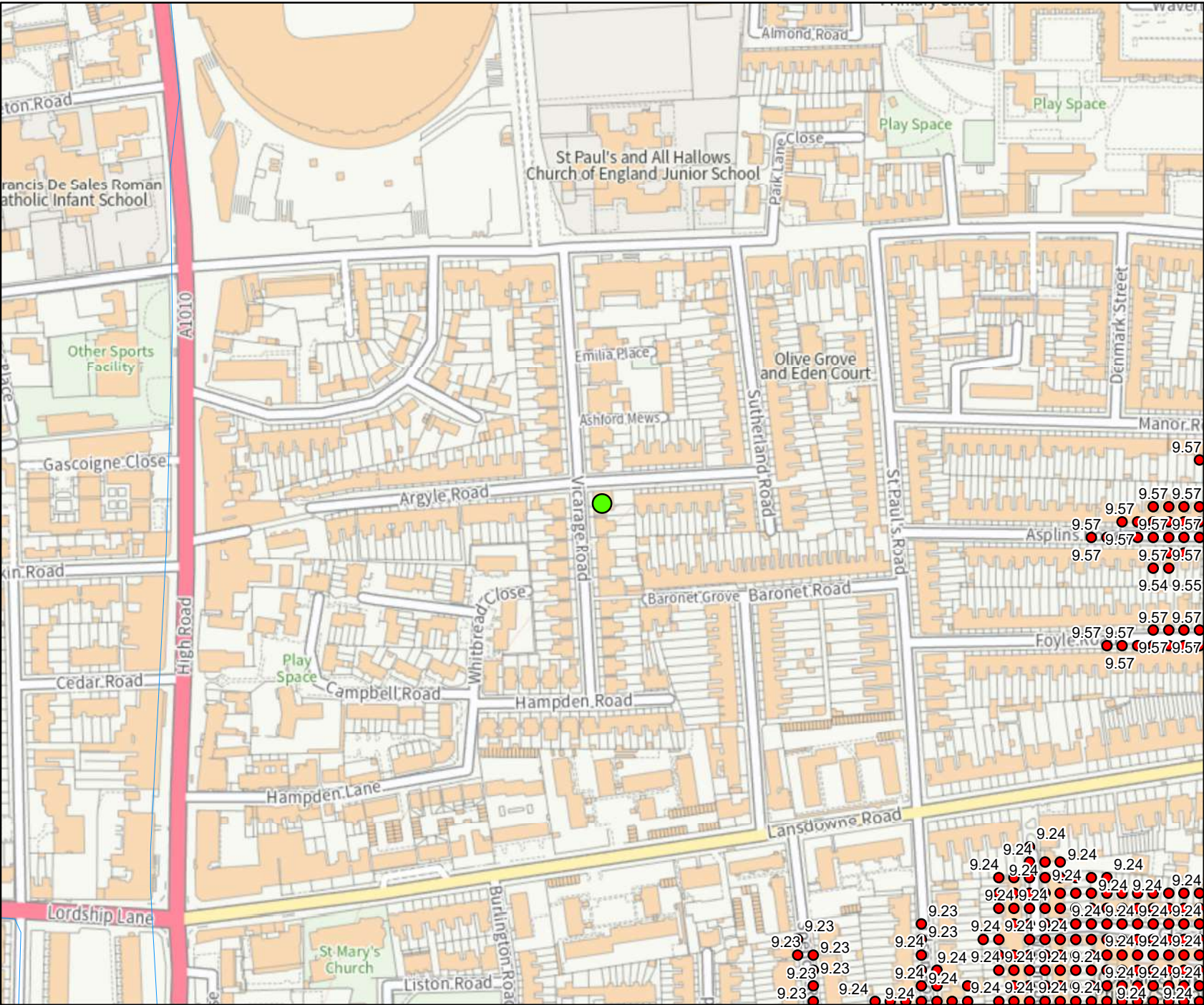
- 1 in 100+20% (CC) Defended

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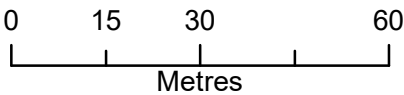


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AL7 1HE



Legend

- Statutory Main Rivers
- Site location

2D Node Results: Heights

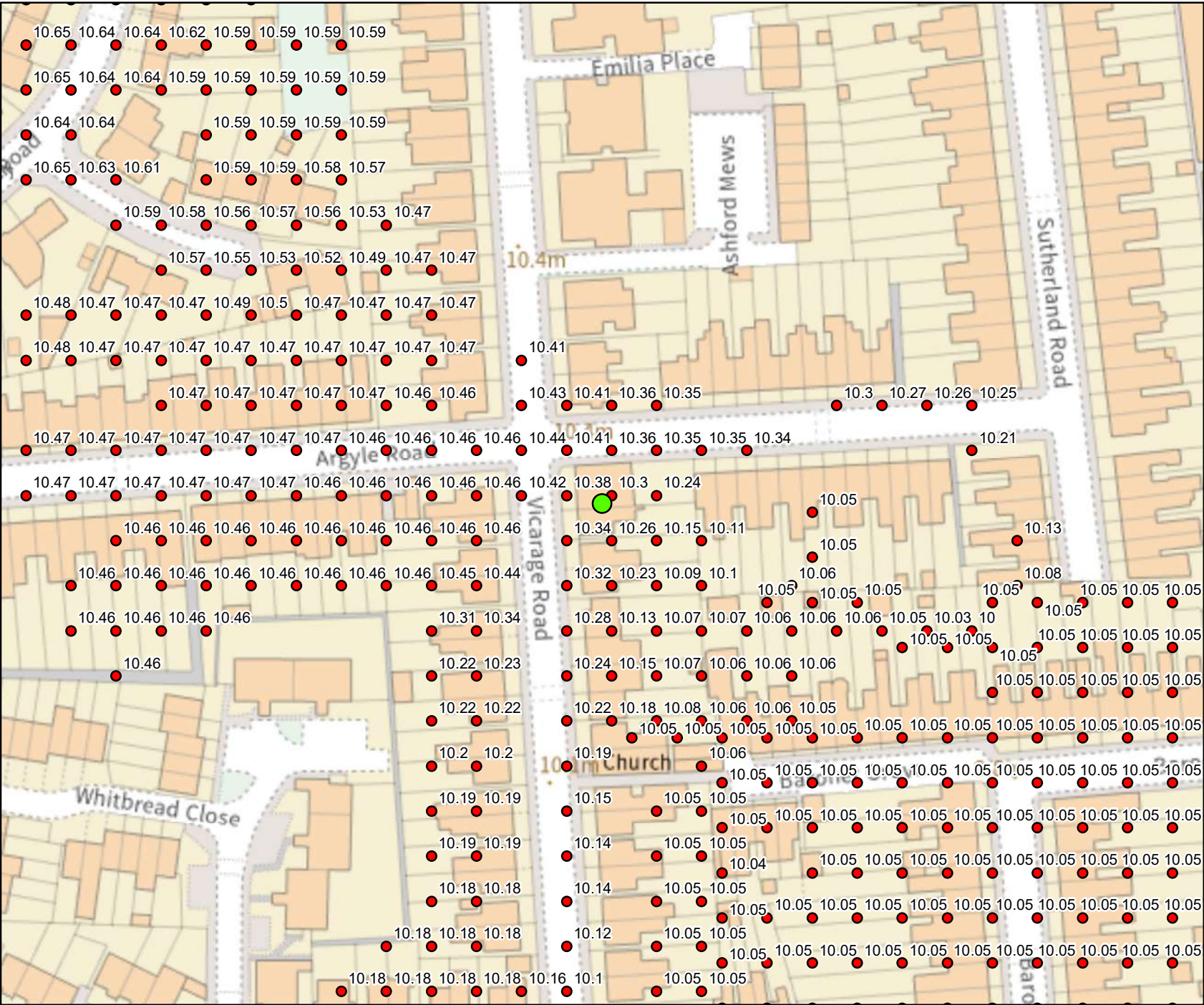
- 1 in 1000 (0.1%) Defended

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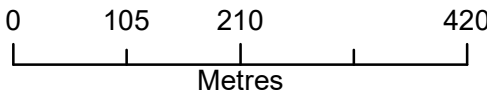


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Historic Flood Map centred on: 23/25 Vicarage Road, Tottenham, London, N17 0BB - 20/04/2023 - HNL 307214 AS



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Alchemy,
Bessemer Road,
Welwyn Garden City,
Hertfordshire,
AL7 1HE



Legend

- Statutory Main Rivers
- Site location

Flood Event Outlines

1947

The historic flood event outlines are based on a combination of anecdotal evidence, Environment Agency staff observations and survey. Our historic flood event outlines do not provide a definitive record of flooding. It is possible that there will be an absence of data in places where we have not been able to record the extent of flooding. It is also possible for errors occur in the digitisation of historic records of flooding.

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