

Flood Risk Assessment
AEG6964_SW13_Richmond_01

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Site Address: 23 Nassau Road

London

London Borough of Richmond upon Thames

SW13 9QF

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

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Document Issue Record

Project: Flood Risk Assessment

Prepared for: Clare & Enrico Longo

Reference: AEG6964_SW13_Richmond_01

Site Location: 23 Nassau Road, London, London Borough of Richmond upon Thames, SW13 9QF

Issue	Date	Author	Check	Auth.	Comments
1	14/01/2025	Jacob Caddick	ML	DS	First issue

Please Note:

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Summary

Development Description	Existing	Proposed
Development Type	A residential dwelling	The client is submitting a planning application for the construction of extensions to provide greater habitable space to the existing dwelling, in addition to external alterations to the garden and driveway.
EA Vulnerability Classification	More Vulnerable	More Vulnerable
Ground Floor Level	Based on 1m LiDAR, the ground elevation of the site varies between approximately 4.7m AOD and 5.3m AOD.	The proposed extension is at a level between 4.9m AOD and 5.2m AOD. FFLs are to be set no lower than existing FFLs.
Level of Sleeping Accommodation	First Floor	First Floor
Site Size	c.390m²	No change
Risk to Development	**Summary**	**Comment**
EA Flood Zone	Flood Zone 3	River Thames
Flood Source	Tidal Watercourse	
SFRA Available	Level 1 Strategic Flood Risk Assessment (Richmond Council, 2021)	
Management Measures	**Summary**	**Comment**
Ground floor level above extreme flood levels	Actual (defended) risk of flooding is considered low	Risk is limited to the breach of the Thames Tidal Defences scenario. Proposed development is considered as Minor Development, flood risk is considered to be low.
Safe Access/Egress Route	N/A[1]	Access/egress arrangements will remain as per existing situation, post-development.

Flood Resilient Design	Yes	Flood resilience/resistance measures recommended in section 5.
Flood Warning and Evacuation Plan	N/A[1]	The site is located in 'Tidal Thames from Putney Bridge to Mortlake High Street East' Flood Warning Area
Offsite Impacts	**Summary**	**Comment**
Displacement of floodwater	Negligible	Development in area of tidal flood risk. As such, development in isolation should not increase flood risk elsewhere.
Increase in surface run-off generation	No	Recommended to reuse existing drainage infrastructure where possible. Existing drainage should be investigated via a CCTV survey and remediation should be undertaken as required. Small scale SuDS such as rainwater planters and water butts are also recommended to provided betterment over existing situation.
Impact on hydraulic performance of channels	Negligible	Nearest EA Main River (River Thames) is approximately 400m from site.

[1] not required for this assessment

[2] data not available.

1. Introduction

1.1. Aegaea were commissioned by Clare & Enrico Longo 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 23 Nassau Road, London, London Borough of Richmond upon Thames, SW13 9QF (Figure 1).

Figure 1: Site Location (Base map and data from Google Satellite Imagery. Contains public sector information licensed under the Open Government Licence v3.0)

1.4. The client is submitting a planning application for the construction of a ground floor rear and side extensions to provide greater habitable space within the kitchen/dining/living area to the existing dwelling, in addition to external alterations to the garden and driveway.

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 4.7m AOD (metres Above Ordnance Datum) and 5.3m AOD. Analysis of topographic levels indicates that the site generally slopes with a fall to the south-west.

1.6. The proposed extension is shown to be at a level between 4.9m AOD and 5.2m AOD.

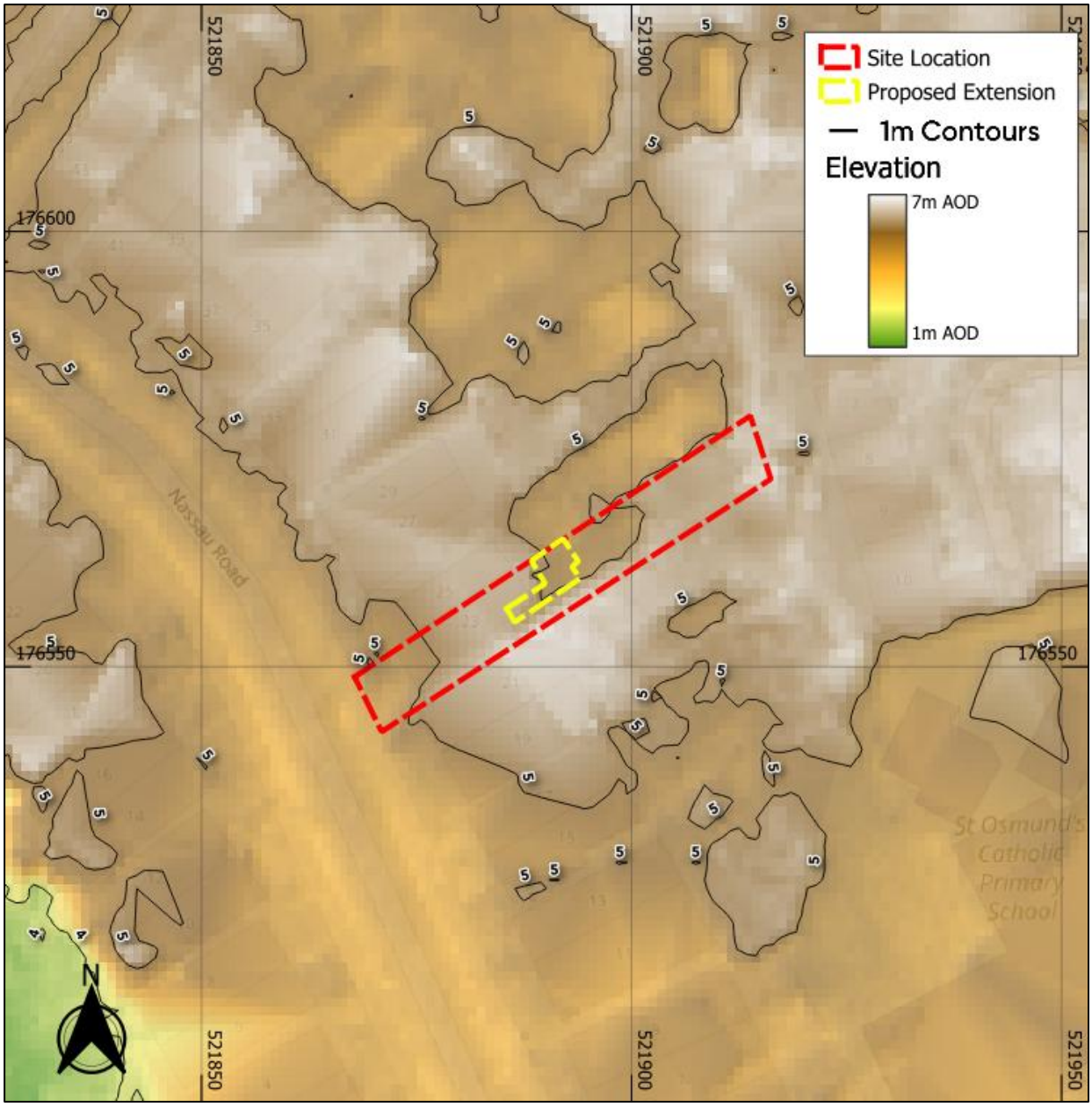

Figure 2: Site Topography (Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © https://www.openstreetmap.org and contributors. Contains public sector information licensed under the Open Government Licence v3.0)

1.7. Richmond 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 Kent South London and East Sussex region.

Planning Policy and Guidance

1.8. UK government planning guidance states[1] that an FRA is required for developments which are:

- *in flood zones 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*

1.9. The site is located within Flood Zone 3. According to NPPF Footnote 63 an FRA is required.

1.10. 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/tidal flood risk
- Surface water flood risk
- Risk of flooding from other sources

[1] **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 Framework[2] (NPPF) (MHCLG, 2024) which includes UK Government policy on development and flood risk states:

> *170. 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.*
>
> *176. Applications for some minor development and changes of use should not be subject to the sequential or exception tests but should still meet the requirements for site-specific flood risk assessments set out in footnote 63.*
>
> *181. 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;*

[2] **https://www.gov.uk/guidance/national-planning-policy-framework, last updated Dec 2024**

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;*

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 63 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. Paragraph 051 of the Flood Risk and Coastal Change Planning Practice Guidance (PPG) states:

Minor development means:

- *minor non-residential extensions (industrial/commercial/leisure etc): extensions with a floorspace not in excess of 250 square metres.*
- *alterations: development that does not increase the size of buildings, e.g. alterations to external appearance.*
- *householder development: for example, sheds, garages, games rooms etc within the curtilage of the existing dwelling,* ***in addition to physical extensions to the existing dwelling itself.*** *This definition excludes any proposed development that would create a separate dwelling within the curtilage of the existing dwelling (eg subdivision of houses into flats) or any other development with a purpose not incidental to the enjoyment of the dwelling.*

2.5. As such, the proposal would be considered a Minor Development under the PPG.

2.6. Footnote 63 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.*

2.7. 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)

2.8. 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.

2.9. An assessment of hydrological impacts should be undertaken, including to surface water runoff and impacts to drainage networks in order to demonstrate how flood risk to others will be managed following development and taking climate change into account.

The London Plan

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

2.11. 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.

2.12. 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

2.13. The Local Plan prepared by the Local Planning Authority, Richmond Council, sets out the policies for development in the local area.

2.14. Policy LP 21.1 Flood Risk and Sustainable Drainage outlines the requirements for new development within the area. It states:

> *All developments should avoid, or minimise, contributing to all sources of flooding, including fluvial, tidal, surface water, groundwater and flooding from sewers, taking account of climate change and without increasing flood risk elsewhere. Development will be guided to areas of lower risk by applying the 'Sequential Test' as set out in national policy guidance, and where necessary, the 'Exception Test' will be applied.*
>
> *Unacceptable developments and land uses will be refused in line with national policy and guidance, the Council's Strategic Flood Risk Assessment (SFRA) and as outlined in the table below. In Flood Zones 2 and 3, all proposals on sites of 10 dwellings or more or 1000sqm of non-residential development or more, or on any other proposal where safe access/egress cannot be achieved, a Flood Emergency Plan must be submitted.*
>
> *Where a Flood Risk Assessment is required, on-site attenuation to alleviate fluvial and/or surface water flooding over and above the Environment Agency's floodplain compensation is required where feasible.*

2.15. Policy LP 21.3 Flood Risk and Sustainable Drainage outlines the requirements for new development within the area. It states:

> *The Council will require the use of Sustainable Drainage Systems (SuDS) in all development proposals. Applicants will have to demonstrate that their proposal complies with the following:*
>
> *- A reduction in surface water discharge to greenfield run-off rates wherever feasible.*
>
> *- Where greenfield run-off rates are not feasible, this will need to be demonstrated by the applicant, and in such instances, the minimum requirement is to achieve at least a 50% attenuation of the site's surface water runoff at peak times based on the levels existing prior to the development.*

2.16. Policy LP 21.4 Flood Risk and Sustainable Drainage outlines the requirements for new development within the area. It states:

> *Applicants will have to demonstrate that their proposal complies with the following:*
> *- Retain the effectiveness, stability and integrity of flood defences, river banks and other formal and informal flood defence infrastructure.*
>
> *- Ensure the proposal does not prevent essential maintenance and upgrading to be carried out in the future.*
>
> *- Set back developments from river banks and existing flood defence infrastructure where possible (16 metres for the tidal Thames and 8 metres for other rivers).*
>
> *- Take into account the requirements of the Thames Estuary 2100 Plan and the River Thames Scheme, and demonstrate how the current and future requirements for flood defences have been incorporated into the development.*
>
> *– The removal of formal or informal flood defences is not acceptable unless this is part of an agreed flood risk management strategy by the Environment Agency.*

Sequential and Exception Tests

2.17. 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.

2.18. The proposed development is viewed as minor development in accordance with the EA standing advice. In accordance with NPPF paragraph 174, minor developments should not be subject to the sequential or exception tests but should still meet the requirements for site-specific flood risk assessments set out in footnote 63.

Summary

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

3. Document Review

Documents and Online Mapping

3.1. 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.

3.2. The following sources of information have been reviewed for this assessment:

- Flood Map for Planning on the Environment Agency website[4]
- Long Term Flood Risk Information on the Environment Agency website[5]
- National Planning Policy Framework (NPPF) (Department for Levelling Up, Housing and Communities, 2023)
- Planning Practice Guidance - Flood Risk and Coastal Change (Department for Levelling Up, Housing and Communities, 2022)
- Geoindex Onshore (British Geological Survey, 2023)[6]
- The London Plan (Greater London Authority, 2021)[7]
- Local Plan (London Borough of Richmond upon Thames, 2018)[8]

[4] **https://flood-map-for-planning.service.gov.uk/**
[5] **https://www.gov.uk/check-long-term-flood-risk**
[6] **https://www.epsom-ewell.gov.uk/sites/default/files/documents/residents/planning/planning-policy/Core%20Strategy%202007.pdf**
[7] **https://www.london.gov.uk/programmes-strategies/planning/london-plan/new-london-plan/london-plan-2021**
[8] **https://www.richmond.gov.uk/services/planning/planning_policy/local_plan/local_plan_review/local_plan_examination#adoption**

- Preliminary Flood Risk Assessment (London Borough of Richmond upon Thames, 2011)[9] and Preliminary Flood Risk Assessment Addendum[10] (London Borough of Richmond upon Thames, 2017)
- Level 1 Strategic Flood Risk Assessment (London Borough of Richmond upon Thames, 2021)[11]
- Local Flood Risk Management Strategy (London Borough of Richmond upon Thames, 2023)[12]
- Surface Water Management Plan (London Borough of Richmond upon Thames, 2021)[13]

Preliminary Flood Risk Assessment (PFRA)

3.3. The PFRA, published in 2011 and 2017, is a high-level appraisal of flood risk across Lead Local Flood Authority Richmond 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.

3.4. The PFRA summarises historical flood incidents in Richmond Council. The site is not recorded as having been affected by any flood event.

Strategic Flood Risk Assessment (SFRA)

3.5. The SFRA, published in 2021, provides the evidence base for the Local Planning Authority Richmond 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.

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[9] **https://www.richmond.gov.uk/preliminary_flood_risk_assessment**

[10] **https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/698669/PFRA_London_Borough_of_Richmond_upon_Thames_2017.pdf**

[11] **https://www.richmond.gov.uk/media/20529/sfra_level_1_report.pdf**

[12] **https://richmond.gov.uk/media/m00nwx4m/richmond_lfrms.pdf**

[13] **https://www.richmond.gov.uk/media/23830/surface_water_management_plan.pdf**

3.6. The SFRA mapping provided by Richmond Council has been used throughout production of this report as a source of information, particularly pertaining to historical flood incidents.

Local Flood Risk Management Strategy (LFRMS)

3.7. The Local Flood Risk Management Strategy sets out roles and responsibilities for flood risk management, assesses the risk of flooding in the area, where funding can be found to manage flood risk, and the policies, objectives, and actions of the Lead Local Flood Authority.

3.8. The Richmond Council LFRMS is used within this report to identify any flood management infrastructure and historical incidences of flooding.

4. Sources of Flood Risk

Tidal Watercourses

4.1. Flooding from tidal 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. 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 riverbank or river defences when tide levels are high.

Main Rivers

4.3. The nearest EA Main River is the River Thames which is approximately 400m west of the site. The River Thames is tidally influenced at this location.

Ordinary Watercourses

4.4. No other mapped watercourses could be found in the vicinity of the site.

EA Flood Map for Planning

4.5. The EA Flood Map for Planning shows the site is located wholly within Flood Zone 3 (Figure 3). Flood Zone 3 denotes a risk of flooding greater than 1 in 200 (0.5%AEP) from tidal sources.

4.6. The Thames Tidal Defences (TTD) offer a design standard of protection of up to the 1 in 1000 year return period until at least the year 2100, for this area of London.

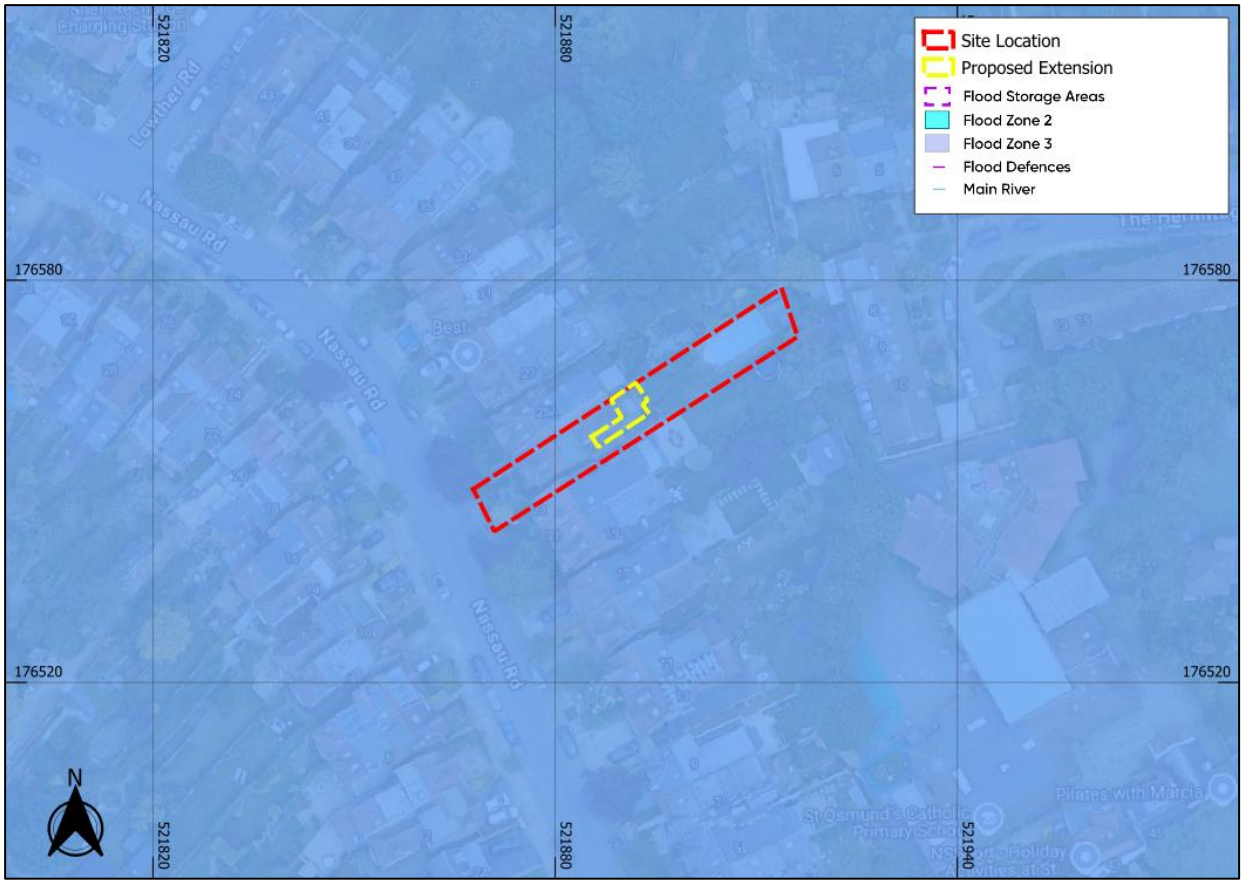


Figure 3: EA Flood Map for Planning (Base map and data from Google Satellite Imagery. Contains public sector information licensed under the Open Government Licence v3.0)

Upstream Thames Tidal Breach Model (2017)

4.7. For developments such as this, which rely on protection from flood defences, the NPPF requires the residual risk of flooding, resulting from a failure or 'breach' of the defences to be considered.

4.8. The EA's Thames Upstream Breach Modelling study (2017) show the modelled flood extent and depths in the event of a breach of the existing linear defences in the 2100 epoch. The 2100 epoch flood depths across the site have been visualised below in Figure 4.

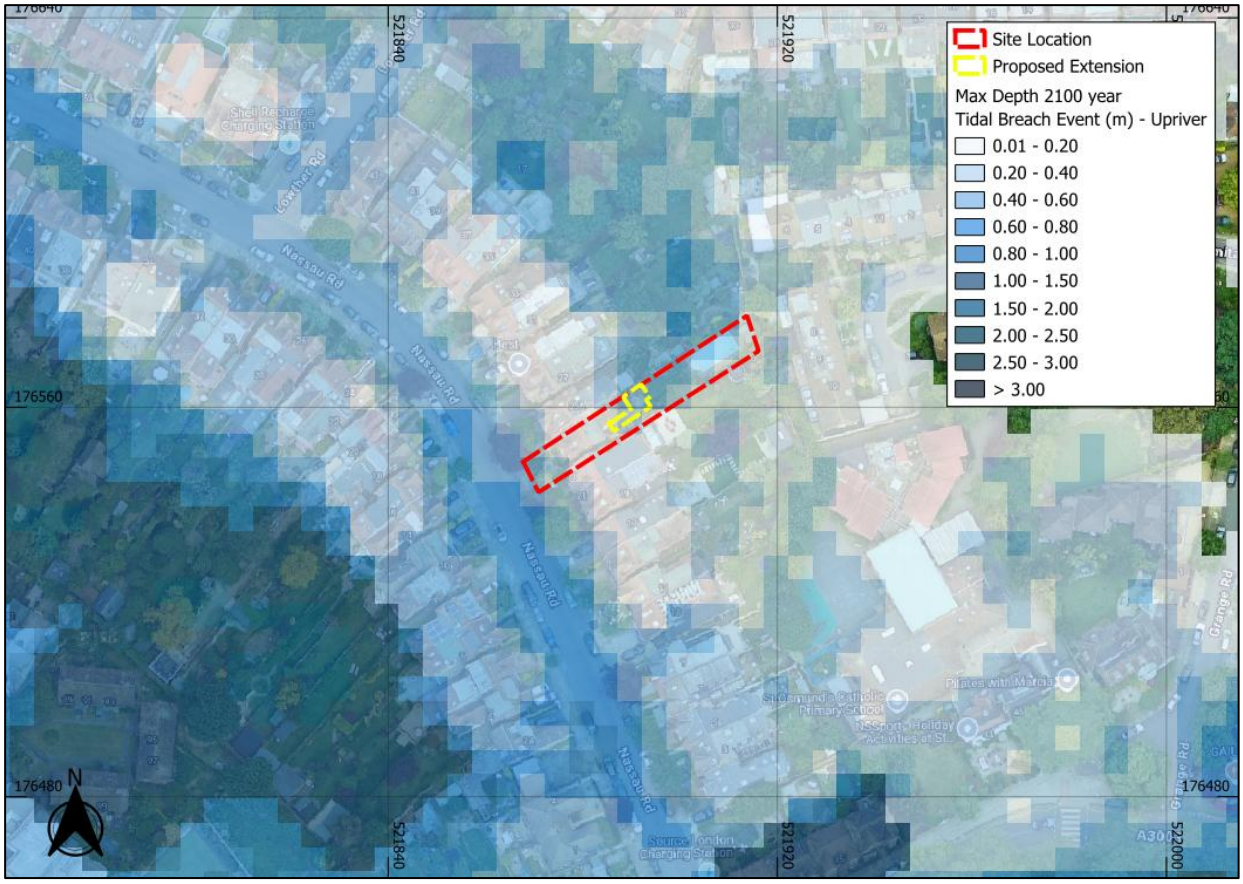


Figure 4: Upstream Thames Tidal Breach Model (2017) Flood Extent and Depths (Source: Base map and data from Google Satellite Imagery. Contains public sector information licensed under the Open Government Licence v3.0)

4.9. In this modelled event, the highest flood level associated with the site is 5.40m AOD. Compared to existing ground levels provided by EA LiDAR data for the site (4.7m AOD – 5.3m AOD), the maximum flood depth on site is shown to be 700mm respectively.

4.10. The flood level at the location of the proposed extension is estimated to be 5.37m AOD, resulting in flood depths up to 470mm (based on EA LiDAR level between 4.9m AOD and 5.2m AOD at the proposed location of the extension).

4.11. In the event of a breach, the EA hazard rating denoted to the flood extent is shown in Figure 5. The highest rating within site boundary and the area around the site, including Nassau Road, is shown to be categorised as a 'danger for most' with a numerical rating between 1.25 and 2.00. However, some areas within the site boundary categories as at a lower hazard level (<0.75 - 1.25).

4.12. The proposed extension is shown to at a hazard level of 'danger for some', and a numerical rating of between 0.75 and 1.25.

4.13. In the event of a breach, it is recommended that where prior evacuation from the site cannot be achieved, safe refuge is sought within the existing dwelling at first floor level.

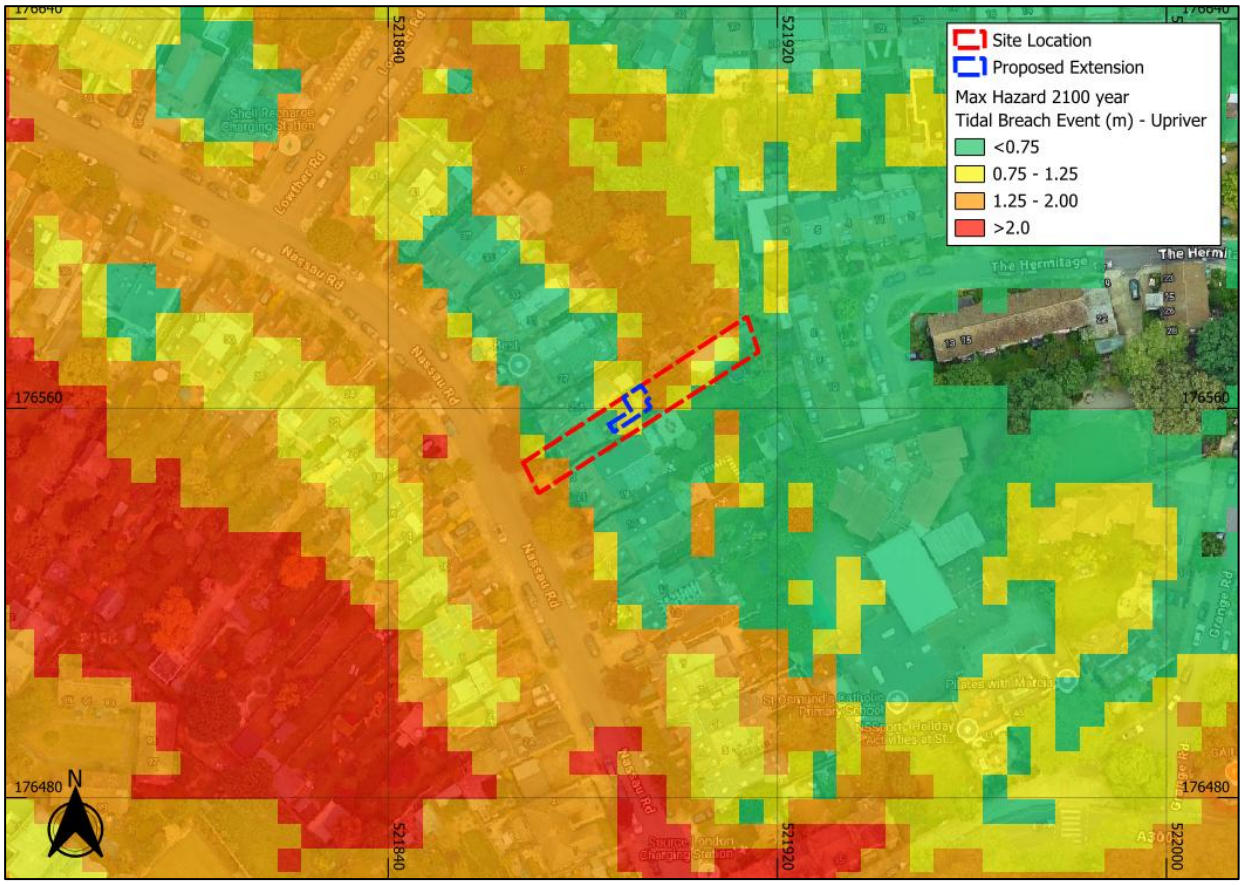


Figure 5: Upstream Thames Tidal Breach Model (2017) Hazard Rating (Source: Base map and data from Google Satellite Imagery. Contains public sector information licensed under the Open Government Licence v3.0)

Historical Fluvial Flooding

4.14. Based on the EA Recorded and Historical Flood Outlines, there is no record of historical tidal and fluvial flooding on or in the vicinity of the site (Figure 6).

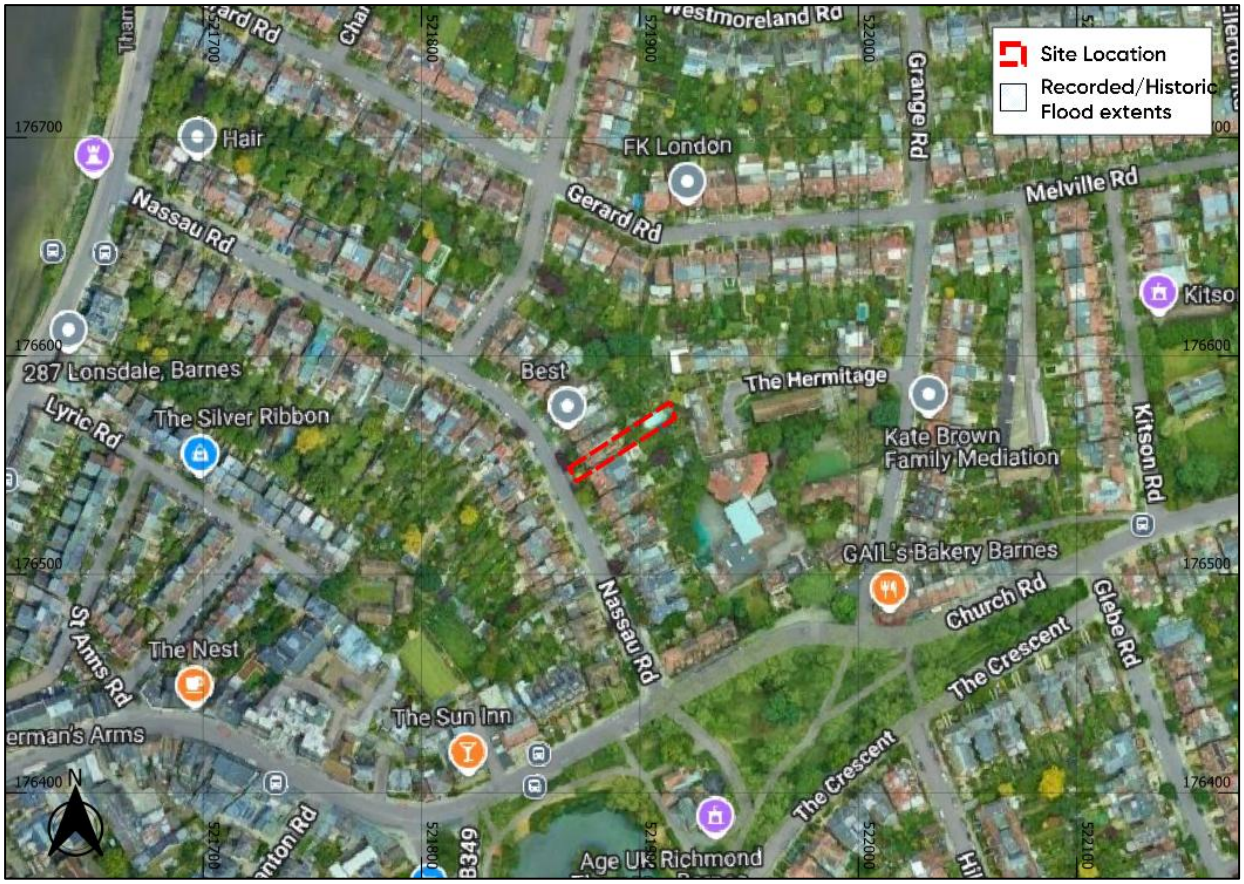


Figure 6: EA Historic Flood Mapping (Base map and data from Google Satellite Imagery. Contains public sector information licensed under the Open Government Licence v3.0)

Fluvial

4.15. The site is at risk of flooding from tidal sources rather than fluvial sources and there are no other mapped watercourses in the vicinity of the site.

4.16. As such, the risk of flooding from fluvial sources is considered to be low.

Canals

4.17. 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.

4.18. Flooding can occur where a canal is impounded above surrounding ground levels, and the retaining structure fails.

4.19. According to CRT mapping[14] there are no canals identified within 1km of the site.

4.20. The risk of flooding from canals is therefore considered to be low.

Pluvial

4.21. 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.

4.22. Annual surface water flood risk is labelled by the EA as:

- 'High Risk'; >3.3% AEP (annual probability greater than 1 in 30).
- 'Medium Risk'; 1.1% to 3.3% AEP (annual probability between 1 in 100 and 1 in 30).
- 'Low Risk'; 0.1% to 1% AEP (annual probability between 1 in 1000 and 1 in 100).
- 'Very Low Risk'; <0.1% AEP (annual probability less than 1 in 1000).

4.23. Examination of the EA's Flood Risk from Surface Water mapping for 'High Risk', 'Medium Risk', and 'Low Risk' AEP flood extents shows the site is located outside the risk category extents, therefore is deemed to be of 'Very Low' risk of surface water flooding (Figure 7).

[14] **https://canalrivertrust.org.uk/canals-and-rivers**

Figure 7: EA Surface Water Flood Risk Mapping (Base map and data from Google Satellite Imagery. Contains public sector information licensed under the Open Government Licence v3.0)

4.24. Given the site is not located within an area of 'high', 'medium' or 'low' surface water flood risk, no flood depths have been recorded on site during the modelled 1 in 30 year (3.3% AEP) scenario, 1 in 100 (1% AEP) scenario or 1 in 1000 year (0.1% AEP) scenario.

4.25. Therefore, the site is considered to be at a low risk of surface water flooding.

Reservoirs

4.26. Large waterbodies or reservoirs that have walls built above the surrounding ground level pose a risk of flooding. Walls could fail due to old age, accident, or because excess flood water has been added to the reservoir. Although a breach is unlikely the consequences would be significant, leading to rapid inundation of the downstream floodplain.

4.27. According to the EA's Flood Risk from Reservoirs mapping the site is at risk of flooding in in the event of a breach at the Brent (aka Welsh Harp), King George VI, Pen Pond Lower and Upper Lakes (Richmond), Queen Elizabeth II, Queen Mary, Queen Mother, Staines North and South and

Walton – Bessborough reservoirs. The reservoir failure model is a 'dry day' and 'wet day' scenarios (Figure 8).

4.28. The 'dry day' scenario predicts if flooding were to occur if the dam or reservoir failed when rivers are at normal levels. 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.

4.29. The 'wet day' scenario predicts how much worse the flooding might be if a river is already experiencing an extreme natural flood.

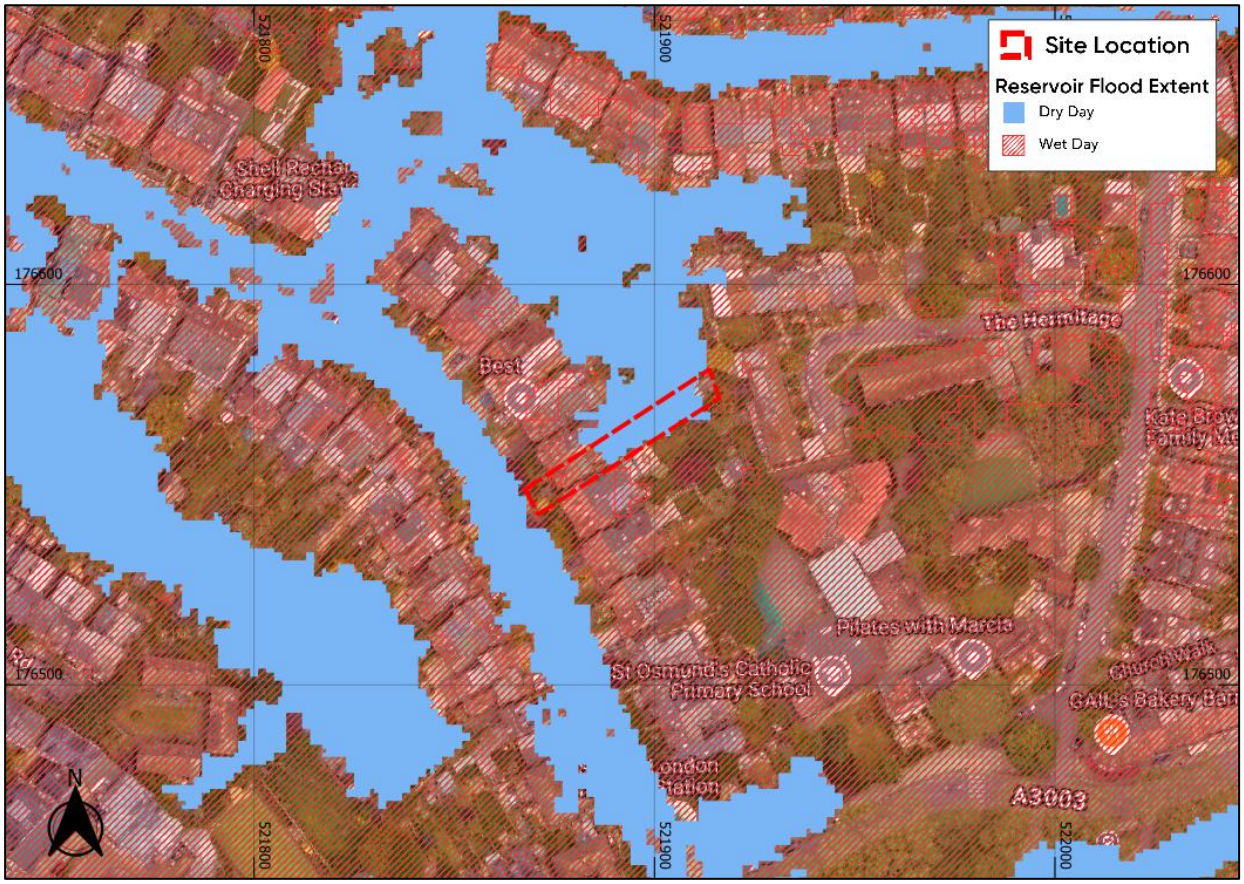


Figure 8: EA Reservoir Flood Risk Mapping (Base map and data from Google Satellite Imagery. Contains public sector information licensed under the Open Government Licence v3.0)

4.30. 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 regularly inspected 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.

4.31. 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.

Groundwater

4.32. Groundwater flooding occurs in areas where underlying geology is permeable and water can rise within the strata sufficiently to breach the surface.

4.33. The British Geological Survey's (BGS) mapping shows superficial deposits of Kempton Park Gravel Member comprised of Sand and Gravel underlying the site. The bedrock underlying the site is mapped as London Clay comprised of clay and silt.

4.34. Historical BGS borehole dataset shows there are no boreholes within 300m of the site.

4.35. The SFRA presents the EA's Areas Susceptible to Groundwater Flooding mapping (Figure 9). The site is within a 1km cell of which is identified as being between 50% and 74.9% susceptible to groundwater flooding.

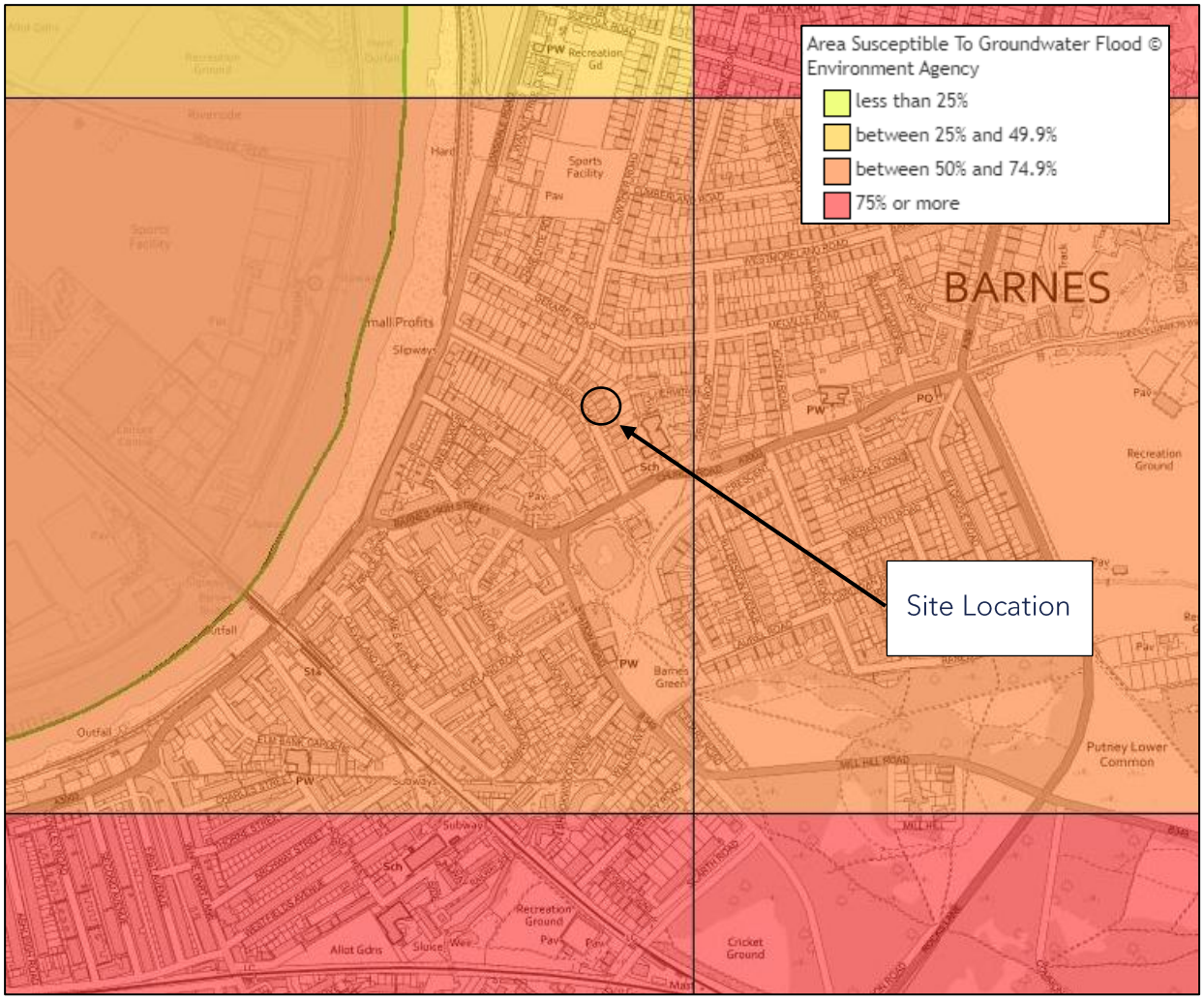


Figure 9: Area Susceptible to Groundwater Flood © Environment Agency (Richmond SFRA 2021).

4.36. Based on EA's Areas Susceptible to Groundwater Flooding mapping the site is considered to be at a moderate risk of groundwater flooding. During construction if groundwater investigation is completed the risk rating to the site can be reviewed.

Sewers

4.37. 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.

4.38. The SFRA provides mapping of historical sewer flood incident records kept by the local authority (Figure 10). The site is located within an area with 21-25 incidents recorded incidents.

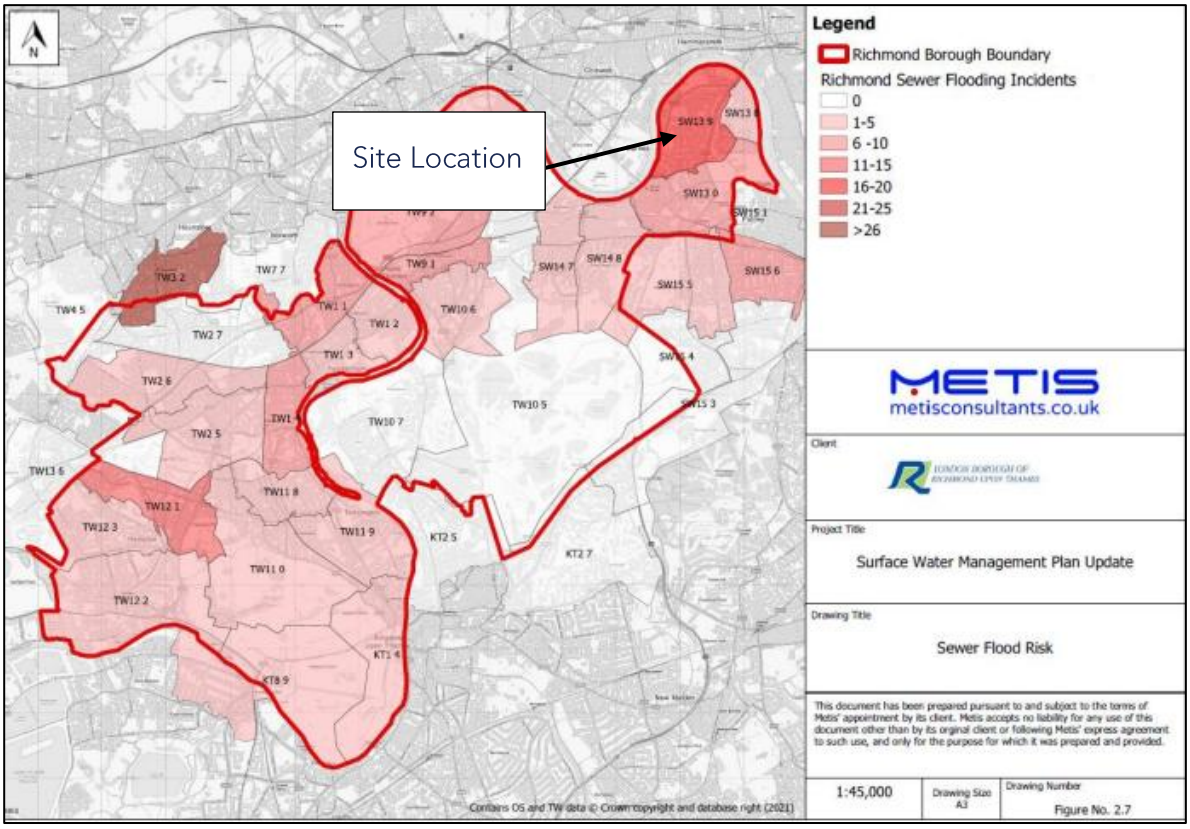


Figure 10: Historic Sewer Flooding Incidents (Richmond Council, 2021).

4.39. Based on EA LiDAR levels of Nassau Road, the site is located c.500mm higher than the highway drains within the adjacent road. Furthermore, ground levels are shown to fall to the south away from the property.

4.40. Therefore, in the event of a sewer flood the property would not be located along the flow pathway.

4.41. There is no evidence to suggest existing dwelling has been flooded from this source or the proximity of the flood locations to the site, therefore the proposal is considered to be at low risk of flooding from sewers.

5. Flood Risk Mitigation

Tidal/Groundwater

5.1. The tidal flood risk (defended) to the proposed development is considered low. The Thames tidal defences are designed to protect the site up to the 0.1% AEP event until at least 2100, as long as the defences remain intact and operational. In the event of a breach, flood depths up to 470mm could be experienced in the area proposed.

5.2. Groundwater risk is considered to be moderate, therefore the below mitigation has been recommended to reduce the risk to the proposed extension.

5.3. Resilience/resistance measures have been recommended as part of '*Improving the Flood Performance of New Building' Flood Resistant Construction* (2007)[15]. Measures include but are not limited to;

- The use of durable fittings that are not significantly affected by water and can be easily cleaned (e.g. use of plastic materials or stainless steel for worktop units).
- Water, electricity and gas service entries including sockets should be sealed (e.g. with expanding foam or similar closed cell material) and were possible lifted 470mm above ground level (i.e. above the flood event).
- Special care should be taken to ensure adequate sealing of any PVC window/door sills to the fabric of the dwelling.
- Ensure adequate sealing of joints between internal fitting and surfaces to prevent any penetration of water behind fittings.
- Damp Poof Membrane (d.p.m) should be included to minimise the passage of water through ground floors.

5.4. Along with the resilience/resistance measures, site uses should sign up to flood warning notifications to reduce risk posed to occupants, detailed below.

[15] **https://assets.publishing.service.gov.uk/media/602d673ee90e0709e8d085d8/Improving_the_Flood_Resilience_of_Buildings_Through_Improved_Materials__Methods_and_Details_Technical_Report.pdf**

Other sources

5.5. Flood risks from fluvial, tidal, reservoirs, sewers, and canals are considered to be low, therefore additional mitigation is not a requirement.

Increase to Flood Risk Elsewhere

5.6. The client is submitting a planning application for the construction of extensions to provide greater habitable space to the existing dwelling, in addition to external alterations to the garden and driveway. As such, the proposal constitutes a Minor Development under the NPPF.

5.7. Paragraph 051 of the Flood Risk and Coastal Change Planning Practice Guidance (PPG) states:

> *Minor developments are unlikely to raise significant flood issues unless:*
>
> - *they would have an adverse effect on a watercourse, floodplain or its flood defences;*
> - *they would impede access to flood defence and management facilities, or;*
> - *where the cumulative impact of such developments would have a significant effect on local flood storage capacity or flood flows.*

5.8. As such, the proposed development in isolation should have a negligible impact on flood risk elsewhere.

Flood Warnings

5.9. The site is located in 'Tidal Thames from Putney Bridge to Mortlake High Street East' warning and 'Tidal Thames in the boroughs of Wandsworth and Richmond-upon-Thames' flood alert area. This service allows site occupants to register an address along with contact details so that, in the event of a flood being forecast, they are sent an alert. As a further precaution and risk reduction, the owner of the site should sign up and on receipt of flood warning the site should be evacuated.

5.10. The owners of the property should monitor Met Office Weather Warnings to be prepared for extreme weather events. The Met Office issues weather warnings up to 5 days in advance, through the National Severe Weather Warning Service, when severe weather has the potential to bring impacts to the UK. It is also possible to stay up to date with weather warnings through the Met Office app (available on both android and apple), social media (X/twitter, Facebook) or email alerts. During periods of bad weather, site users should monitor local weather reports.

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 23 Nassau Road, London, London Borough of Richmond upon Thames, SW13 9QF. It has been written to support a planning application and prepared with due consideration to the nature of the proposed development to provide the appropriate level of detail.

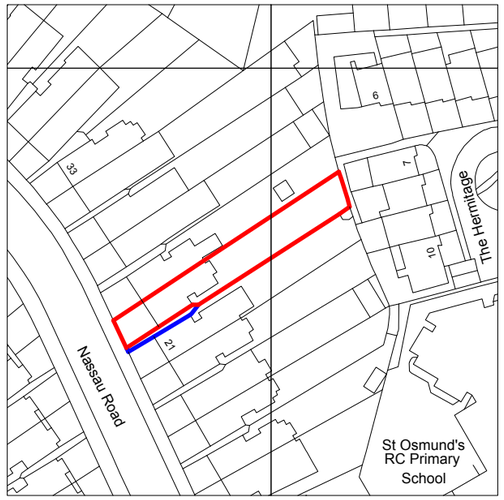
6.2. An assessment of the risk of flooding from all sources has been undertaken and is summarised in the table below:

Source of Flooding	Flood Risk Summary
Tidal	The actual tidal flood risk (defended) to the proposed site is considered low. The Thames tidal defences are designed to protect the site up to the 0.1% AEP event until 2100, as long as the defences remain intact and operational. The breach flood level at the location of the proposed extension is estimated to be 5.37m AOD, resulting in flood depths up to 470mm. The proposed development is for an extension to an existing property, based on EA modelling, the site is only going to be impacted in a worst-case scenario. Therefore, the site is considered to be at a low risk of tidal flooding.
Groundwater	Based on EA's Areas Susceptible to Groundwater Flooding mapping the site is considered to be at a moderate risk of groundwater flooding. During construction if groundwater investigation is completed the risk rating to the site can be reviewed.
Pluvial Fluvial Reservoirs Sewers Canals	The site is considered to be at low risk from other flood sources.

6.3. The FRA supports the planning application and demonstrates that there is an acceptable level of flood risk to the site if the mitigation strategies recommended are implemented in the scheme. The development does not increase flood risk off site or to the wider area.

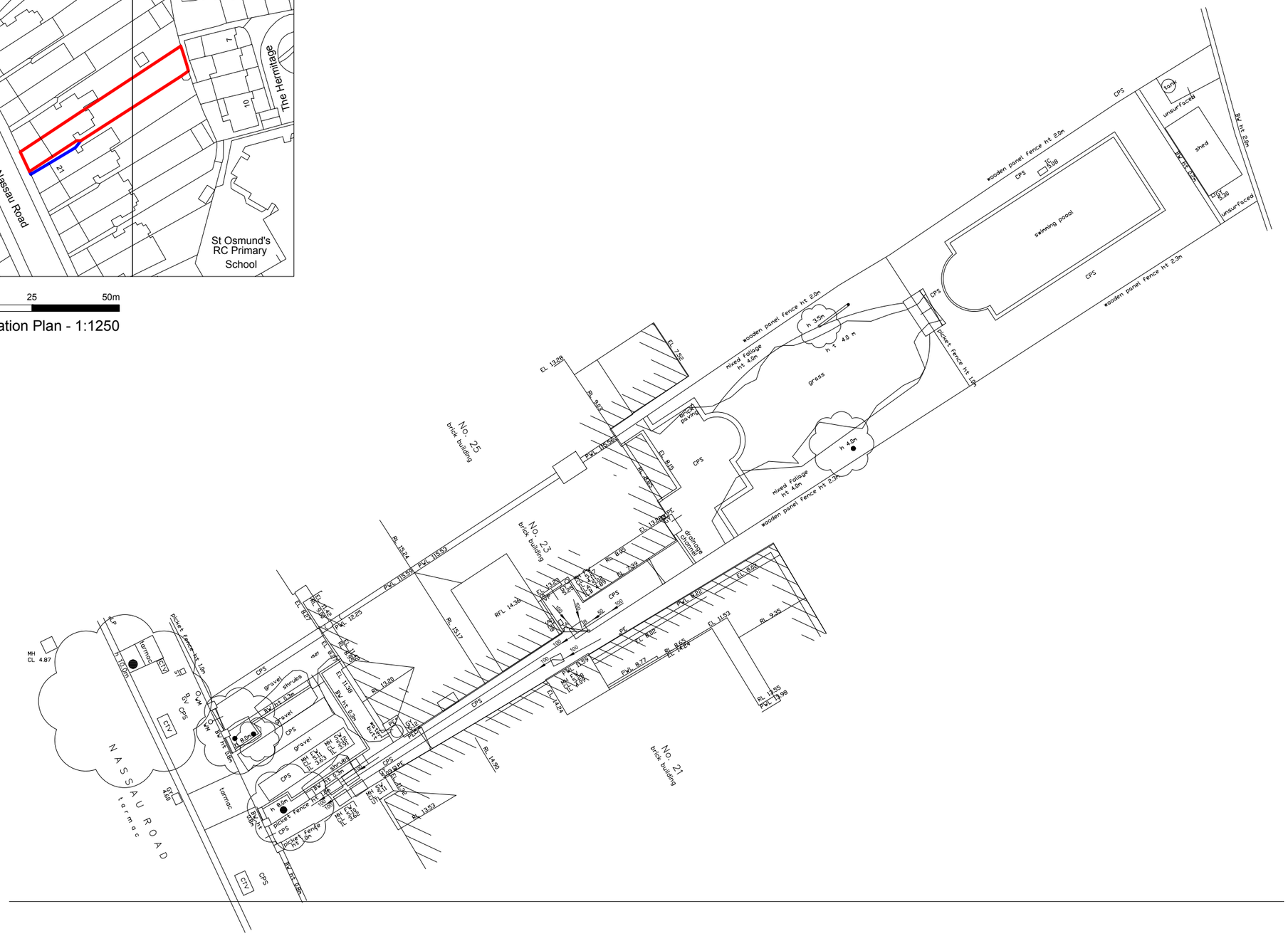
6.4. This Flood Risk Assessment should be submitted as part of the planning application to satisfy the requirements under NPPF.

Appendix A - Development Proposals



0 12.5 25 50m

Site Location Plan - 1:1250



0 2 4 8m

Existing Site Plan - 1:200

Key

Notes

Revisions

A 19.12.24 Planning Application Issue

N

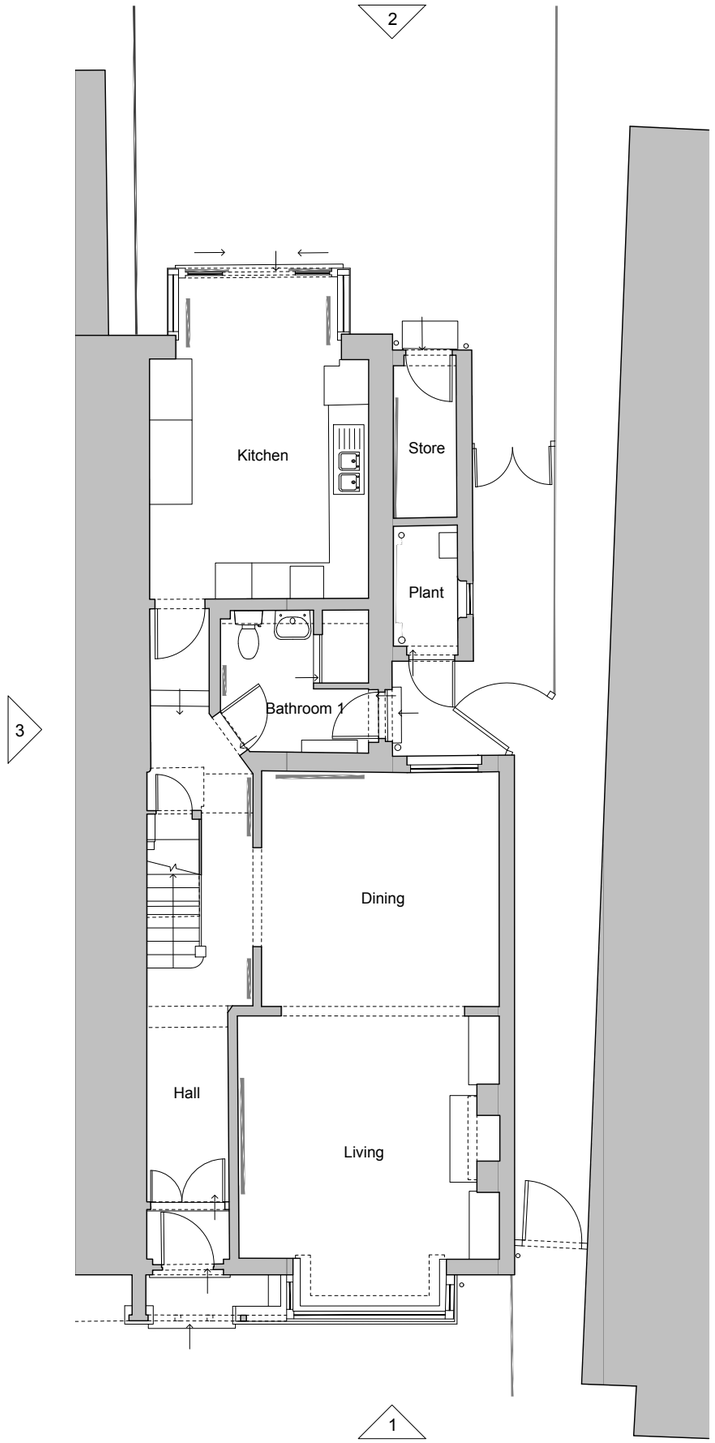
23 Nassau Road

Existing Site Plans

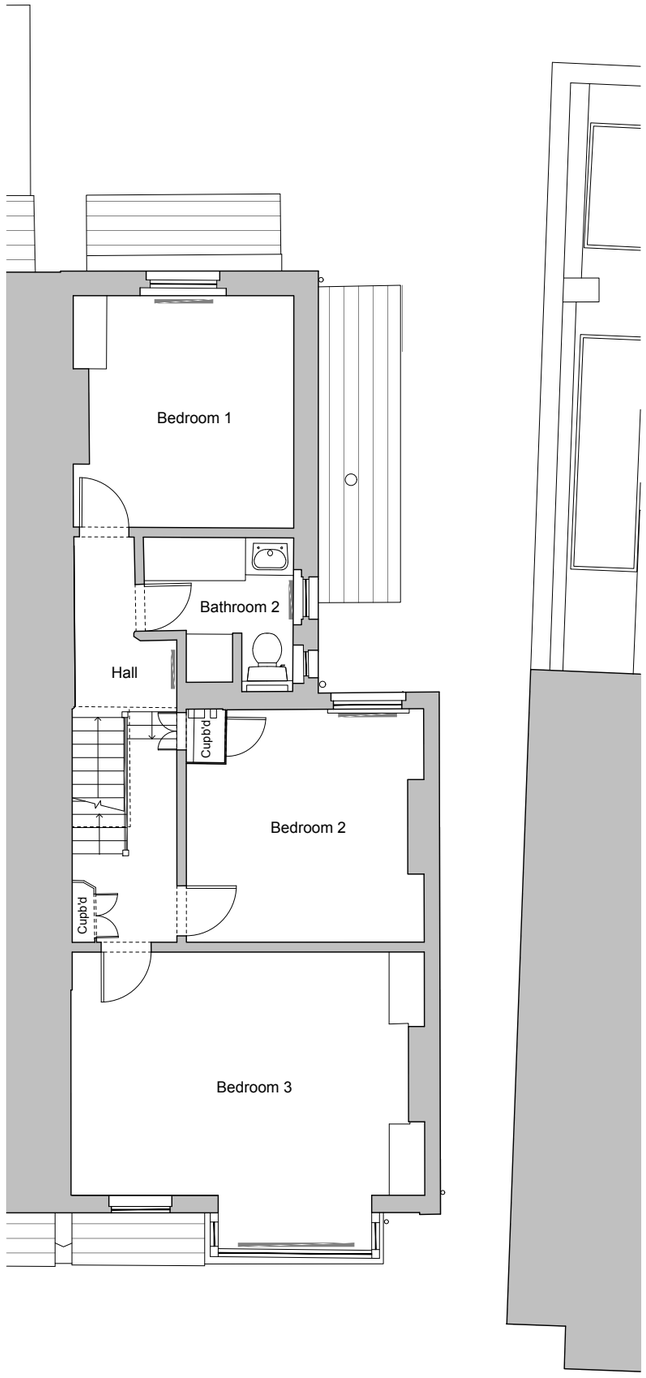
Scale: 1:VAR @ A3

23NR-PLN-00 Rev: **A**

The Vawdrey House



Existing Ground Floor Plan



Existing First Floor Plan

Key

Notes

Revisions

A 19.12.24 Planning Application Issue

N

0 1 2 4m

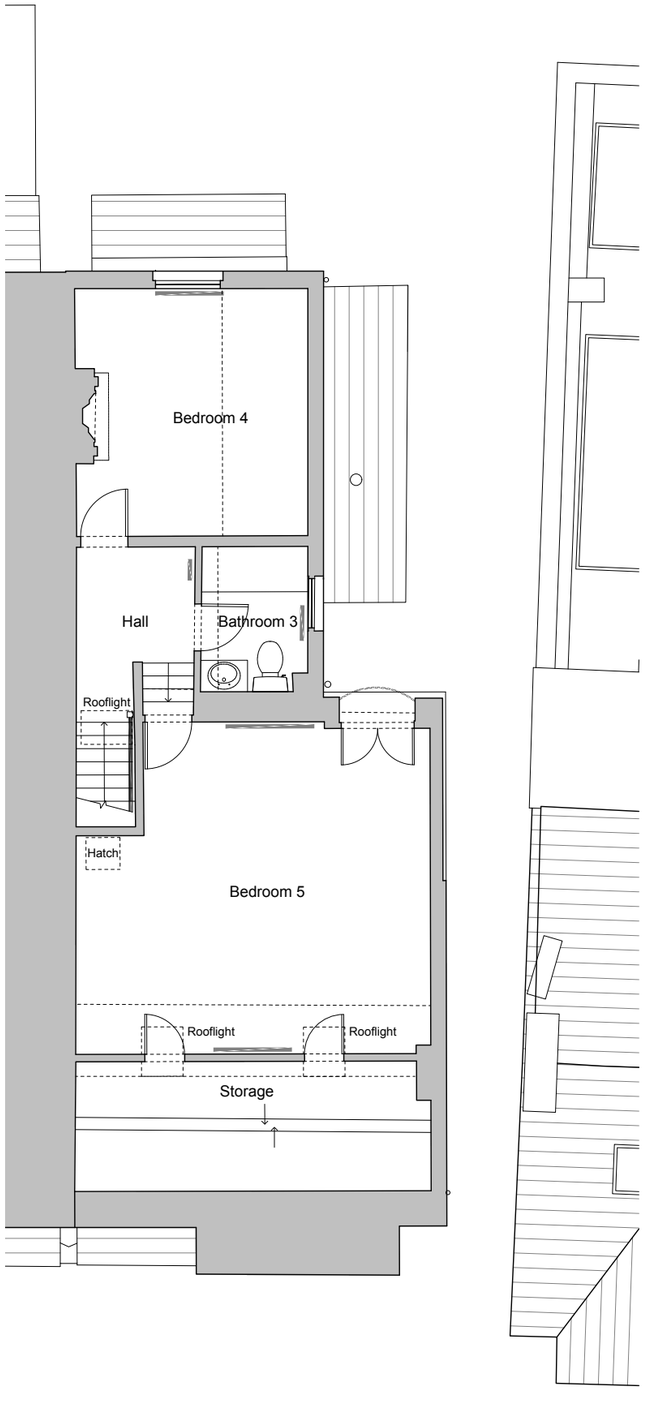
23 Nassau Road

Existing Ground and First Floor Plans

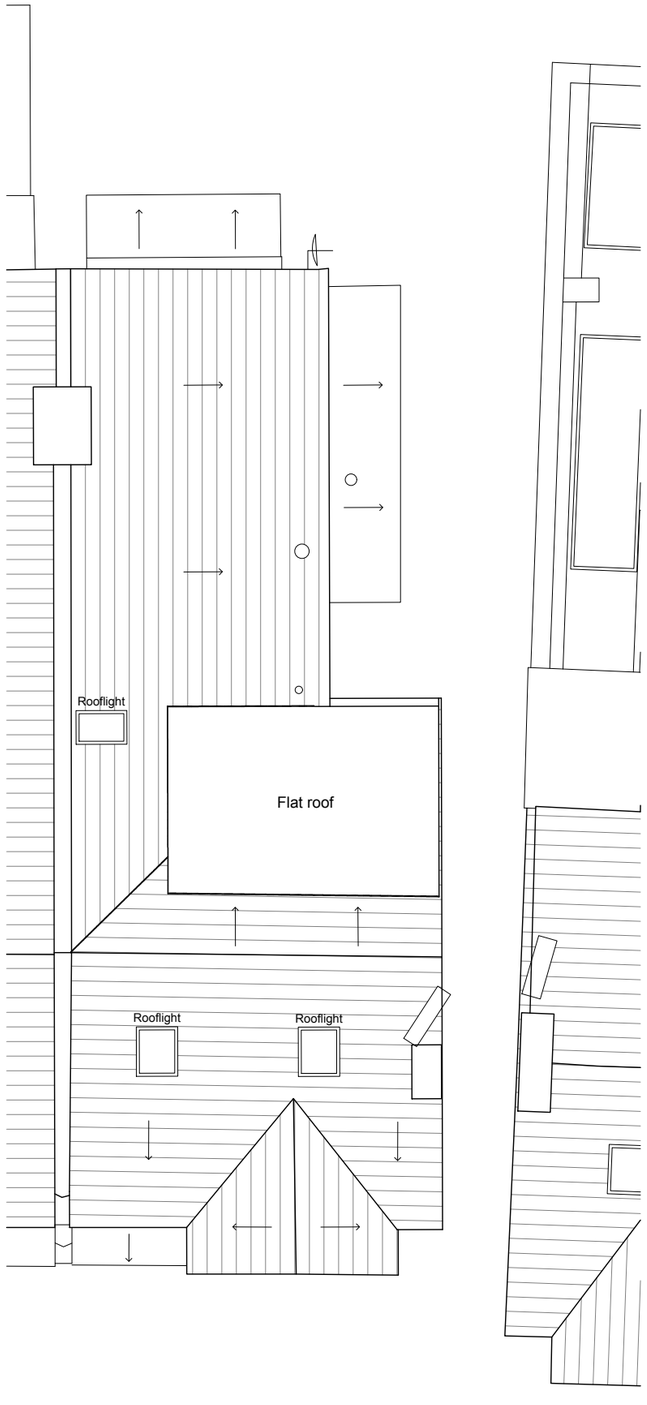
Scale: 1:100 @ A3

23NR-PLN-01 Rev: **A**

The Vawdrey House



Existing Second Floor Plan



Existing Roof Plan

Key

Notes

Revisions

A 19.12.24 Planning Application Issue

N

0 1 2 4m

23 Nassau Road

Existing Second Floor and Roof Plans

Scale: 1:100 @ A3

23NR-PLN-02 Rev: **A**

The Vawdrey House

Existing Front Elevation (1)

Existing Rear Elevation (2)

Key

Notes

Revisions

A 19.12.24 Planning Application Issue

0 1 2 4m

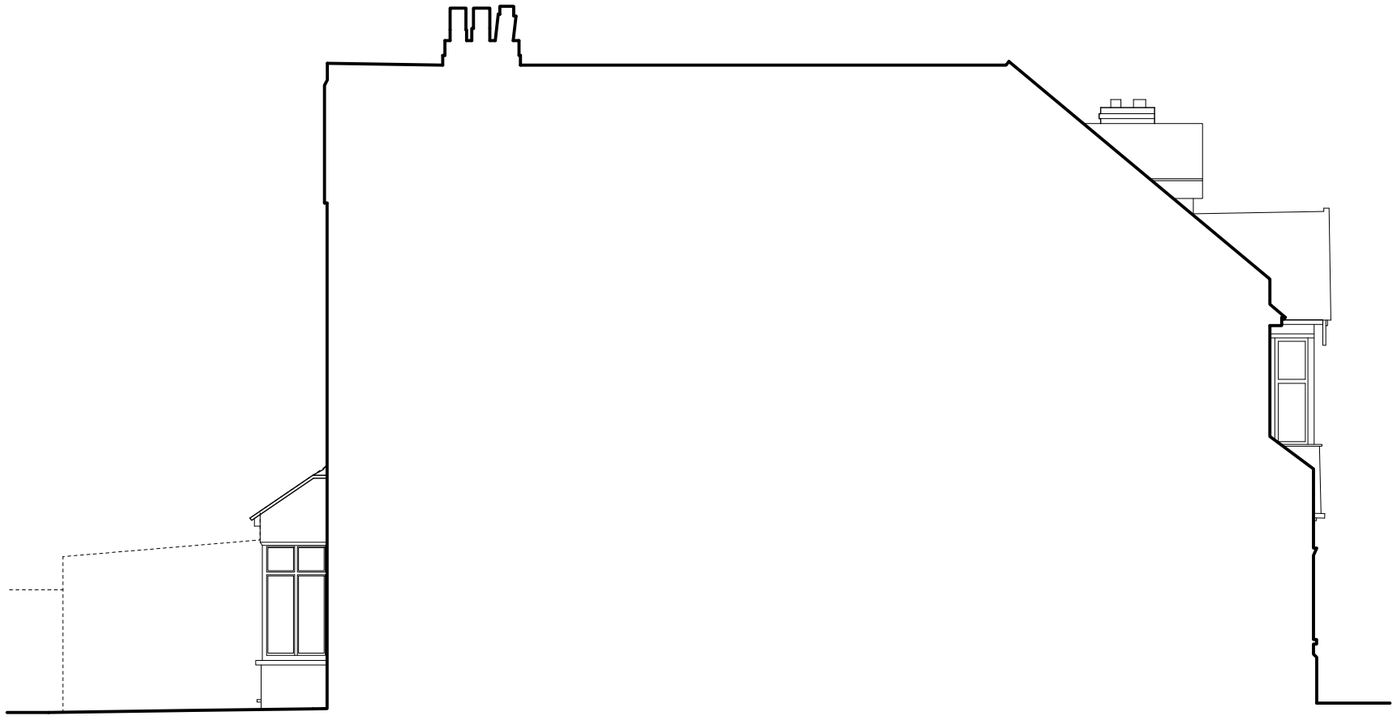
23 Nassau Road

Existing Front and Rear Elevations

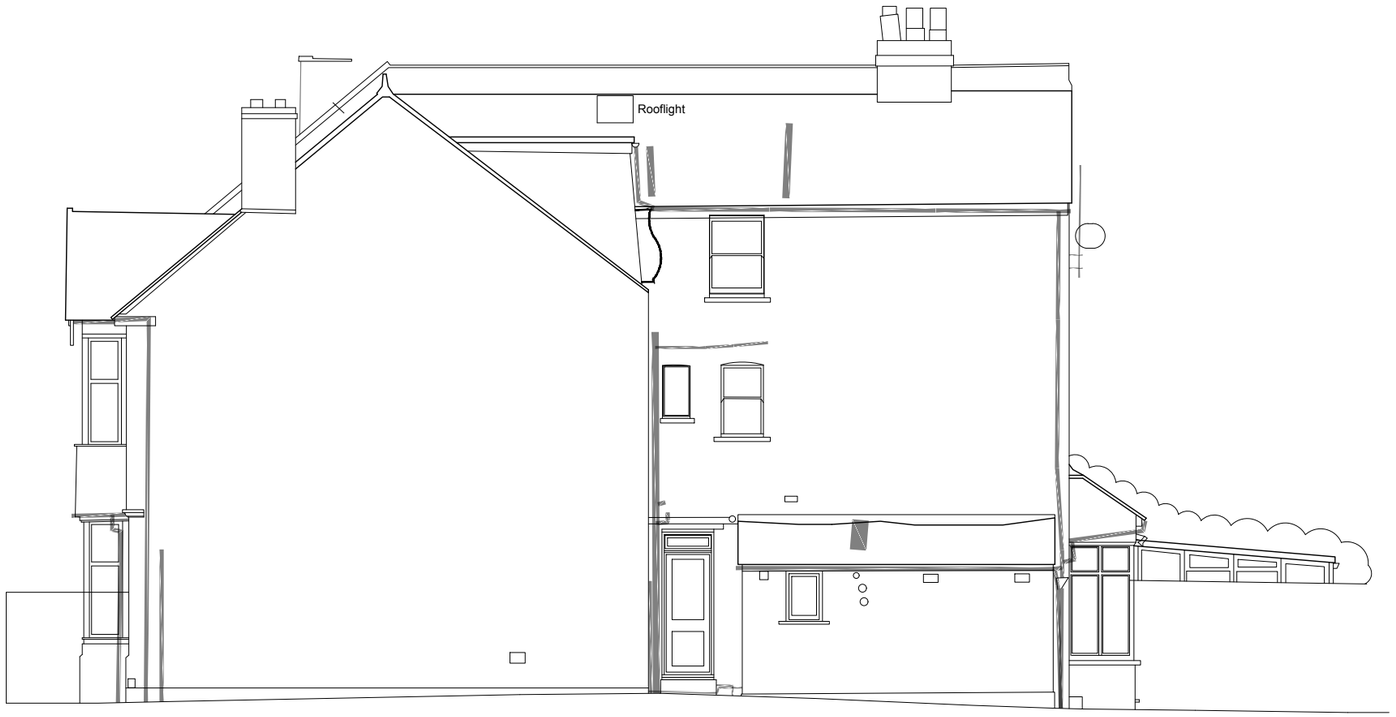
Scale: 1:100 @ A3

23NR-PLN-03 Rev: **A**

The Vawdrey House



Existing Side Elevation (3)



Existing Side Elevation (4)

Key

Notes

Revisions

A 19.12.24 Planning Application Issue

0 1 2 4m

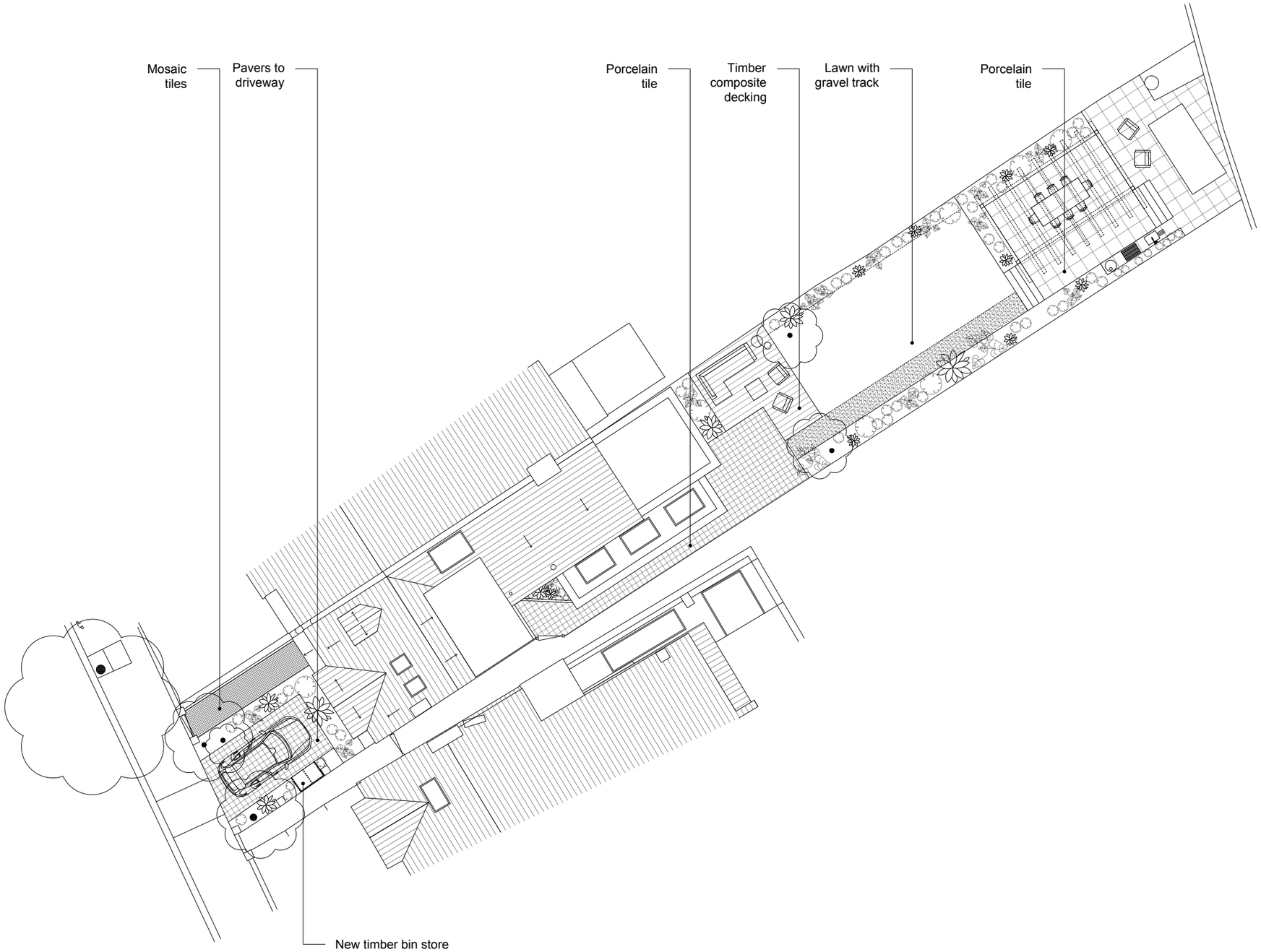
23 Nassau Road

Existing Side Elevations

Scale: 1:100 @ A3

23NR-PLN-04 Rev: **A**

The Vawdrey House



Key

Notes

Revisions

A 19.12.24 Planning Application Issue

N

0 2 4 8m

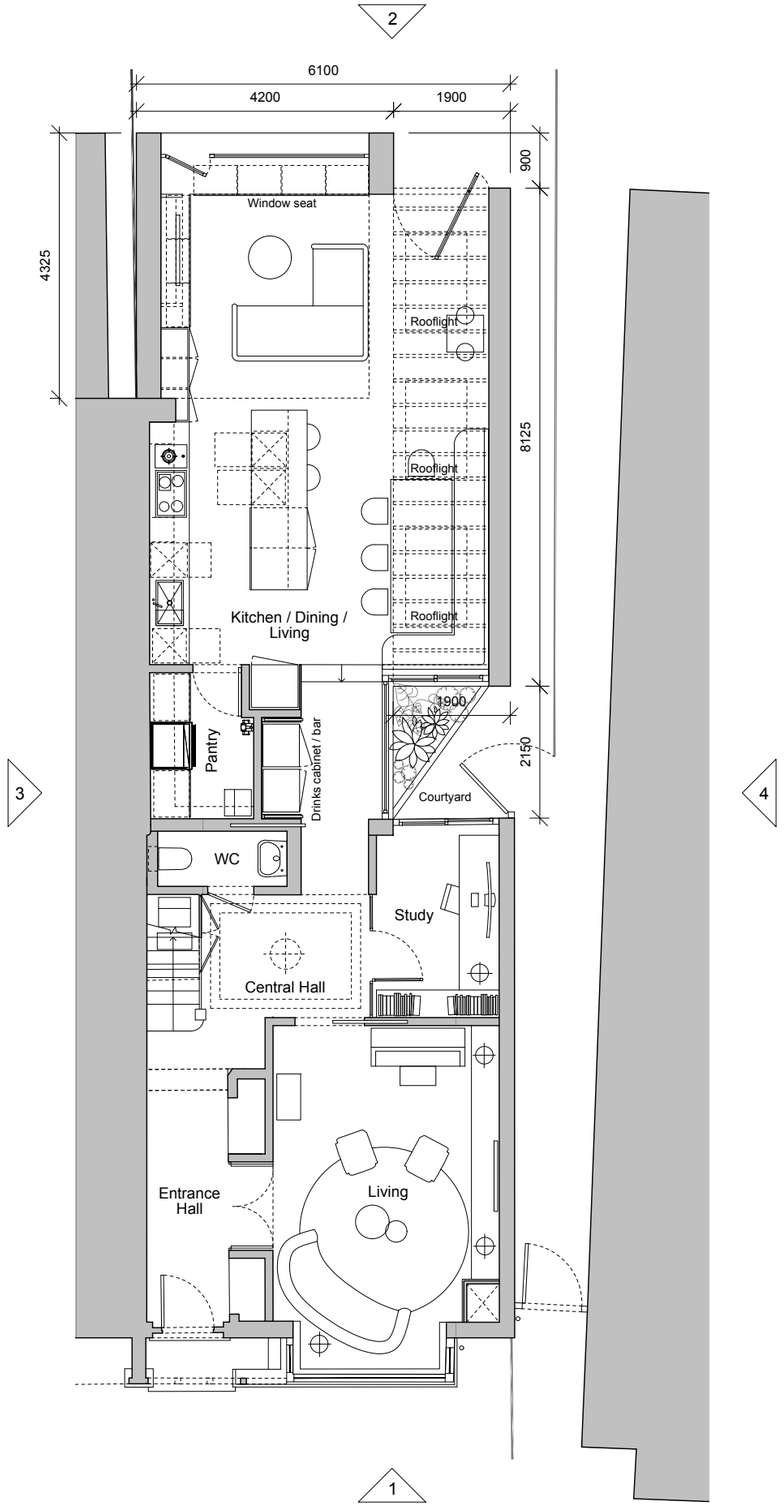
23 Nassau Road

Proposed Site Plans

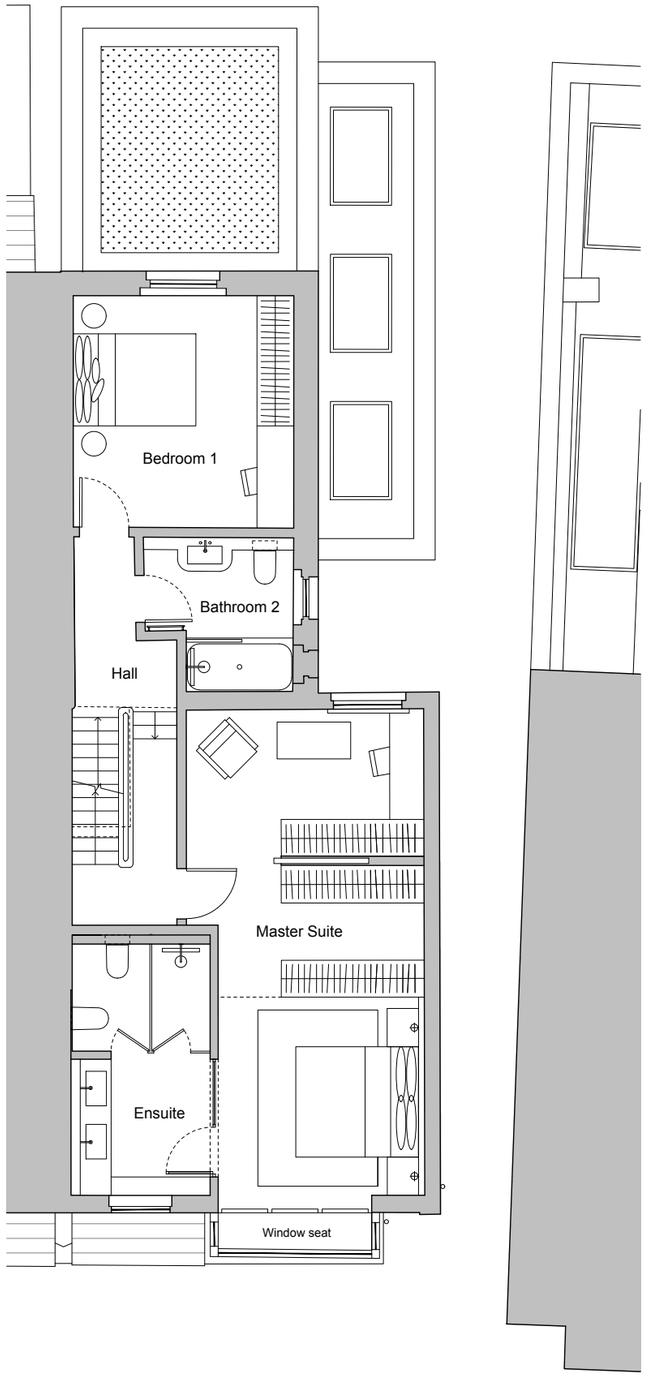
Scale: 1:VAR @ A3

23NR-PLN-10 Rev: **A**

The Vawdrey House



Proposed Ground Floor Plan



Proposed First Floor Plan

Key

Notes

Revisions

A 19.12.24 Planning Application Issue

N

0 1 2 4m

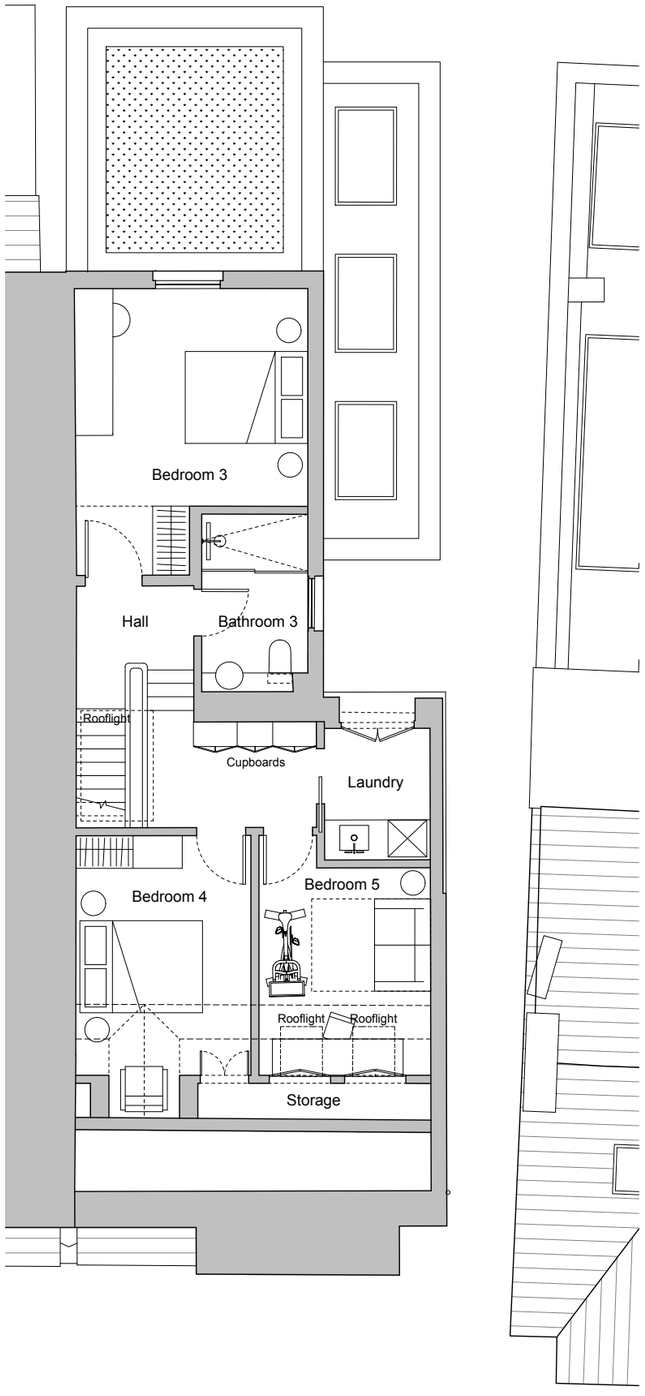
23 Nassau Road

Proposed Ground and First Floor Plans

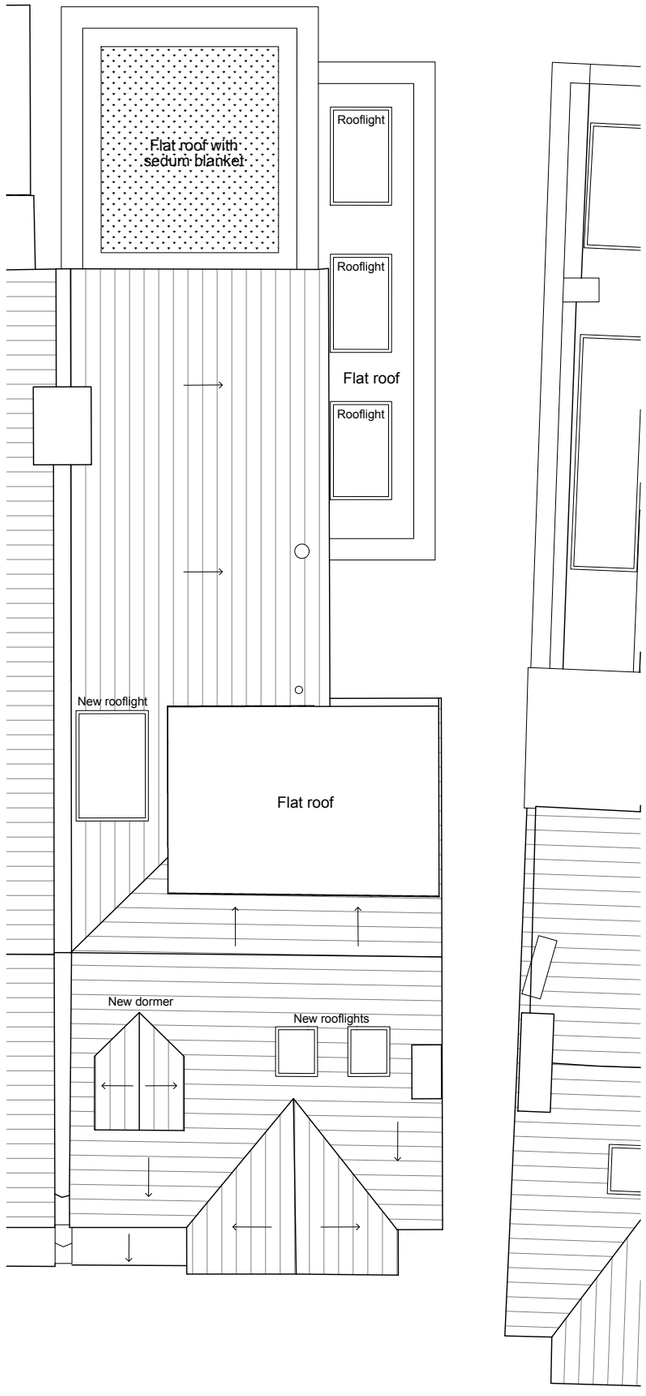
Scale: 1:100 @ A3

23NR-PLN-11 Rev: **A**

The Vawdrey House



Proposed Second Floor Plan



Proposed Roof Plan

Key

Notes

Revisions

A 19.12.24 Planning Application Issue

N

0 1 2 4m

23 Nassau Road

Proposed Second Floor and Roof Plans

Scale: 1:100 @ A3

23NR-PLN-12 Rev: **A**

The Vawdrey House

Proposed Front Elevation (1)

Proposed Rear Elevation (2)

Key

Notes

Revisions

A 19.12.24 Planning Application Issue

0 1 2 4m

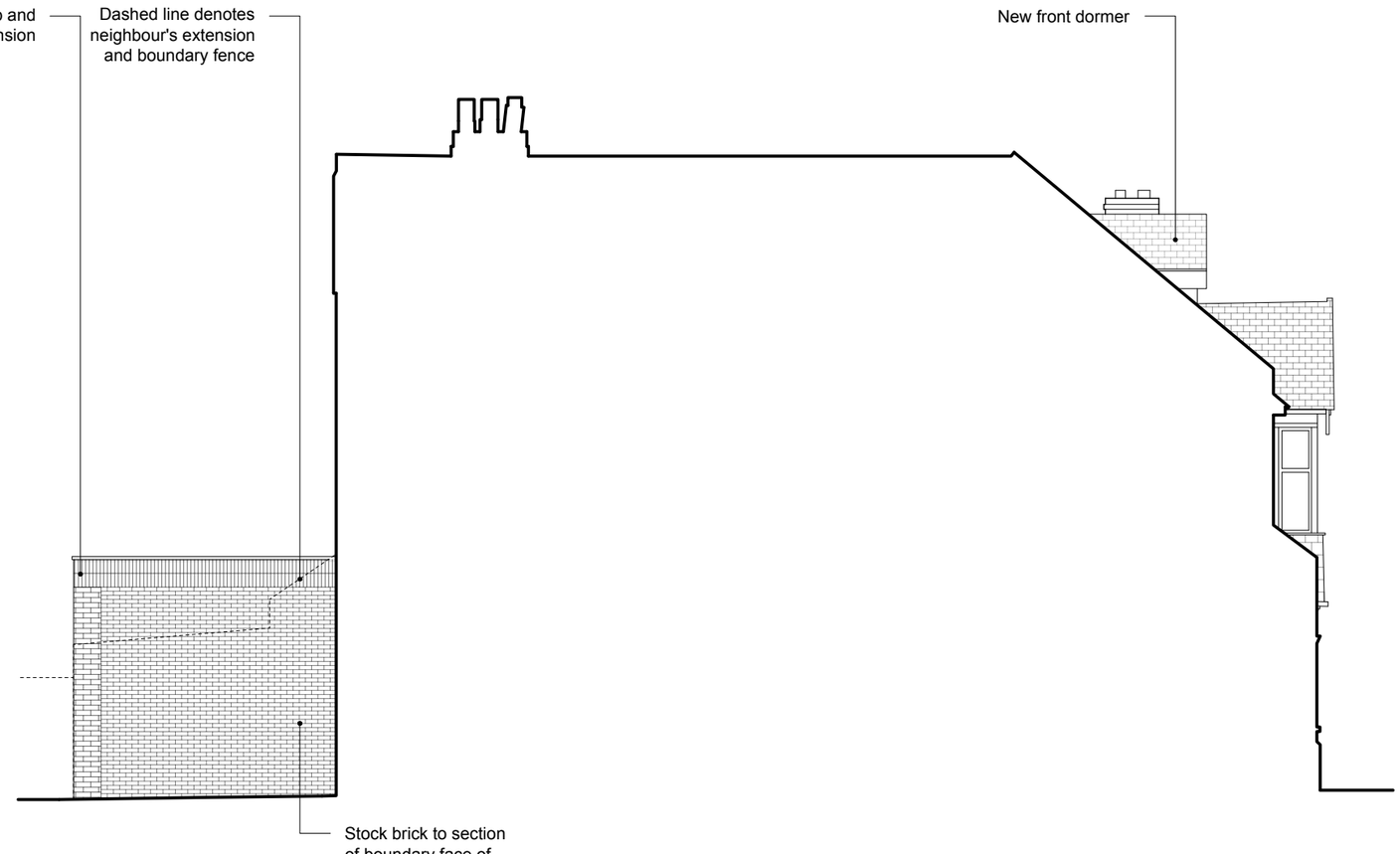
23 Nassau Road

Proposed Front and Rear Elevations

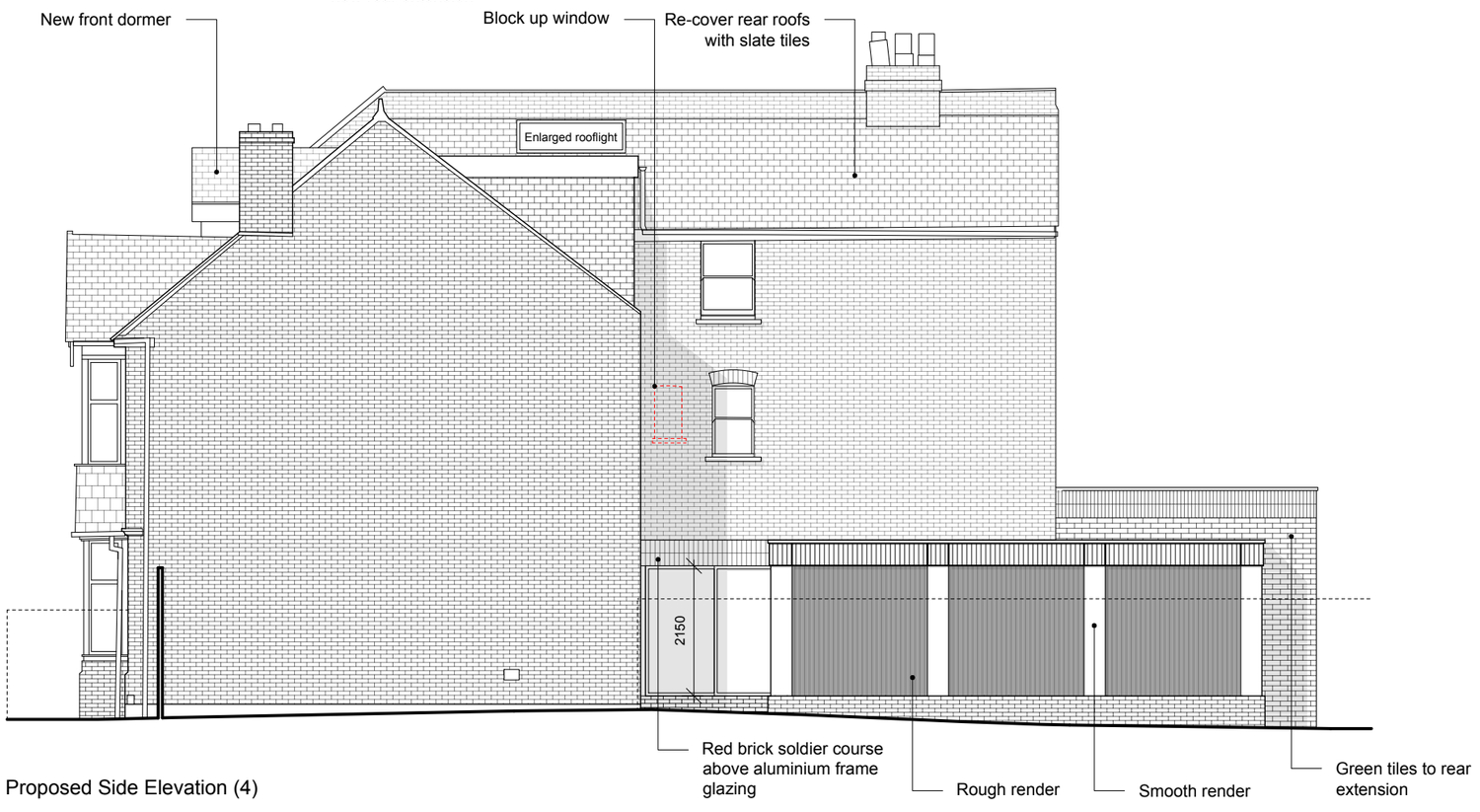
Scale: 1:100 @ A3

23NR-PLN-13 Rev: **A**

The Vawdrey House



Proposed Side Elevation (3)



Proposed Side Elevation (4)

Key

Notes

Revisions

A 19.12.24 Planning Application Issue

0 1 2 4m

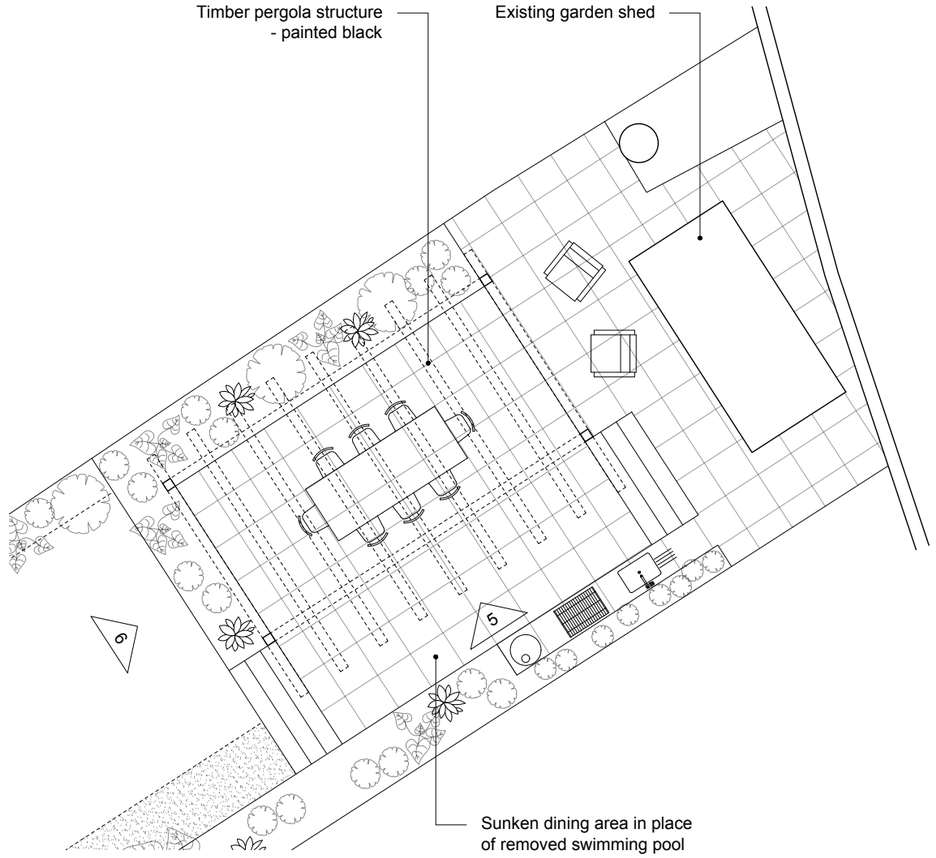
23 Nassau Road

Proposed Side Elevations

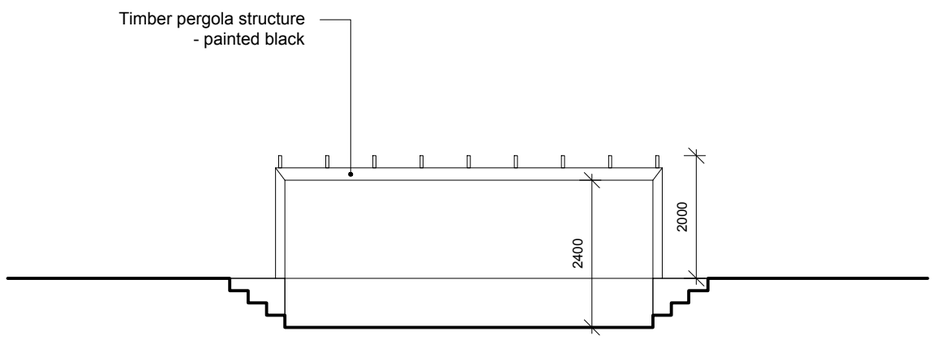
Scale: 1:100 @ A3

23NR-PLN-14 Rev: **A**

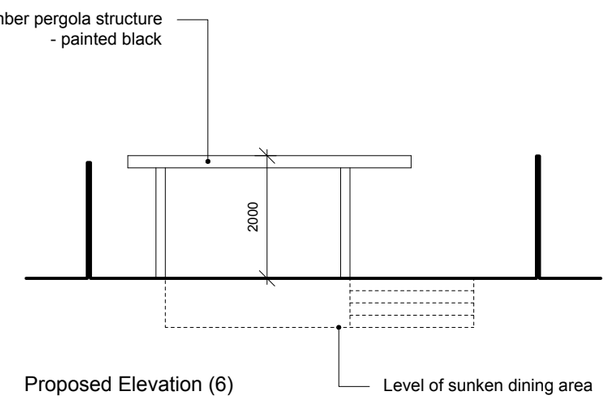
The Vawdrey House



Pergola Plan



Proposed Elevation (5)



Proposed Elevation (6)

Key

Notes

Revisions

A 19.12.24 Planning Application Issue

0 1 2 4m

23 Nassau Road

Proposed Pergola

Scale: 1:100 @ A3

23NR-PLN-15 Rev: **A**

The Vawdrey House