

Flood Risk Assessment
AEG8185_HA4_Hillingdon_01

Site Address: 72 Park Avenue
Ruislip
London
HA4 7UJ

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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: Xi Yang

Reference: AEG8185_HA4_Hillingdon_01

Site Location: 72 Park Avenue, Ruislip, London, HA4 7UJ

Issue	Date	Author	Check	Auth.	Comments
1	06/08/2025	Oliver Harvey	JC	NDD	First issue

Please Note:

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Summary

Development Description	Existing	Proposed
Development Type	Residential dwelling	Construction of a small rear extension to provide greater habitable space
EA Vulnerability Classification	More Vulnerable	No change
Ground Floor Level	External levels: Between 41.11m AOD and 40.10m AOD. Existing FFL: 41.45m AOD	Finished floor levels of the proposed extension to be set no lower than existing.
Level of Sleeping Accommodation	First Floor	First Floor
Surface Water Drainage	Existing building is positively drained via downpipes.	Recommended to incorporate green roof on the proposed extension flat roof and a small capacity 'leaky' water butt.
Site Size	525m^2	No change
Development Size	<250m^2	Minor Development in terms of flood risk
Risk to Development	**Summary**	**Comment**
EA Flood Zone	Flood Zone 3	
Flood Source	Fluvial/Pluvial	Park End Ditch
SFRA Available	West London Strategic Flood Risk Assessment (West London Boroughs, 2018)	
Management Measures	**Summary**	**Comment**
Ground floor level above extreme flood levels	Yes	Existing FFL: 41.45m AOD, approximately 0.17m above 1in100+25%CC food level

Safe Access/Egress Route	N/A	Access/egress to remain as existing as proposal is a minor development – extension to existing dwelling.
Flood Resilient Design	Yes	Flood mitigation measures recommended.
Site Drainage Plan	Yes	Recommended to incorporate green roof on the proposed extension flat roof and a small capacity 'leaky' water butt.
Flood Warning and Evacuation Plan	Yes	Recommended to sign up to the River Pinn at Ruislip Environment Agency flood warning service.
Offsite Impacts	**Summary**	**Comment**
Displacement of floodwater	No	Flood compensation provided by lowering parts of the rear garden.
Increase in surface run-off generation	None	Recommended to incorporate green roof on the proposed extension flat roof and a small capacity 'leaky' water butt.
Impact on hydraulic performance of channels	No	No nearby watercourses

[1] not required for this assessment

[2] data not available.

1. Introduction

1.1. Aegaea were commissioned by Xi Yang 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 72 Park Avenue, Ruislip, London, HA4 7UJ (Figure 1).

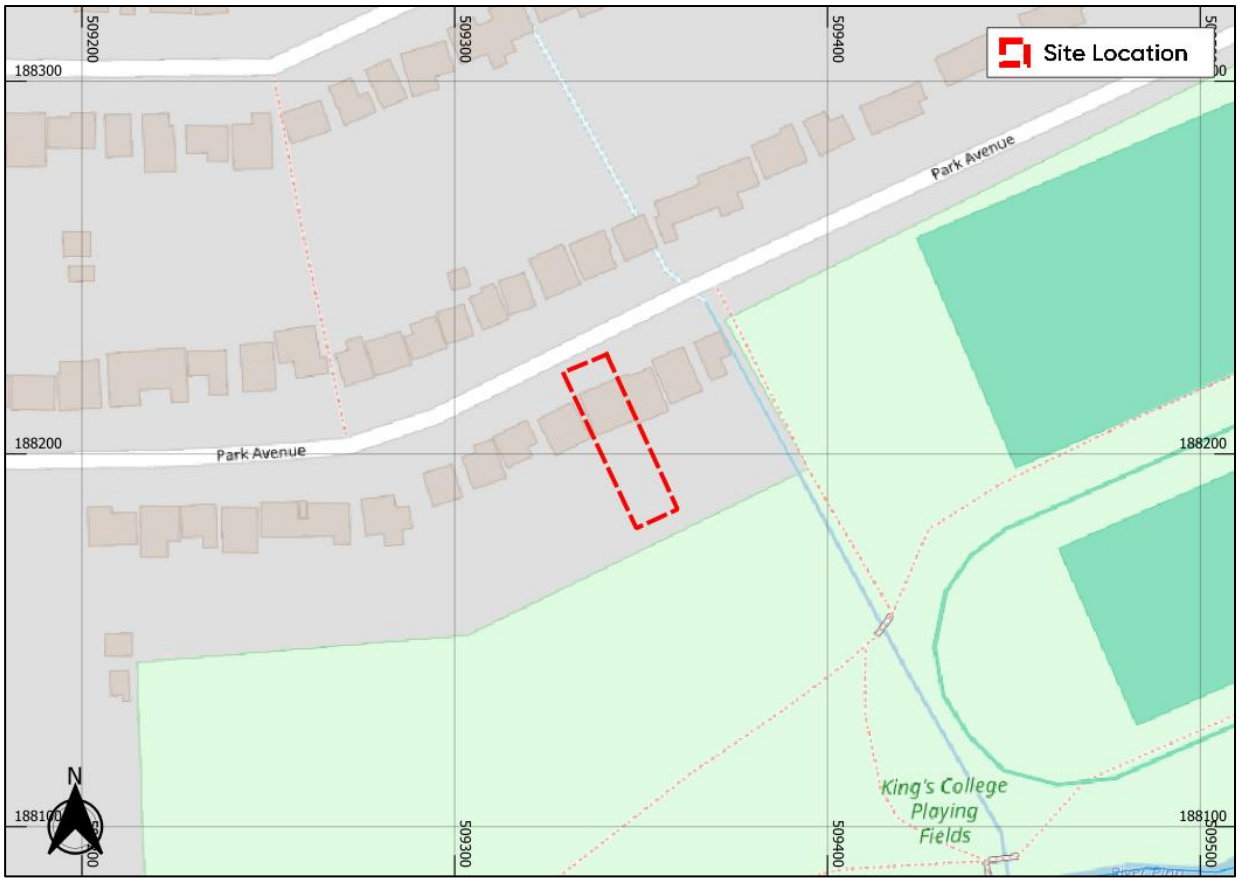

Figure 1: Site Location (Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © https://www.openstreetmap.org and contributors)

1.4. The existing site is currently a residential dwelling. It is understood that the proposed development is for the construction of a rear extension to provide greater habitable space to the existing 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. Analysis of the data shows that the northern half of the site where the existing dwelling is located is at approximately between 41.11m AOD and 41.20m AOD (Above Ordnance Datum) and the southern half of the site, in the rear garden, is between approximately 40.90m AOD and drops down to 40.10m AOD (Figure 2).

1.6. Based on plans provided by the client, the existing finished floor level is raised 220mm above the front driveway/garden. The level adjacent to the internal access is 41.13m AOD, which means the finished floor levels are set at 41.45m AOD.

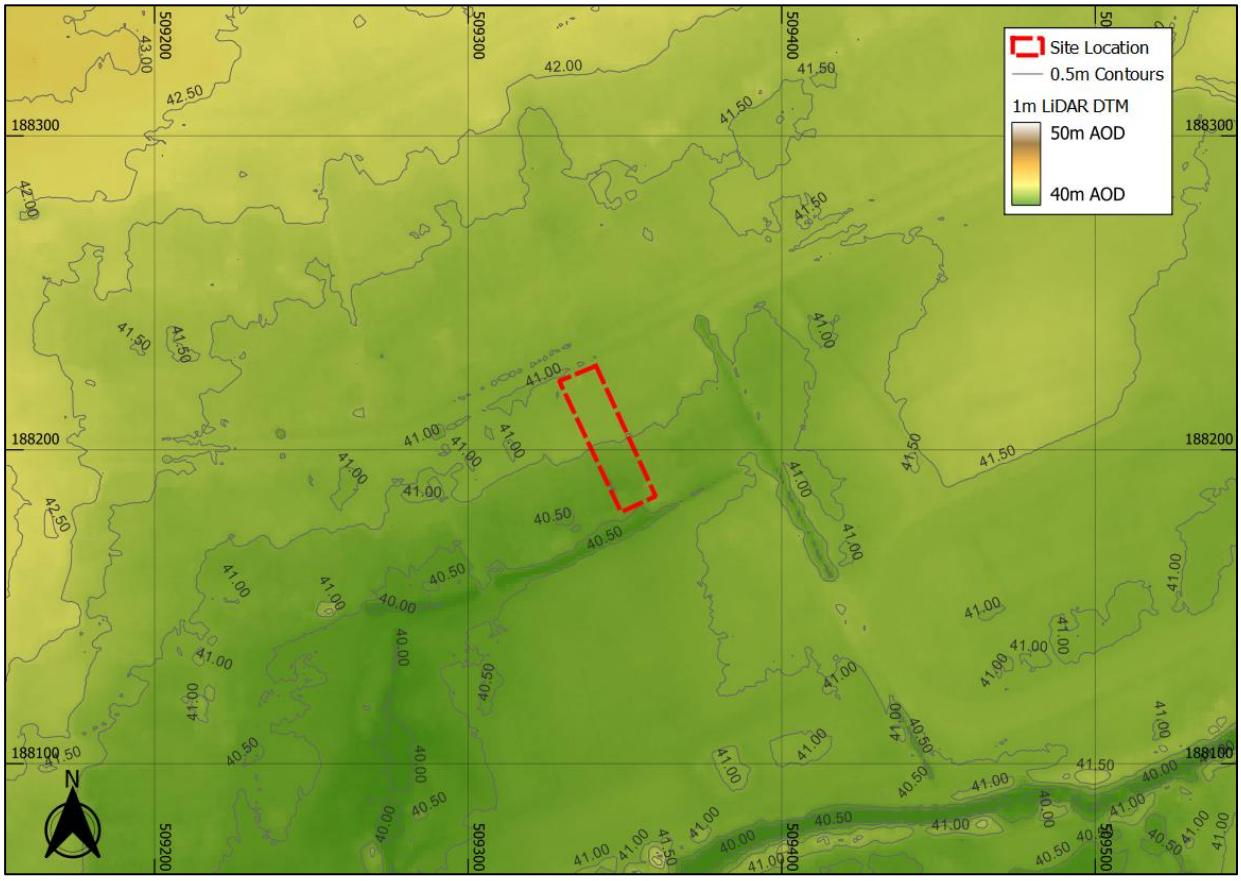

Figure 2: Site Topography (Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © https://www.openstreetmap.org and contributors. Contains public sector information licensed under the Open Government Licence v3.0)

1.7. Hillingdon 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

1.8. UK government planning guidance states[1] 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*

1.9. The site is located in Flood Zone 3 and therefore an FRA is required to be submitted in line with the NPPF.

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.*
>
> *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;*
>
> *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;*

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

> *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.*

> *176. Applications for some minor development and changes of use should also not be subject to the sequential test, nor the exception test [set out below], but should still meet the requirements for site-specific flood risk assessments set out in footnote 63.*

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 (e.g. subdivision of houses into flats) or any other development with a purpose not incidental to the enjoyment of the dwelling.*

2.5. The proposals are considered to a householder development (physical extensions to the dwelling itself). As such, the proposal would be considered a Minor Development under the PPG.

2.6. 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)

2.7. 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.

2.8. 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

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

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

> *Policy SI 12 Flood risk management*
>
> *A) Current and expected flood risk from all sources (as defined in paragraph 9.2.12) across London should be managed in a sustainable and cost-effective way in collaboration with the Environment Agency, the Lead Local Flood Authorities, developers and infrastructure providers.*
>
> *B) Development Plans should use the Mayor's Regional Flood Risk Appraisal and their Strategic Flood Risk Assessment as well as Local Flood Risk Management Strategies, where necessary, to identify areas where particular and cumulative flood risk issues exist and develop actions and policy approaches aimed at reducing these risks. Boroughs should 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.

Local Plan

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

2.12. Policy EM6 Flood Risk Management outlines the requirements for new development within the area. It states:

The Council will require new development to be directed away from Flood Zones 2 and 3 in accordance with the principles of the National Planning Policy Framework (NPPF).

The subsequent Hillingdon Local Plan: Part 2 -Site Specific Allocations LDD will be subjected to the Sequential Test in accordance with the NPPF.

Sites will only be allocated within Flood Zones 2 or 3 where there are overriding issues that outweigh flood risk. In these instances, policy criteria will be set requiring future applicants of these sites to demonstrate that flood risk can be suitably mitigated.

The Council will require all development across the borough to use sustainable urban drainage systems (SUDS) unless demonstrated that it is not viable.

The Council will encourage SUDS to be linked to water efficiency methods. The Council may require developer contributions to guarantee the long-term maintenance and performance of SUDS is to an appropriate standard.

Sequential and Exception Tests

2.13. 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.

2.14. However, Paragraph 176 of the NPPF states:

176. Applications for some ***minor development*** *and change of use should also not be subject to the sequential test, but should still meet the requirements for site-specific flood risk assessments set out in footnote 63.*

3. Consultation and Review

Consultation

3.1. Aegaea have got Product 6 data on file from the River Pinn Modelling Study and have been provided with outputs from the Ruislip - Park Wood and Pinn Meadows FAS (2021). It is understood that this is the best available modelling for the adjacent watercourse at the time of writing.

3.2. It is understood that the Park Wood and Pinn Meadows FAS partially supersedes the River Pinn (2008) flood model outputs. Aegaea have also checked the River Pinn Model Outputs as part of the due diligence which showed that only small parts of the topographically lower rear garden would be affected in the design 1in100+CC scenario. Therefore, the Park Wood and Pinn Meadows Outputs have been deemed most appropriate to be used within this assessment.

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) (Ministry of Housing, Communities and Local Government, 2024)
- Planning Practice Guidance - Flood Risk and Coastal Change (Ministry of Housing, Communities and Local Government, 2022)
- Geoindex Onshore (British Geological Survey, 2024)

- The London Plan (Greater London Authority, 2021)[3]
- Local Plan: Part 1 - Strategic Policies (Hillingdon Council, 2012)[4]
- Preliminary Flood Risk Assessment (Hillingdon Council, 2011)[5]
- West London Strategic Flood Risk Assessment (West London Boroughs, 2018)[6]
- Local Flood Risk Management Strategy 2015 (Hillingdon Council, 2016)[7]

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 Hillingdon 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 Hillingdon Council. The site is recorded as having been affected by a flood event.

Strategic Flood Risk Assessment (SFRA)

3.7. The West London SFRA, published in 2018, provides the evidence base for the Local Planning Authority Hillingdon Council Local Plan and guidance for consideration when determining planning applications.

3.8. 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.

3.9. The West London SFRA (2018) states that boroughs should consider implementation of further surface water flood risk mitigation requirements for proposed developments within Flood Zone 3a (surface water) where the development is also within the 1 in 30 year Risk of Flooding from

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[3] **https://www.london.gov.uk/programmes-strategies/planning/london-plan/london-plan-2021**
[4] **https://www.hillingdon.gov.uk/local-plan-and-review**
[5] **https://modgov.hillingdon.gov.uk/documents/s8734/Appendix%20-%20Flood%20Appraisal.pdf**
[6] **https://westlondonsfra.london/**
[7] **https://modgov.hillingdon.gov.uk/documents/s61462/Appendix+A+-+Hillingdon+Local+Flood+Risk+Management+Strategy.pdf**

Surface Water (RoFSW) mapped extents. These requirements could be similar to those adopted for Flood Zone 3a/3b (fluvial / tidal) Functional Floodplain with modifications:

> *Development within the 1 in 30yr RoFSW mapped extent will be treated as if it were Flood Zone 3b (Functional Floodplain) as defined in PPG Table 1 (Paragraph 065).*
>
> *Development may be possible within the 1 in 30yr RoFSW mapped extents outside of existing infrastructure or solid building footprints.*
>
> *To enable development, the proposals must provide mitigation and resilience against flood risks (taking advice from the LLFA as appropriate) and provide appropriate compensation on existing flood risk levels (addressing the predicted 1 in 30yr and 1 in 100yr RoFSW mapped depths as a minimum), supported by detailed flood risk modelling if appropriate.*
>
> *The development must not increase flood risk elsewhere and where possible reduce flood risk overall.*

3.10. The SFRA online mapping provided by Hillingdon Council has been used throughout production of this report as a source of information, particularly pertaining to historic 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 3 (Figure 3). Flood Zone 3 denotes a risk of flooding from fluvial sources greater than 1 in 100 (1%) annual probability.

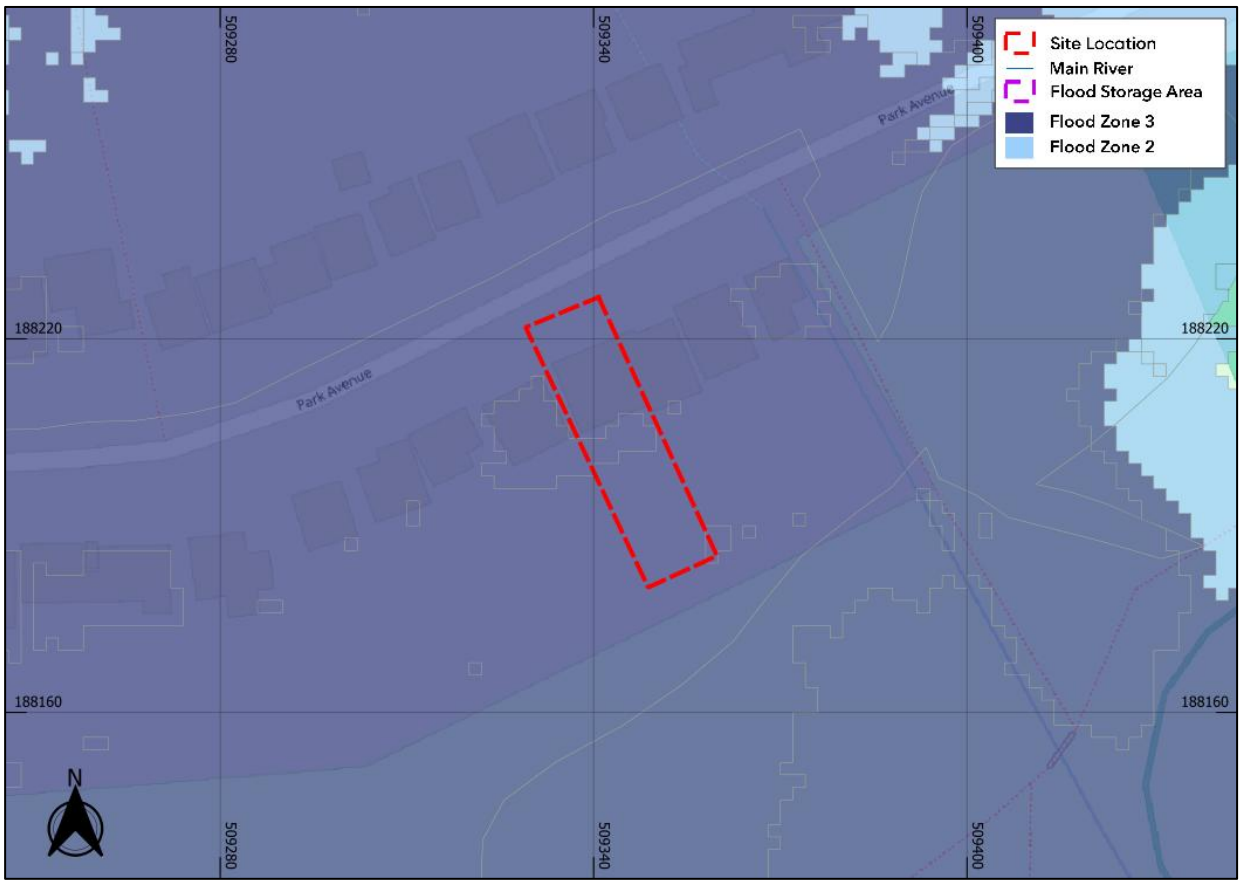

Figure 3: EA Flood Map for Planning (Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © https://www.openstreetmap.org and contributors. Contains public sector information licensed under the Open Government Licence v3.0)

4.3. The closest watercourse to the site is the Park End Ditch, located approximately 30m to the east of the site. The Park End Ditch originates in Park Wood to the north of the site and runs culverted underneath Broadwood Avenue and Park Avenue before emerging and flowing into the River Pinn to the south. The River Pinn is the closest EA Main River and is located approximately 120m to the south of the site.

4.4. Upon review of Recorded and Historical Flood Outlines (Figure 4) shows main river fluvial flooding on-site in 1977 caused by channel capacity exceeded (no raised defences). Flooding was also recorded in June 2016 and affected areas along Park Avenue and the front garden area of the site, however, does not directly affect the dwelling. The Flood Investigation Report. 23 June 2016, London Borough of Hillingdon (2017)[8] states that 16 properties along Park Avenue recorded flooding to gardens and driveways.

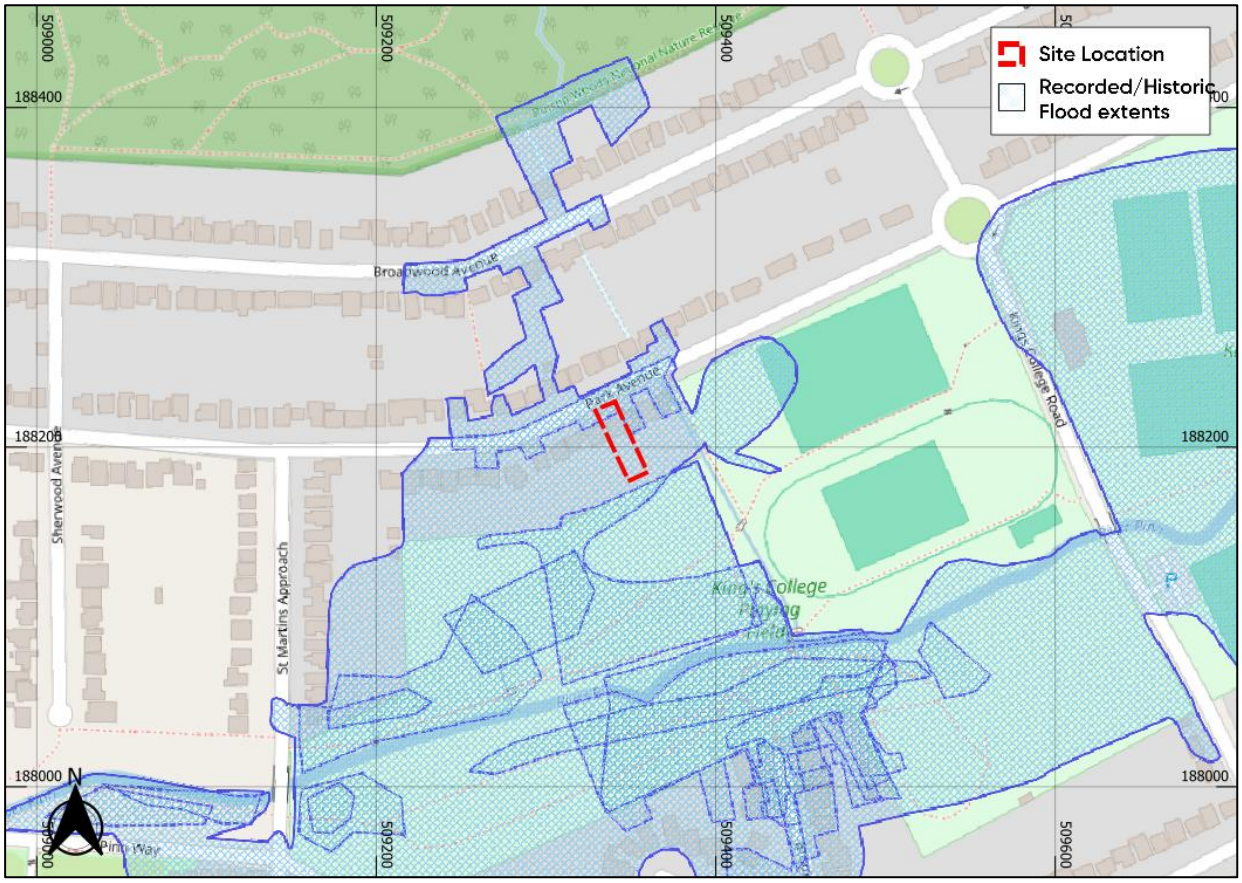

Figure 4: EA Historic Flood Mapping (Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © https://www.openstreetmap.org and contributors. Contains public sector information licensed under the Open Government Licence v3.0)

[8] **https://cdn.arcgis.com/sharing/rest/content/items/d7aad8a5f7394360a08d4b16fe8e54f6/resources/ClWWCRynlQVyIt4Mz-ui-.pdf**

Park Wood and Pinn Meadows FAS (2021)

4.5. Aegaea have Product 6 data on file from the River Pinn Modelling Study and have been provided with outputs from the Ruislip - Park Wood and Pinn Meadows FAS (2021). It is understood that this is the best available modelling for the adjacent watercourse at the time of writing.

4.6. It is understood that the Park Wood and Pinn Meadows FAS partially supersedes the River Pinn (2008) flood model outputs. Aegaea have also checked the River Pinn Model Outputs as part of the due diligence which showed that only small parts of the topographically lower rear garden would be affected in the design 1in100+CC scenario. Therefore, the Park Wood and Pinn Meadows Outputs have been deemed most appropriate to be used within this assessment.

4.7. The Product 5 Park Wood and Pinn Meadows Modelling Report states that within the study area it is believed that flooding is caused by a combination of high-water levels in the River Pinn and inundation of the surface water system. Drainage becomes hydraulically locked and the Pinn overtops its banks.

Present Day Scenarios - Park Wood and Pinn Meadows FAS

4.8. Figure 5 shows the modelled present-day scenarios from the EA's Park Wood and Pinn Meadows FAS.

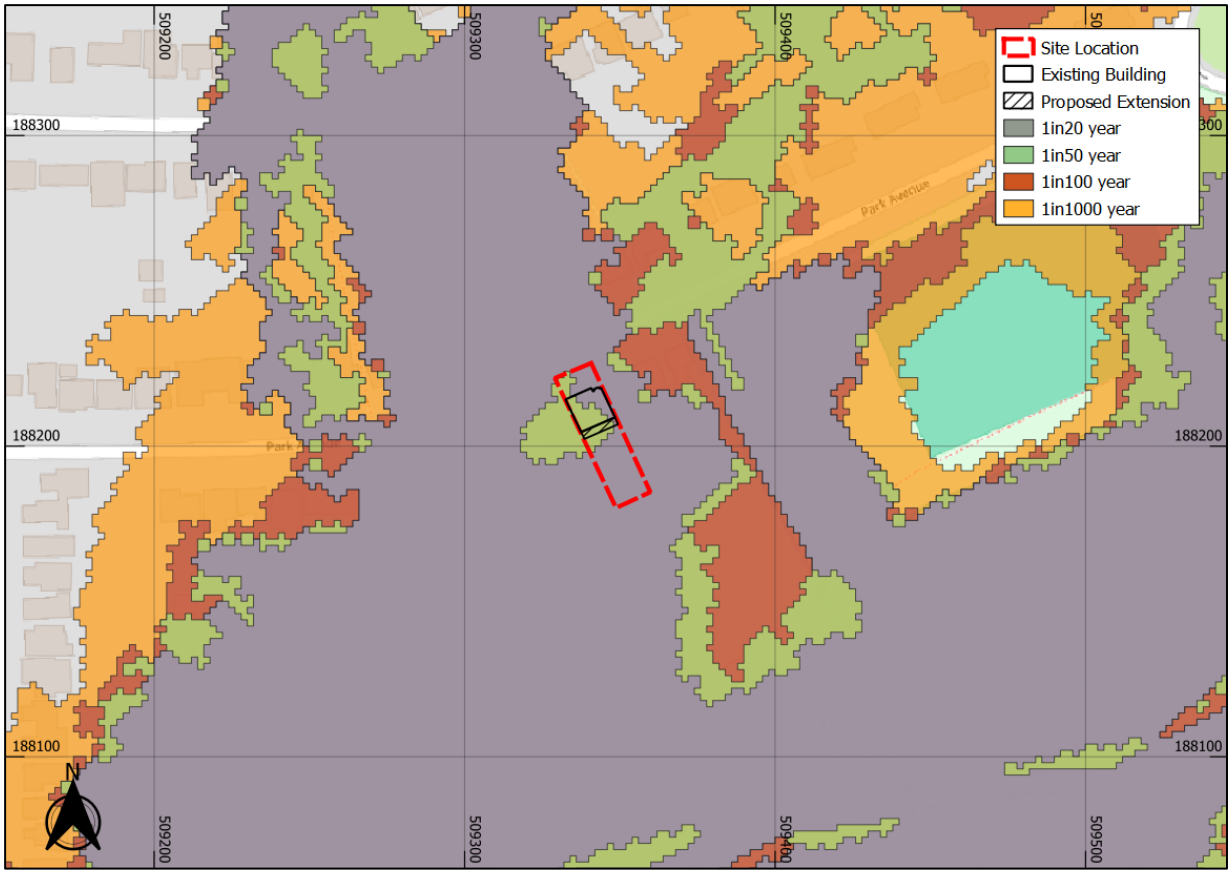

Figure 5: Present Day Flood Extents Ruislip - Park Wood and Pinn Meadows FAS (2021) (Source: EA)

4.9. Analysis of this data shows that during the 1in20-year (5% AEP), 1in50-year (2% AEP) and 1in100-year (1% AEP) and 1in1000-year (0.1% AEP) shows that the site may be affected in all present day modelled scenarios.

Table 2: Modelled Present Day Flood Levels.

Event	1in20 year	1in50 year	1in100 year	1in1000 year
Flood Level	41.09m AOD	41.10m AOD	41.13m AOD	41.60m AOD
Site levels (for reference)	Rear Garden: 40.10m AOD to 40.90m AOD Existing Dwelling External Levels: 41.11m AOD to 41.20m AOD Existing Finished Floor Level: 41.45m AOD			

4.10. Based on the flood levels within Table 3, the rear garden may experience maximum flood depths of 0.99m, 1.00m, 1.03m and 1.50m during the 1in20-year, 1in50-year, 1in100-year and 1in1000-

year flood events, respectively. The highest flood depths would generally be associated with the topographically lower rear gardens areas.

4.11. However, the existing building (FFL: 41.45m AOD) would remain unaffected during the 1in20-year, 1in50-year and 1in100-year scenarios.

Flood Zone 3b

4.12. When the Ruislip - Park Wood and Pinn Meadows FAS model was undertaken in 2021, the definition of Flood Zone 3b was the 1in20 year event. In August 2022, the definition was updated to be 1in30-year event. The 1in30 year event has not been modelled as part of the study and therefore, both the 1in20-year and 1in50-year scenario have been analysed in this FRA. However, the 1in50 year scenario has been used as a conservative proxy for the 1in30-year scenario.

4.13. Analysis of the 2D nodes across the site for the 1in50-year scenario show a flood level of 41.10m AOD. The existing dwelling is located above the flood level at 41.20m AOD and the minimum level on the site is circa. 40.10m AOD. Therefore, in order to visualise Flood Zone 3b extents, LiDAR has been used to derive all levels below 41.10m AOD (Figure 6).

4.14. Analysis of this data shows that the existing building and proposed extension is located on land topographically higher than the 1in50-year flood level, except for a small corner on the southwestern side of the extension – which is considered negligible. **Therefore, no new development is proposed within Flood Zone 3b.**

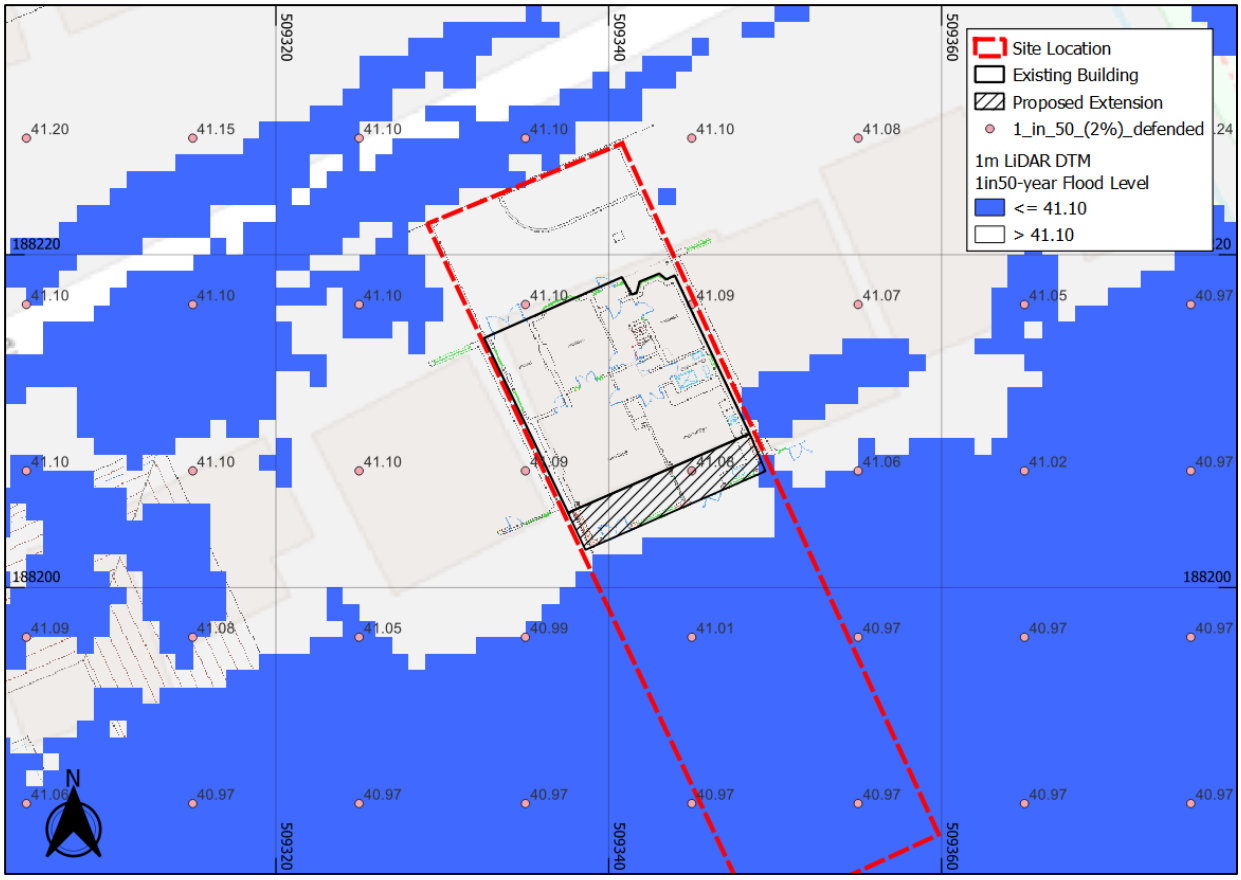

Figure 6: 1in50-year Flood Level (41.10m AOD) Flood Extents Derived from 1m LiDAR 2023

Climate Change Scenarios - Park Wood and Pinn Meadows FAS

4.15. The site is located within the 'Colne' Management Catchment. Guidance suggests that 'More Vulnerable' developments in Flood Zone 2 or 3 should utilise the 'central' climate change allowance. The increase in peak river flow for the 2080's epoch for the 'central' allowance is +21%.

4.16. Data has not been provided from the Park Wood and Pinn Meadows FAS model for the 1in100+21%CC event. However, data has been provided for the 1in100+25%CC scenario. The +25% event has been considered an appropriate proxy and is considered the 'design' scenario.

4.17. It should be noted that no flood outlines have been provided for climate change scenarios, therefore Figure 7 shows the 2D node points across the site. The flood level is uniform across the site at 41.28m AOD.

4.18. Based on minimum topographic levels on site, the rear garden could experience flood depths of 1.18m during this scenario. However, the existing building (FFL: 41.45m AOD) is 0.17m higher and therefore would not experience any internal flooding during this event.

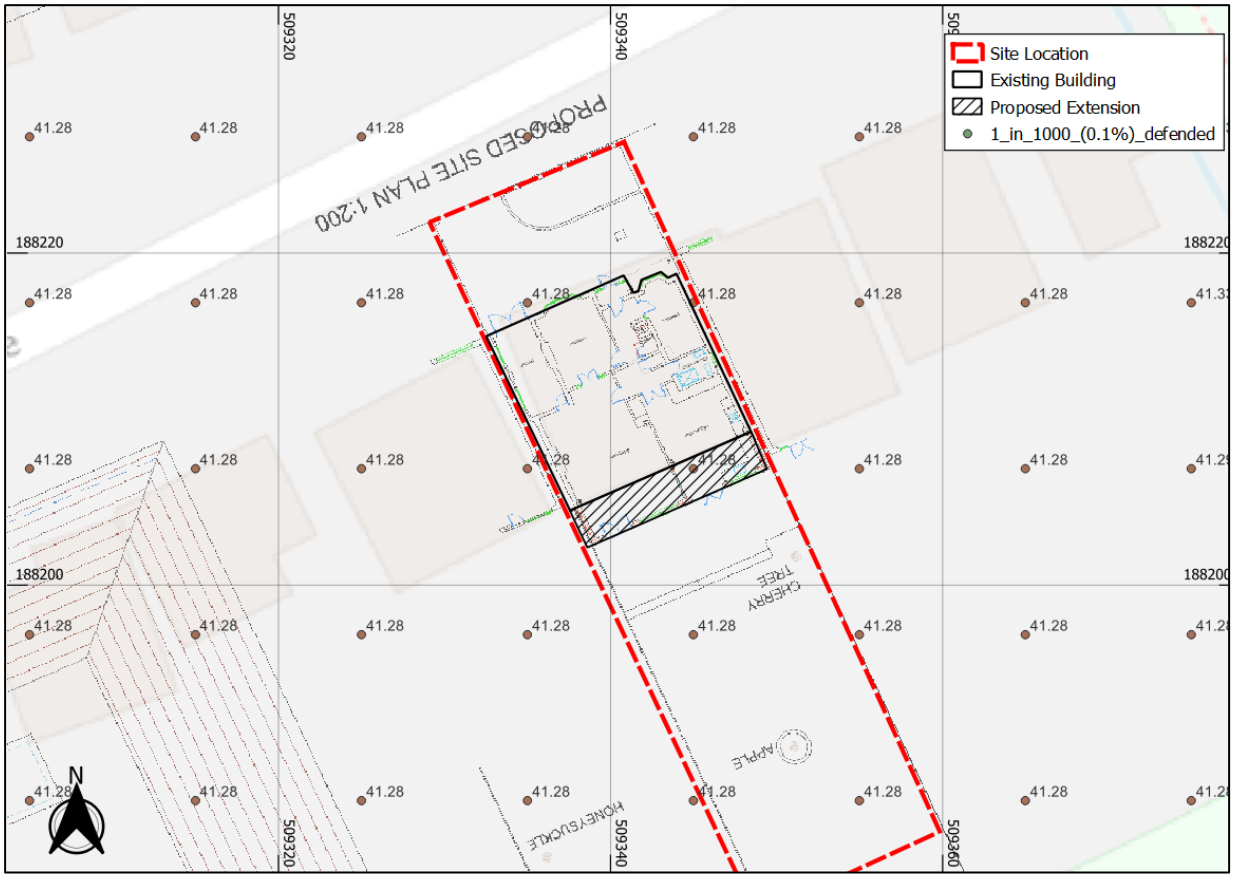

Figure 7: 1in100+25%CC Flood Level (Source: EA)

4.19. Based on the above analysis, the risk of fluvial flooding to the site can be considered high. However, the existing finished floor levels are topographically higher than the 1in100+CC design event, therefore, the risk of internal flooding can be considered low to moderate.

Tidal

4.20. 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. 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.

4.21. The River Pinn and Park End Ditch is fluvially dominant at this location, therefore, the risk of flooding from tidal sources is considered low.

Canals

4.22. 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.

4.23. According to CRT mapping[9] there are no canals identified within 1km of the site.

4.24. The risk of flooding to this site from canals is considered to be low.

Pluvial

4.25. 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.

4.26. The West London SFRA (2018) states that land within EA modelled surface water flood risk extents predicted for up to and including 1 in 100 year return period events will be treated as being Flood Zone 3a (surface water). Furthermore, development within the 1 in 30 year RoFSW mapped extent will be treated as if it were Flood Zone 3b (Functional Floodplain).

4.27. The National Flood Risk Assessment (NaFRA2), published in Jan 2025, has updated the Risk of Flooding from Surface Water (RoFSW) products which show the chance of flooding from surface water to areas of land.

4.28. The RoFSW products are an assessment of where surface water flooding may occur when rainwater does not drain away through the normal drainage systems or soak into the ground but lies on or flows over the ground instead. It includes information about flooding extents and depths including the potential impact of climate change on flood risk, based on the latest UK Climate Projections (UKCP18).

4.29. Risk is displayed as one of three likelihood categories:

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

- ‘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).

4.30. The RoFSW depth mapping shows the annual chance of flooding (based on the three risk categories listed above) beyond a specific depth, for depths at the following intervals from 20cm to 120cm (i.e. 0.2m, 0.3m, 0.6m, 0.9m, and 1.20m).

4.31. As well as present day risk of flooding from surface water, climate change scenarios have been produced to indicate the predicted impacts of climate change on future flood risk. The climate change allowances are based on the latest UK Climate Projections (UKCP18) from the Met Office, using the Representative Concentration Pathway (RCP) 8.5. A near-term epoch (2040 – 2060 “2050s” epoch) and central allowances are being used initially, to support short and medium-term decisions informed by the highest flood likelihood projections.

RoFSW Present Day Scenario

4.32. Examination of the EA's Flood Risk from Surface Water mapping shows that the majority of the site is at high risk of flooding with a small area to the rear of the existing building, towards the location of the proposed extension, being outside the low, medium and high risk extents (Figure 8).

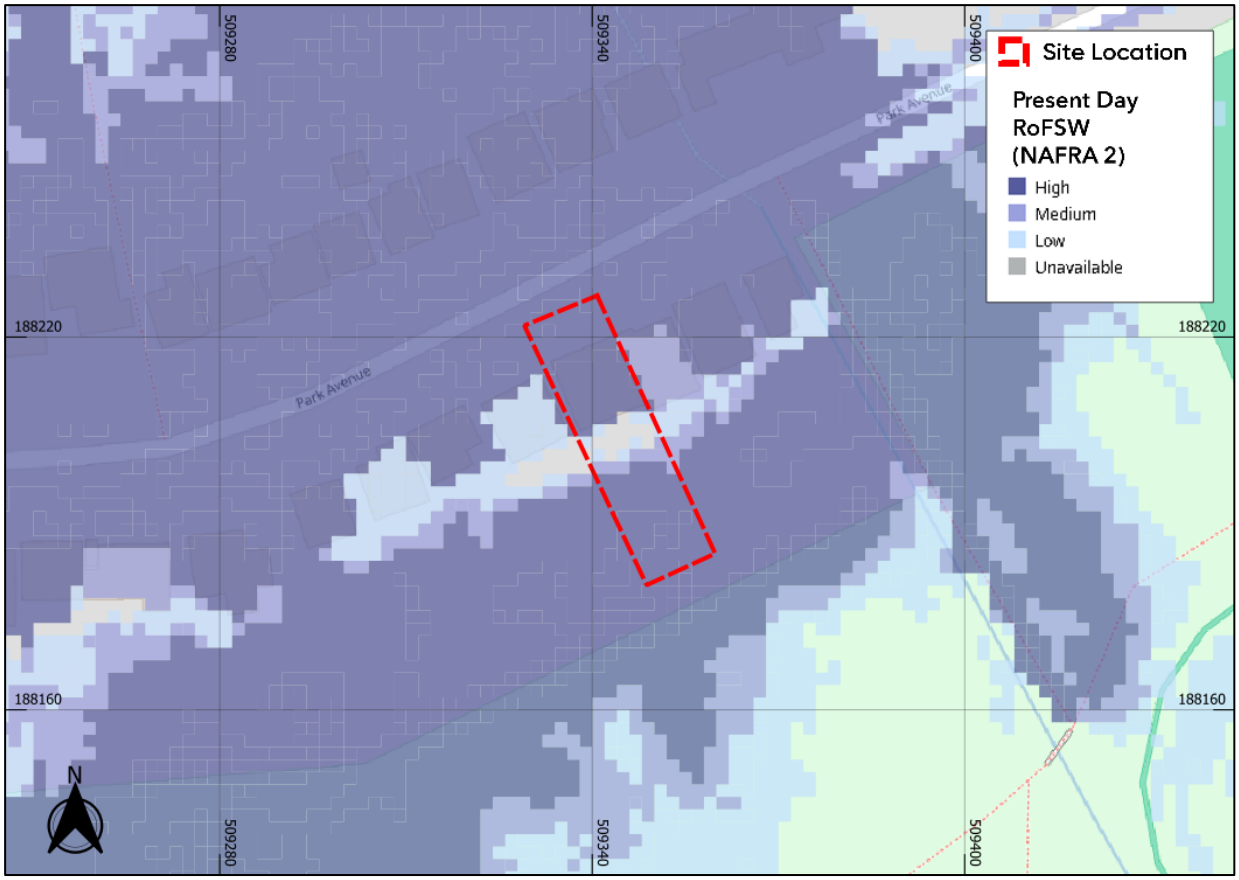


Figure 8: EA Surface Water Flood Risk Mapping (Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © https://www.openstreetmap.org and contributors. Contains public sector information licensed under the Open Government Licence v3.0)

4.33. Analysis of the present day RoFSW flood depth map for the likelihood of flood depths exceeding 0.3m shows that the front garden and areas around the existing building may experience a 'high' risk of depths exceeding depths greater than 0.3m. The rear garden has a 'low' to 'high' chance of experiencing flood depths greater than 0.3m (Figure 9).

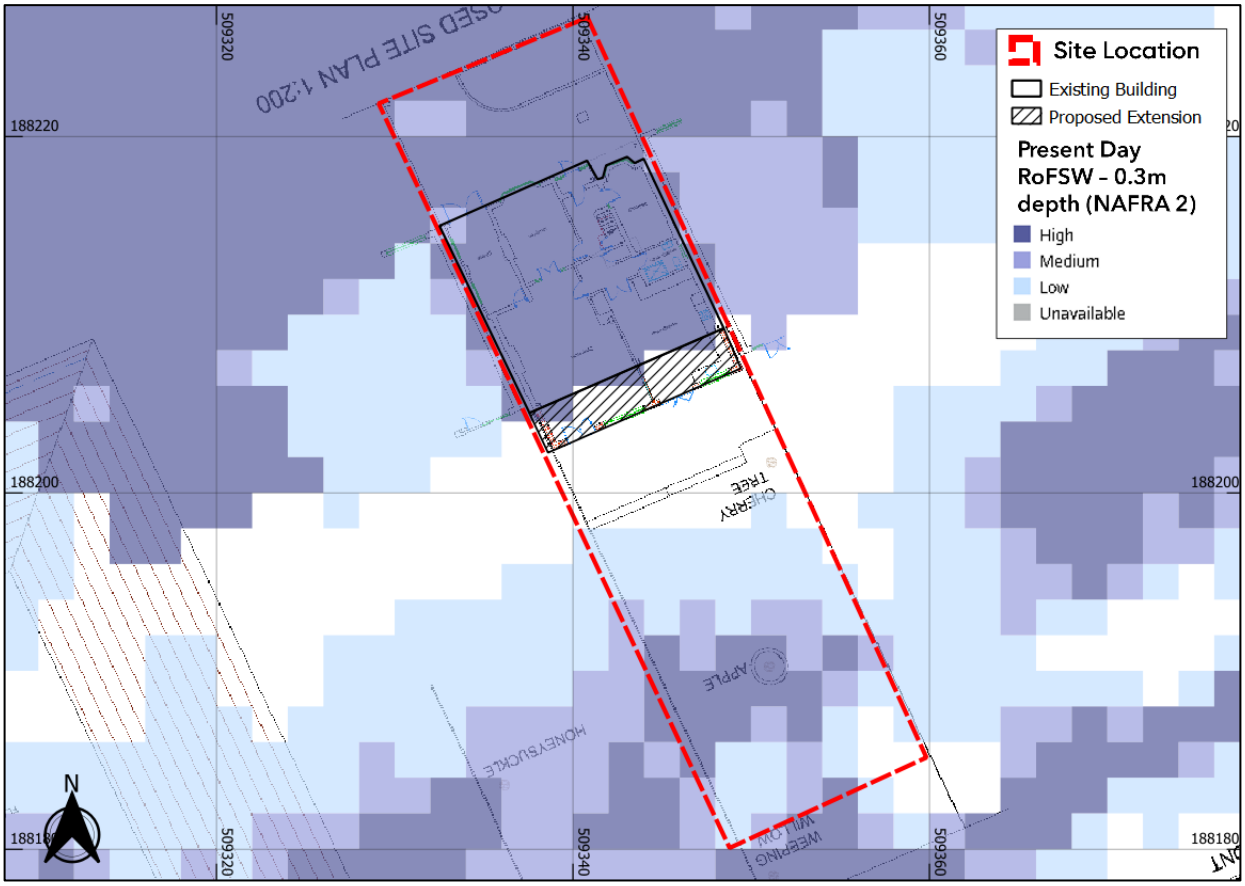


Figure 9: EA Surface Water Flood Risk – Depths Exceeding 0.3m (Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © https://www.openstreetmap.org and contributors. Contains public sector information licensed under the Open Government Licence v3.0)

4.34. Analysis of the other flood depth intervals mapping (0.6m, 0.9m and 1.2m) shows the site is outside all likelihood categories apart from a small area in the front garden, which may have a 'low' chance of exceeding 0.6m (Figure 9).

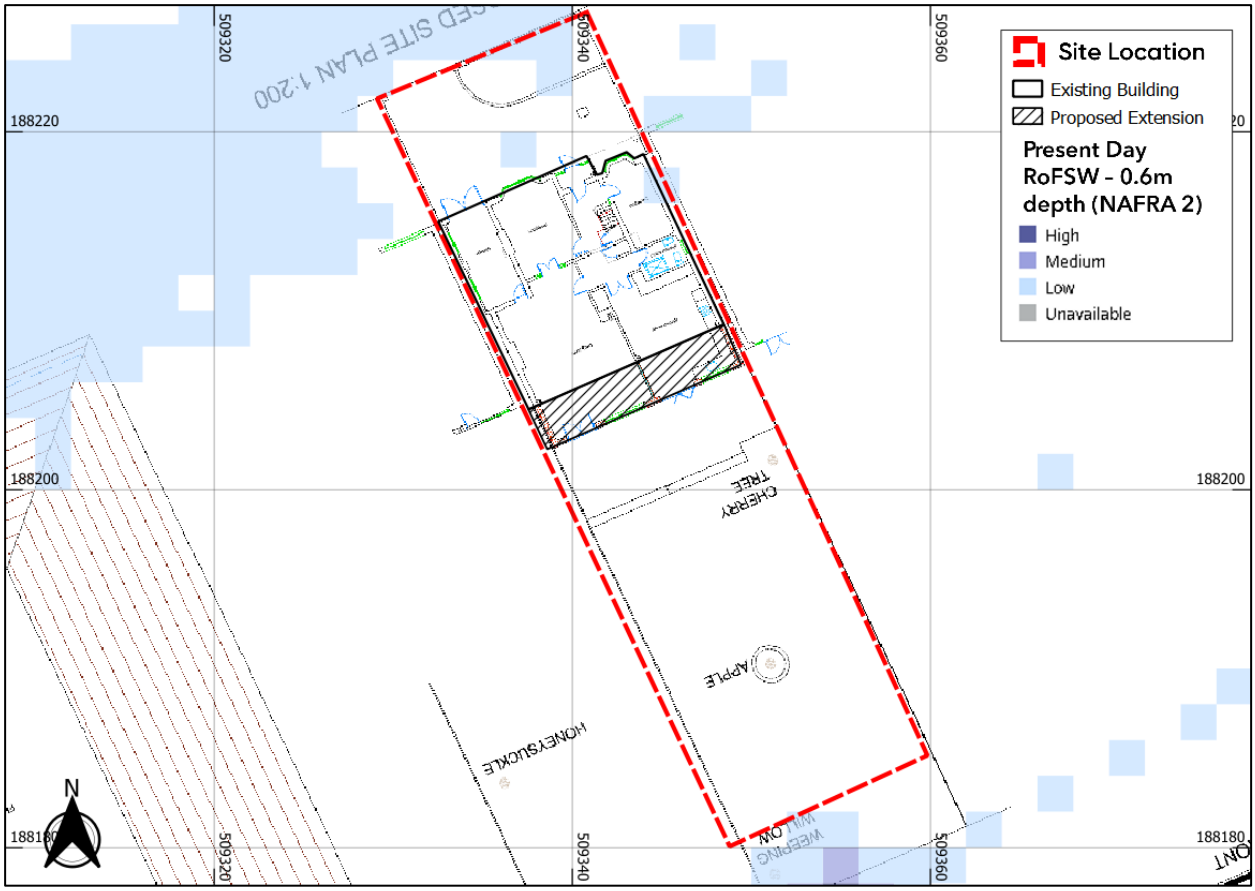


Figure 10: EA Surface Water Flood Risk – Depths Exceeding 0.6m (Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © https://www.openstreetmap.org and contributors. Contains public sector information licensed under the Open Government Licence v3.0)

RoFSW Climate Change Scenario

4.35. The EA Online 'Flood Risk from Surface Water – Climate Change' map shows a similar pattern of flooding with the majority of the site being at 'high' risk of flooding with a small area to the rear of the existing building, towards the location of the proposed extension, having a 'low' risk of flooding (Figure 11).

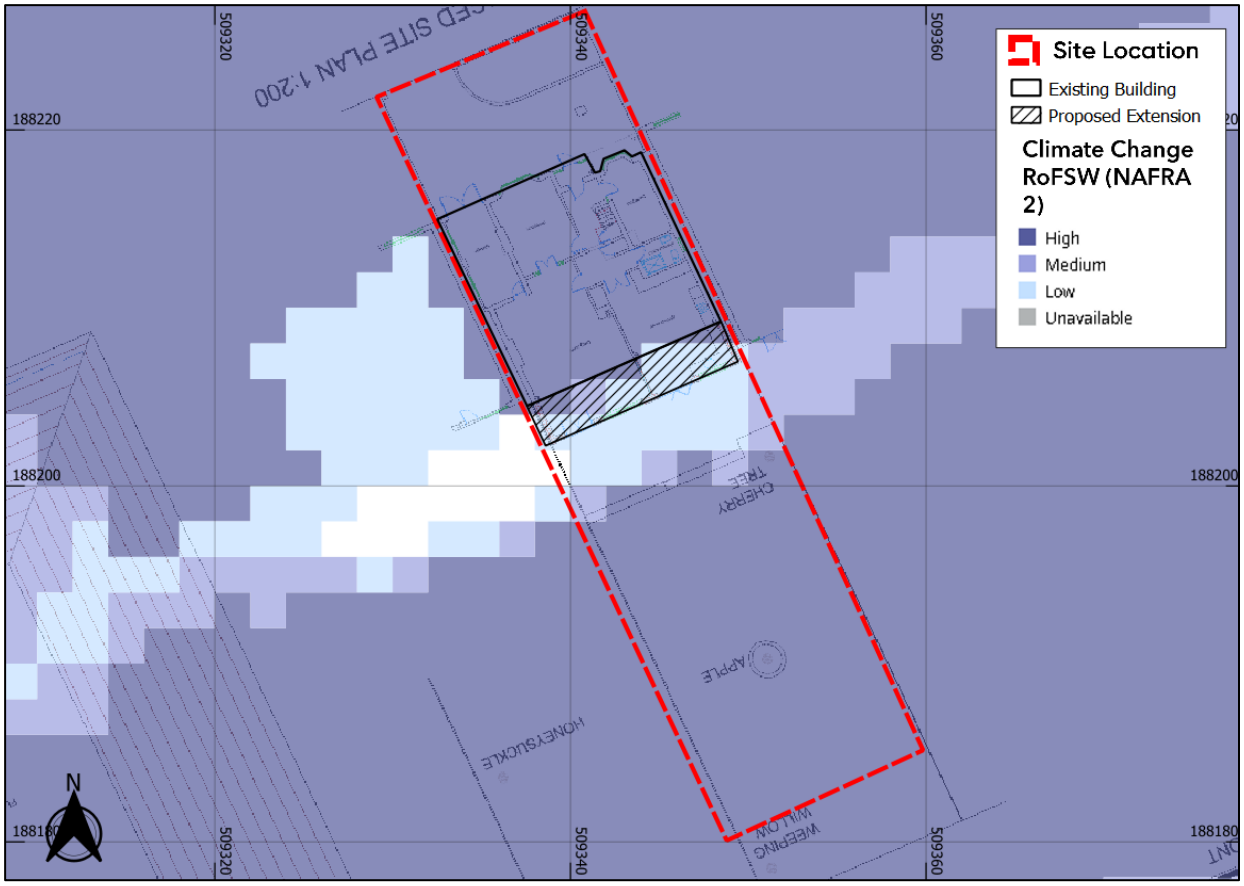


Figure 11: EA Surface Water Flood Risk with Climate Change Mapping (Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © https://www.openstreetmap.org and contributors. Contains public sector information licensed under the Open Government Licence v3.0)

4.36. Analysis EA Online 'Flood Risk from Surface Water – Climate Change' flood depth map for the likelihood of flood depths exceeding 0.3m shows that the front garden and areas around the existing building may experience a 'high' risk of depths exceeding depths greater than 0.3m. The rear garden has a 'low' to 'high' chance of experiencing flood depths greater than 0.3m (Figure 12).

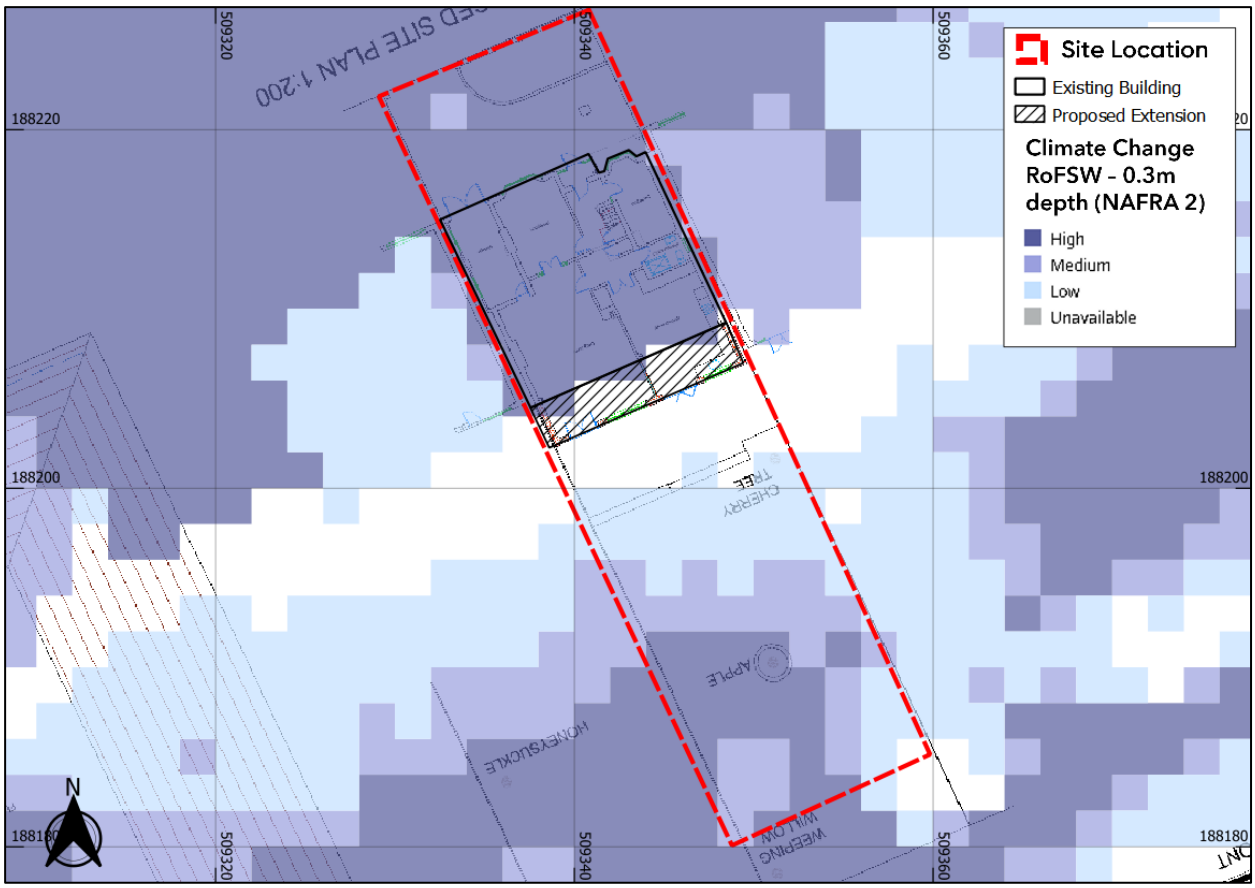


Figure 12: EA Surface Water Flood Risk with Climate Change Mapping – Depths Exceeding 0.3m (Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © https://www.openstreetmap.org and contributors. Contains public sector information licensed

4.37. Analysis of the other flood depth intervals mapping (0.6m, 0.9m and 1.2m) shows the site is outside all likelihood categories apart from a small area in the front garden, which may have a 'low' chance of exceeding 0.6m (Figure 13).

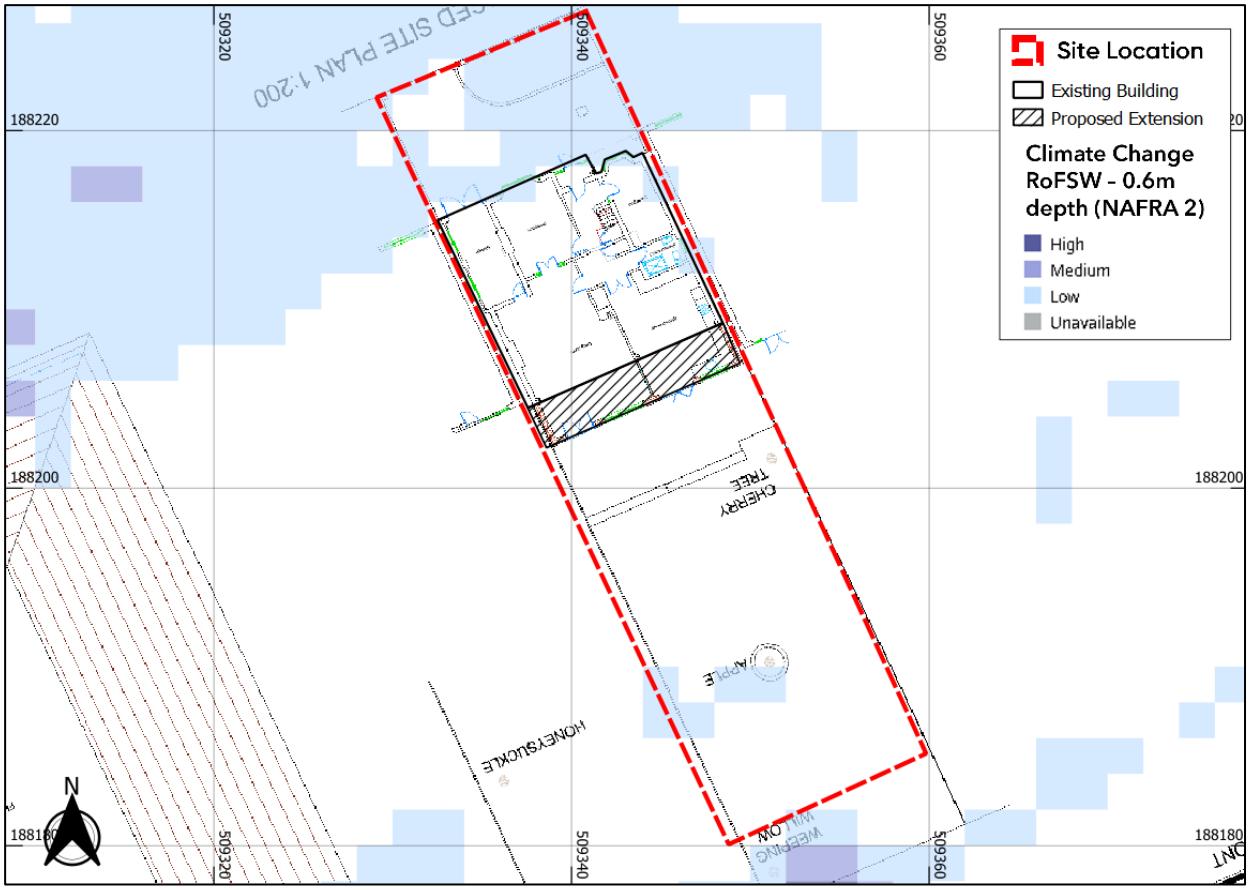


Figure 13: EA Surface Water Flood Risk with Climate Change Mapping – Depths Exceeding 0.6m (Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © https://www.openstreetmap.org and contributors. Contains public sector information licensed

4.38. The increase in built footprint is located to the rear of the existing property, generally where flood depths are shown to not exist. There are small corners of pixels that are shown to have a high risk of exceeding 0.3m, however, the flow pathway for this catchment is from north to south and these flood depth pixels originate from the existing building – which will act as a barrier to flooding. Therefore, compensatory flood storage for pluvial flooding is not considered necessary.

4.39. However, Flood Compensatory Storage for fluvial flooding is addressed in Section 5 of this report – the compensation area has been designed such that it will also provide additional storage during the pluvial flood events.

4.40. Overall, the risk of flooding from pluvial sources can be considered to be moderate to high.

Reservoirs

4.41. 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.

4.42. According to the EA's Flood Risk from Reservoirs mapping the site is within flood extents for both the 'dry day' and 'wet day' event (Figure 14).

4.43. This 'dry day' scenario assumes that at the time of the reservoir failure, local rivers and watercourses are at their normal, non-flood levels. The 'wet day' scenario refers to the predicted area that would be inundated if a large, raised reservoir were to fail and release its water when local rivers are already experiencing an extreme natural flood.

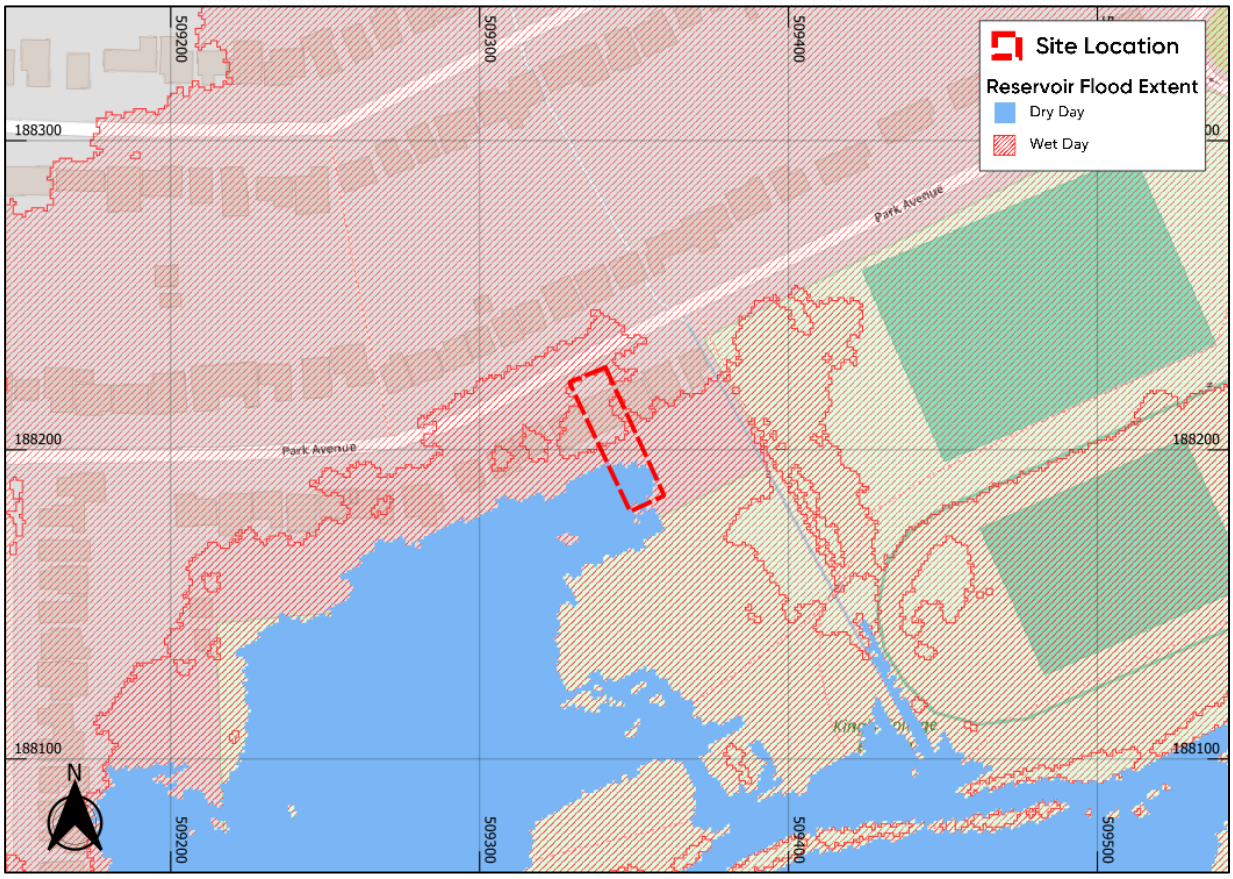


Figure 14: EA Reservoir Flood Risk Mapping (Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). ©https://www.openstreetmap.org and contributors. Contains public sector information licensed under the Open Government Licence v3.0)

4.44. 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. 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

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

4.46. The British Geological Survey's (BGS) mapping shows superficial deposits underlying the site defined as Alluvium consisting of clay, silt, sand and gravel. The site is underlain by Lambeth Group bedrock, a composition of clay, silt and sand. This geological unit generally has a low hydraulic conductivity which means water does not easily move through it.

4.47. The SFRA presents the EA's 'Areas Susceptible to Groundwater Flooding' mapping. The site is located within a 1km square grid of which >=25% <50% is considered susceptible to groundwater flooding (Figure 15).

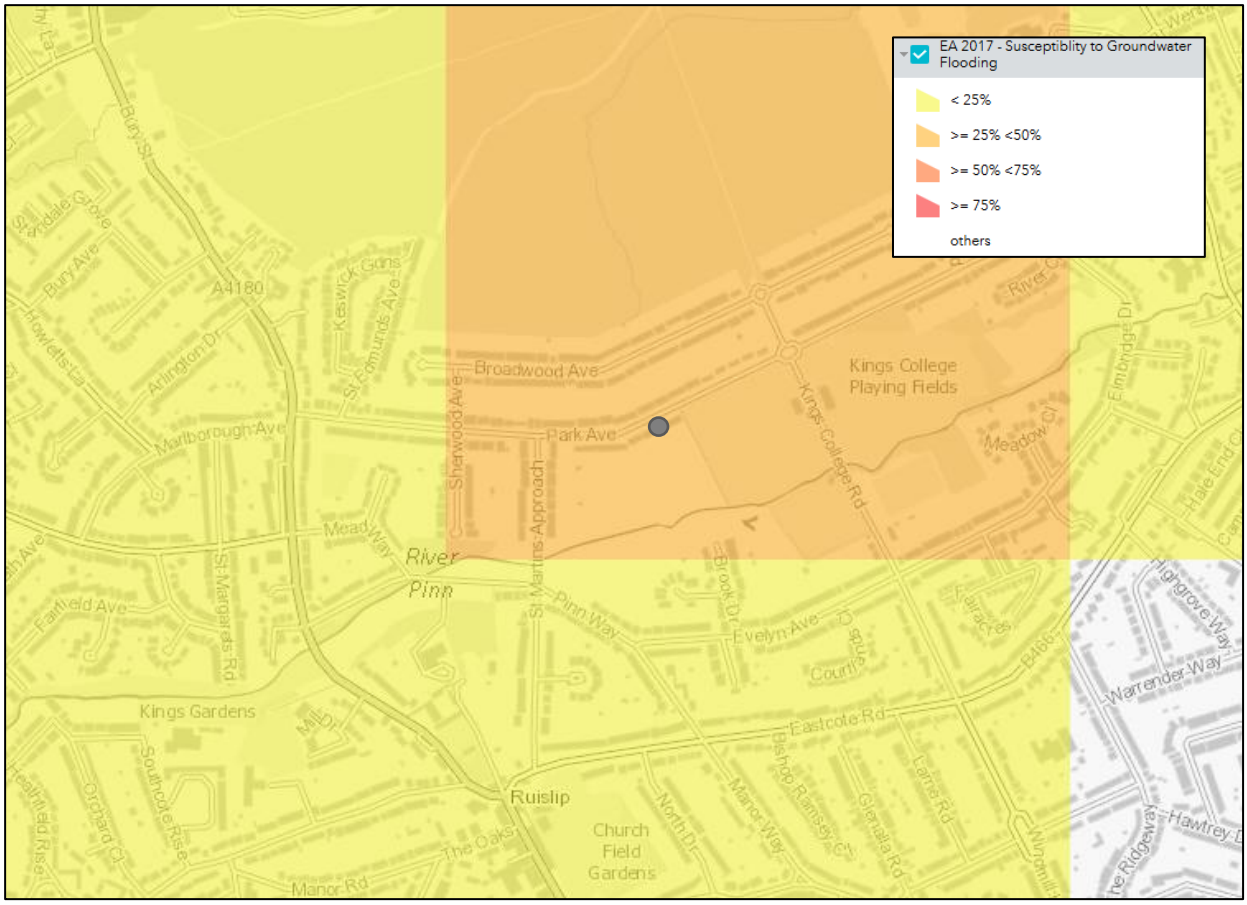


Figure 15 :Areas Susceptible to Groundwater Flooding, Grey dot represents location of site (West London SFRA)

4.48. There are a number of BGS borehole records located in close proximity to the site at 58 Martin Close (BGS ID: 13457891: BGS Reference: TQ08NE162[10]). Borehole TQ08NE162 was bored to a depth of 6m and encountered silty, sandy clay to a depth of 2.0m underlain by a 1.3m thick sand layer to a depth of 3.3m underlain by clay. The borehole indicate that groundwater was encountered within the sand layer at a depth of approximately 3m below ground level.

4.49. Prolonged and intense rainfall can lead to an increase in the volume of water within the permeable superficial deposits. As these deposits become saturated and the Lambeth Clay prevents downward percolation, the perched water table rises. If this rise brings the water table to or near the ground surface, or into basements and other subsurface structures, groundwater flooding occurs.

[10] **https://api.bgs.ac.uk/sobi-scans/v1/borehole/scans/items/13457891**

4.50. In areas near watercourses, permeable superficial deposits (such as River Terrace Deposits and Alluvium) can be in hydraulic continuity with the river. When river levels rise due to heavy rainfall, groundwater levels in these interconnected superficial deposits can also rise, leading to flooding.

4.51. Given the existing dwelling is located on the highest part of the site and finished floor levels raised above external level, combined with the fact that there is no below ground habitable accommodation, the risk of groundwater flooding to the development is considered to be low.

Sewers

4.52. 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.

4.53. Drainage in Hillingdon is serviced by Thames Water Utilities Ltd (Thames Water), who provide surface water, foul and combined sewer systems. Modern sewer systems are designed to be separate surface water and foul water systems, typically accommodating up to 1 in 30 year rainfall events. However, sewer system segments across London vary in capacity due to age. Older segments have a smaller capacity and may not be designed to accommodate rainfall events as significant as 1 in 30 year events.

4.54. The Thames Water historical sewer flooding dataset (DG5 register), produced as part of the SFRA provides sewer flood incidents within a four-digit postcode area. The HA4 7 postcode area has no incidents of sewer flooding. However, there is no indication to suggest that the site has been previously affected by flooding from this source.

4.55. The development is therefore considered to be at low risk of flooding from sewers.

5. Flood Risk Mitigation

Fluvial and Pluvial

5.1. Analysis of the present day modelled data shows that during the 1in20-year (5% AEP), 1in50-year (2% AEP) and 1in100-year (1% AEP) and 1in1000-year (0.1% AEP) shows that the site may be affected in all scenarios.

5.2. However, the existing building (FFL: 41.45m AOD) would remain unaffected during the 1in20-year, 1in30-year and 1in100-year scenarios.

5.3. The flood level for the 1in100+25%CC scenario is uniform across the site at 41.28m AOD. Based on minimum topographic levels on site, the rear garden could experience flood depths of 1.18m during this scenario. However, the existing building (FFL: 41.45m AOD) is 0.17m higher and therefore would not experience any internal flooding during this event.

5.4. Analysis EA Online 'Flood Risk from Surface Water – Climate Change' flood depth map for the likelihood of flood depths exceeding 0.3m shows that the front garden and areas around the existing building may experience a 'high' risk of depths exceeding depths greater than 0.3m. The rear garden has a 'low' to 'high' chance of experiencing flood depths greater than 0.3m

5.5. Analysis of the other flood depth intervals mapping (0.6m, 0.9m and 1.2m) shows the site is outside all likelihood categories apart from a small area in the front garden, which may have a 'low' chance of exceeding 0.6m.

5.6. EA Flood Risk Standing Advice[11] for minor extensions states the following:

> *We recommend floor levels are set at least 600 millimetres (mm) above the estimated flood level. You will also need to use flood resistant materials up to at least 600mm above the estimated flood level.*
>
> *You may be able to reduce this to 300mm if there is a high level of certainty about your estimated flood level. If there is a particularly high level of uncertainty it may need to be increased.*

[11] **https://www.gov.uk/guidance/flood-risk-assessment-standing-advice**

If you cannot raise the floor levels in this way, you will also need to include extra flood resistance and resilience measures. These measures should protect the property to at least 600mm above the estimated flood level.

5.7. Given the proposals include the construction of an extension to an existing residential dwelling, Finished Floor Levels (FFLs) are required to set level with the existing FFLs to ensure easy internal access. Therefore, general waterproofing measures and flood resilience measures are recommended to be incorporated into the extensions in accordance with the DCLG Report '*Improving the Flood Performance of New Buildings - Flood Resilient Construction' (2007).* However, it is also recommended that resilience measures be retrofitted, where possible:

- Solid (i.e. concrete floors) with waterproof screed.
- Damp proof membranes should be included within the design of the dwelling to minimise the passage of water through ground floors. Impermeable polythene membranes should be at least 1200 gauge to minimise ripping.
- Cavity insulation should preferably incorporate rigid closed cell materials as these retain integrity and have low moisture take-up.
- Non-return valve fitted to any new sewer connections.
- External renders are effective barriers to water penetration and should be used with blocks (or bricks) to at least the first-floor level. External cement renders with lime content (in addition to cement) can induce faster surface drying.
- External doors may be susceptible to ingress of flood water. Any PVC window/door sills should be adequately sealed. Double glazing should be used to provide resistance against external flood water pressure.
- Watertight sealing of external pipes/wires entering the building through the brickwork.
- Owners to investigate the possible use of property level protection measures such as demountable flood doors.
- Flood compensation is to be provided to ensure that flood risk is not increased elsewhere (discussed below).

Tidal, Reservoirs, Groundwater and Sewers

5.8. Flood risk from other sources is considered to be low, therefore mitigation is not required.

Increase to Flood Risk Elsewhere

5.9. It is understood that the proposed development is for the construction of a single storey side and rear extension to the existing dwelling. As such, the proposal constitutes a Minor Development under the NPPF.

5.10. The West London SFRA states that if permissible development decreases the volume of a fluvial floodplain or surface water flood area, flood storage compensation must be provided. The compensatory storage provided must equal or exceed the storage lost to ensure there will be no net loss of flood storage. Where developments are proposed within Flood Zone 3a (surface water), floodplain compensation must account for predicted flood depths for the 1 in 30yr and 1 in 100yr RoFSW mapping or depths predicted by site specific modelling.

5.11. It has been demonstrated within the analysis that the increase in built footprint is located to the rear of the existing property, generally where flood depths are shown to not exist. There are small corners of pixels that are shown to have a high risk of exceeding 0.3m, however, the flow pathway for this catchment is from north to south and these flood depth pixels originate from the existing building – which will act as a barrier to flooding. Therefore, compensatory flood storage for pluvial flooding is not considered necessary.

5.12. However, Flood Compensatory Storage for fluvial flooding will be required to ensure there is no increase in flood risk during the 1in100-year+CC scenario.

5.13. The flood level for the 1in100+25%CC scenario is uniform across the site at 41.28m AOD.

5.14. Levels at the location of the rear extension average approximately 41.16m AOD. This gives flood depths of 0.12m.

5.15. The proposed increase in built footprint totals 29m^2 which means a total of 3.48m^3 of displaced flood water that required compensation.

5.16. Given the proposals are for a minor development, it is understood that compensatory flood storage (CFS) can be provided within the floodplain. Furthermore, there is no land above 41.28m AOD that could be lowered within the site boundary.

5.17. Figure 16 shows the proposed compensation areas. There will be small alterations to the rear patio which will provide an additional 9m^2 storage area, then it is proposed to lower an 80m^2 area in the rear garden – avoiding the existing trees.

5.18. The 9m^2 area will be lowered by approximately 100mm and therefore provide 0.9m^3 of storage and the 80m^2 rear garden will be lowered by approximately 50mm, providing 4.0m^3 of storage.

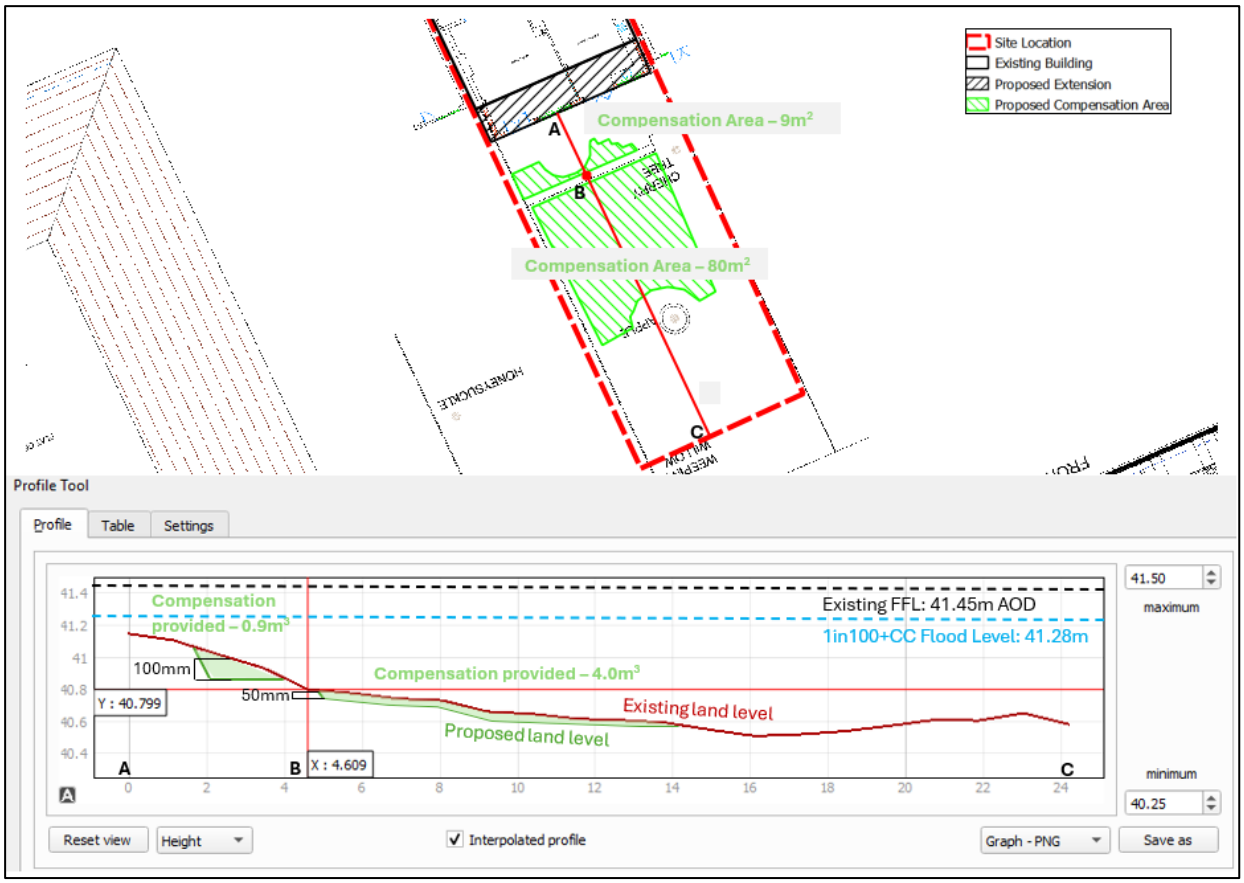


Figure 16: Proposed Compensation Cross Section

5.19. Based on the calculations above, the proposals will provide 4.9m^3 of additional flood compensation, which is greater than the 3.48m^3 of displaced flood water. A larger version of Figure 16 has been provided within Appendix B.

5.20. Therefore, there will be no increase in flood risk elsewhere as a result of the development.

Flood Warnings

5.21. The site is in the Environment Agency 'River Pinn at Ruislip' flood warning service area. This service allows site owners 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.

5.22. 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.

Surface Water Drainage & SuDS

5.23. The site is located within a Critical Drainage Area, as defined by the West London SFRA. Therefore, there is a requirement to incorporate SuDS into the proposed development as per Table 4-2[12] of the West London SFRA.

5.24. The existing building is positively drained via existing rainwater downpipes.

5.25. It is recommended that betterment be provided by incorporating a green roof, possibly with additional depression storage (PermaSEAL PRO 20P, or similar) and a small capacity 'leaky' water butt, for example a capacity of 300 litres, or 0.3m^3, which will be fitted to a downpipe to provide water for non-potable uses around the site, before discharging to the existing private surface water drainage on site.

5.26. It is proposed to incorporate a green roof on the proposed extension flat roof area. This totals approximately 29m^2. The green roof is also recommended to incorporate additional membrane storage within the subbase using PermaSEAL PRO 20P (or similar).

5.27. PermaSEAL PRO 40P is a high-performance drainage and water storage membrane specifically designed for green roofs. It incorporates 20mm deep perforated studs which offers a water storage capacity of approximately 8l/m^2. Therefore, the green roof will provide a total of 0.23m^3 of attenuation capacity.

5.28. A 'leaky' water butt for SuDS is a standard water butt that has been intentionally modified to release stored rainwater slowly and in a controlled manner back into the drainage system or the surrounding ground. During heavy rainfall, it captures water from the roof, preventing it from

[12] **https://westlondonsfra.london/wp-content/uploads/2019/03/West-London-SFRA-Table-4-2-v1.4.pdf**

immediately overwhelming the drains and contributing to surface water flooding. The stored water is then gradually released through a small hole or a slow-release mechanism over a period of time after the rain has stopped. The slow-release mechanism usually consists of a small hole (or valve) near the base of the water butt.

5.29. Maintenance of the surface water drainage infrastructure within the bounds of the site curtilage will be the responsibility of the site owner.

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 72 Park Avenue, London, HA4 7UJ. 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:

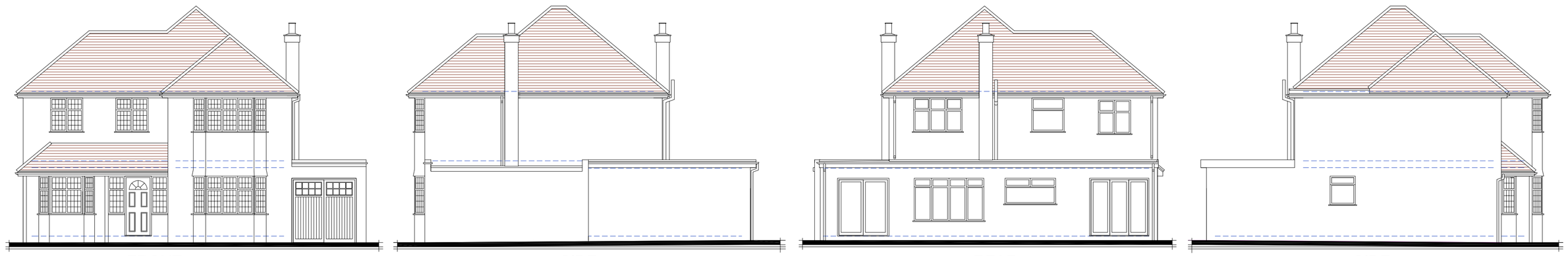
Source of Flooding	Flood Risk Summary
Fluvial	The site is located within Flood Zone 3. Analysis of the 2D nodes across the site for the 1in50-year scenario show a flood level of 41.10m AOD. The existing dwelling is located above the flood level at 41.20m AOD and the minimum level on the site is circa. 40.10m AOD. Analysis of this data shows that the existing building and proposed extension is located on land topographically higher than the 1in50-year flood level, except for a small corner on the southwestern side of the extension – which is considered negligible. Therefore, no new development is proposed within Flood Zone 3b. Analysis of the present day modelled data shows that during the 1in20-year (5% AEP), 1in50-year (2% AEP) and 1in100-year (1% AEP) and 1in1000-year (0.1% AEP) shows that the site may be affected in all scenarios. However, the existing building (FFL: 41.45m AOD) would remain unaffected during the 1in20-year, 1in30-year and 1in100-year scenarios. The flood level for the 1in100+25%CC scenario is uniform across the site at 41.28m AOD. Based on minimum topographic levels on site, the rear garden could experience flood depths of 1.18m during this scenario. However, the existing building (FFL: 41.45m AOD) is 0.17m higher and therefore would not experience any internal flooding during this event. Based on the analysis, the risk of fluvial flooding to the site can be considered high. However, the existing finished floor levels are topographically higher than the 1in100+CC design event, therefore, the risk of internal flooding can be considered low to moderate.
Pluvial	Analysis EA Online 'Flood Risk from Surface Water – Climate Change' flood depth map for the likelihood of flood depths exceeding 0.3m shows that the front garden

	and areas around the existing building may experience a 'high' risk of depths exceeding depths greater than 0.3m. The rear garden has a 'low' to 'high' chance of experiencing flood depths greater than 0.3m Analysis of the other flood depth intervals mapping (0.6m, 0.9m and 1.2m) shows the site is outside all likelihood categories apart from a small area in the front garden, which may have a 'low' chance of exceeding 0.6m. The increase in built footprint is located to the rear of the existing property, generally where flood depths are shown to not exist. There are small corners of pixels that are shown to have a high risk of exceeding 0.3m, however, the flow pathway for this catchment is from north to south and these flood depth pixels originate from the existing building – which will act as a barrier to flooding. Therefore, compensatory flood storage for pluvial flooding is not considered necessary. Overall, the risk of flooding from pluvial sources can be considered to be moderate to high.
Tidal Reservoirs Groundwater Sewers Canals	The site is considered to be at low risk from other 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



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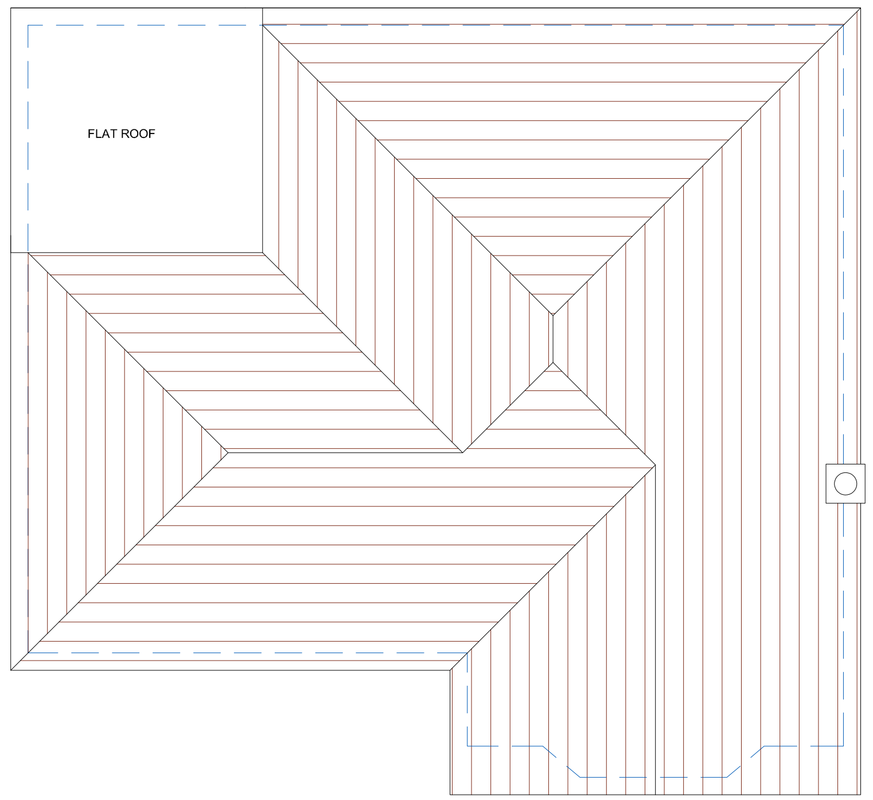
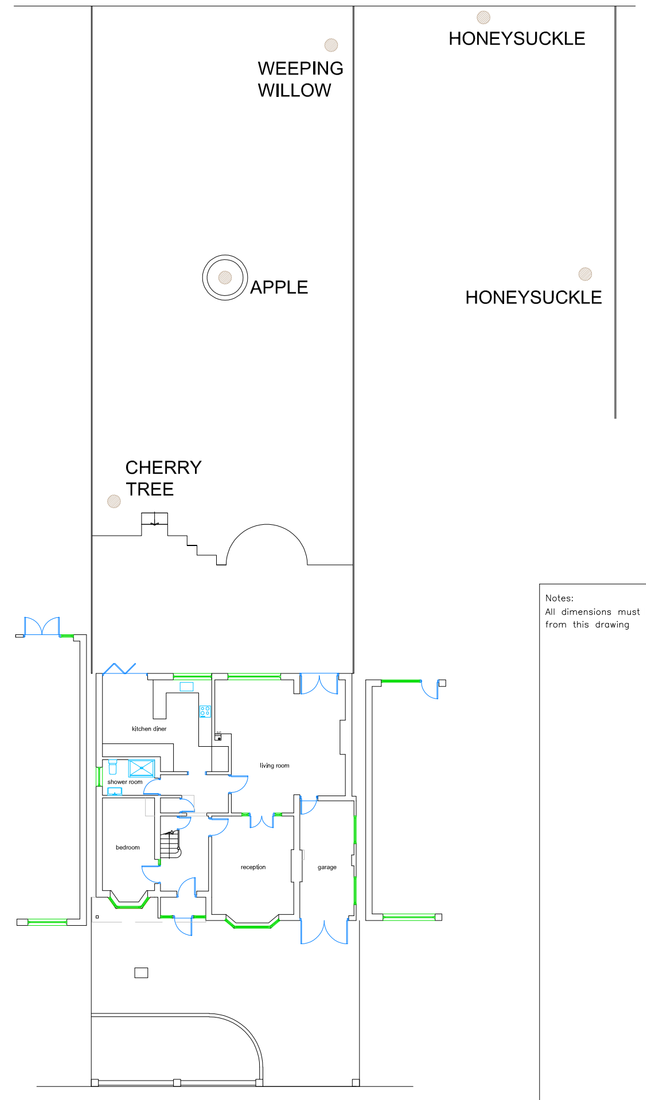
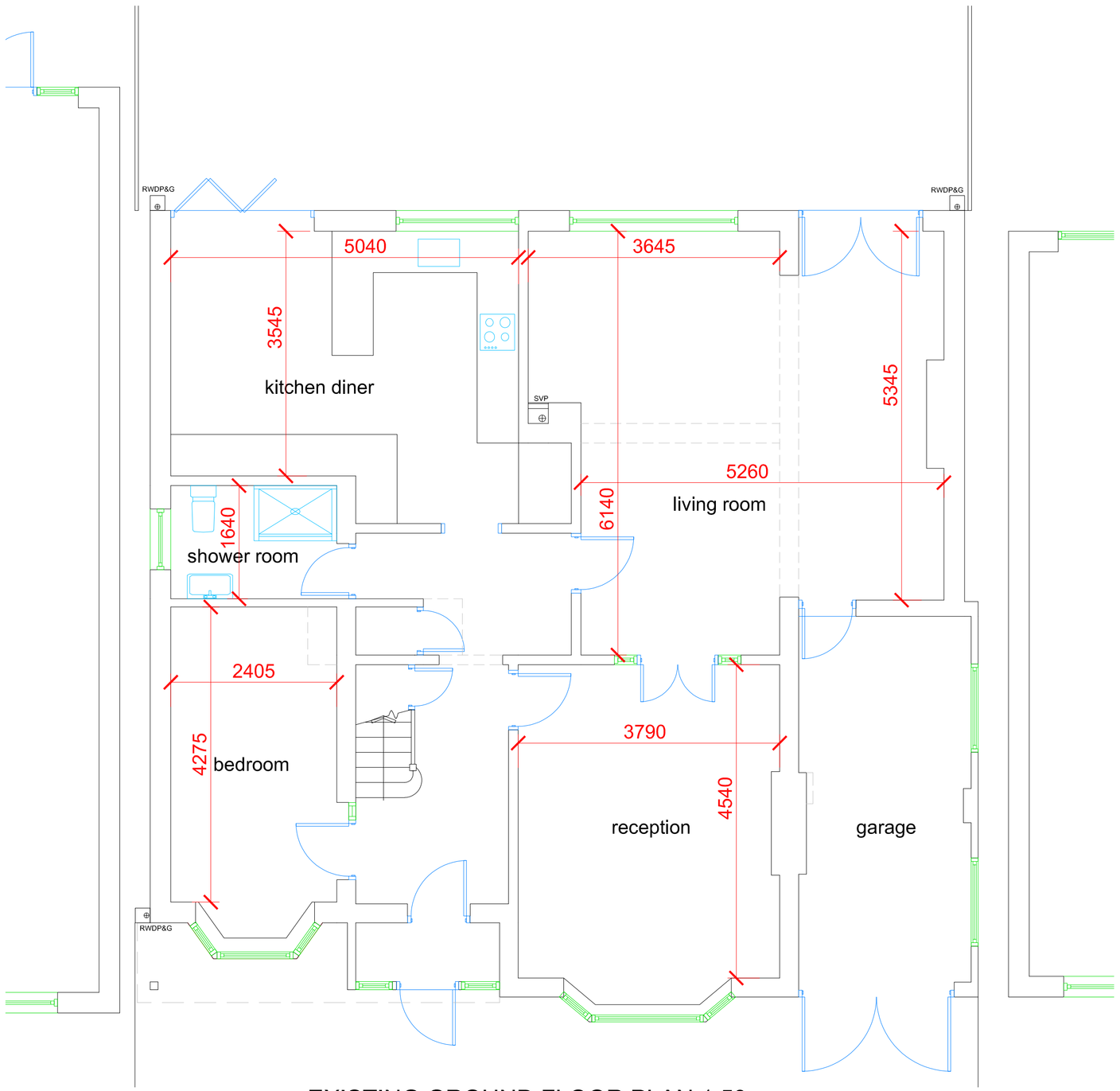


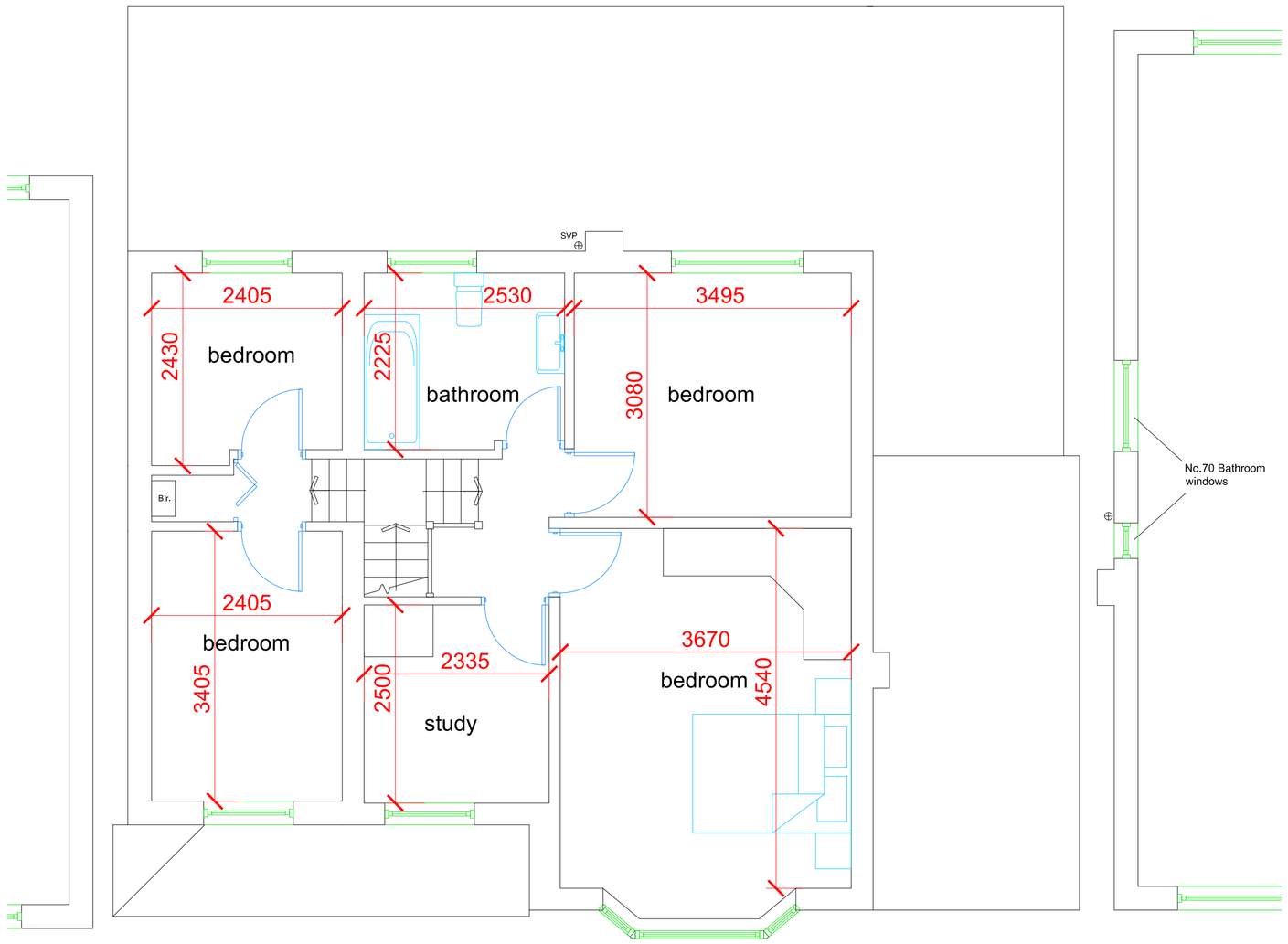
EXISTING ROOF PLAN 1:50



EXISTING SITE PLAN 1:200



EXISTING GROUND FLOOR PLAN 1:50



EXISTING FIRST FLOOR PLAN 1:50

Notes:
All dimensions must be checked on site and not scaled from this drawing

1:20 1:50 1:100 1:1250

N.R. Hammond
ARCHITECTURAL SERVICES
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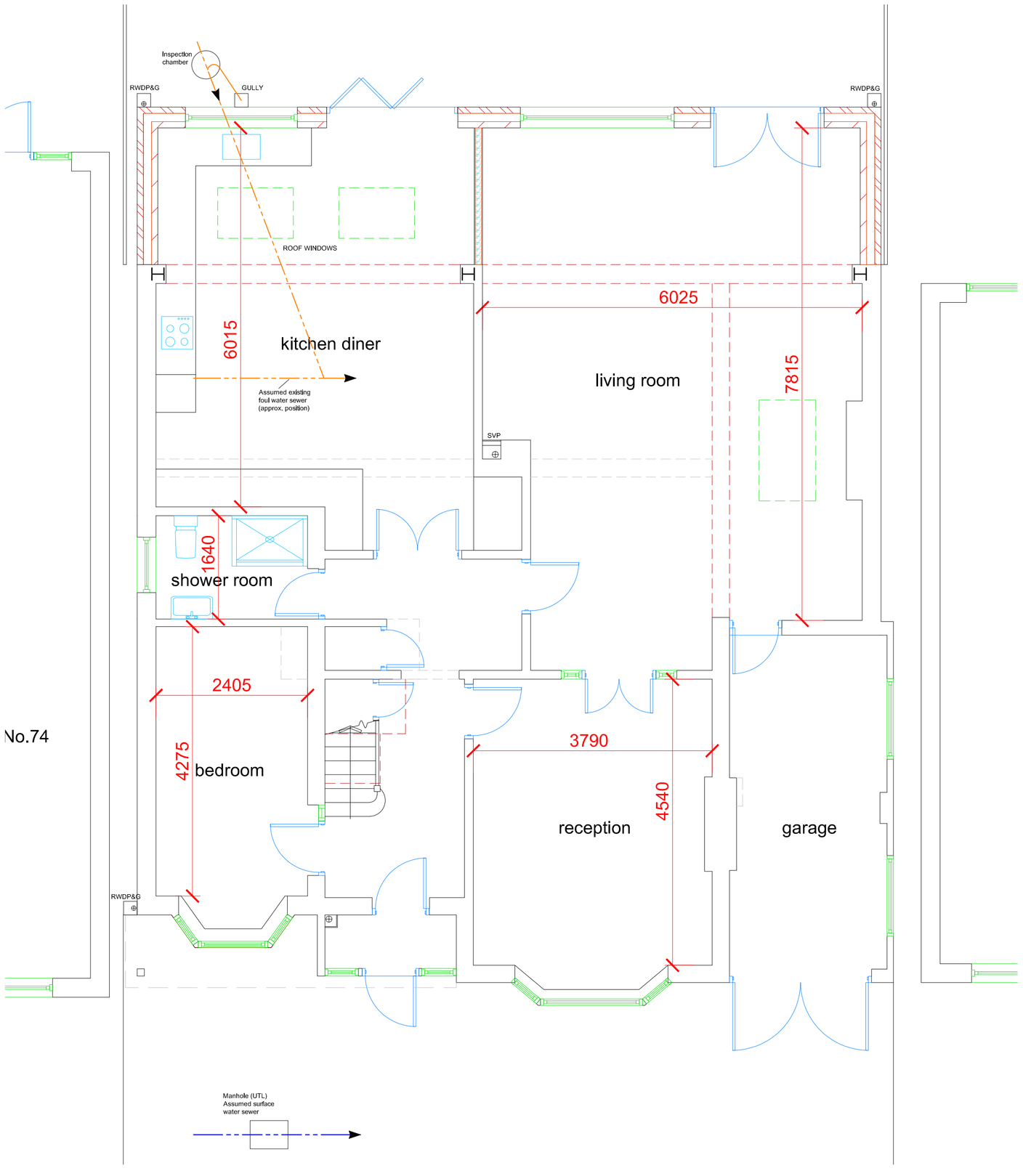
Job Title
Extensions and Alterations at
72 PARK AVENUE
RUISLIP
HA4 7UJ

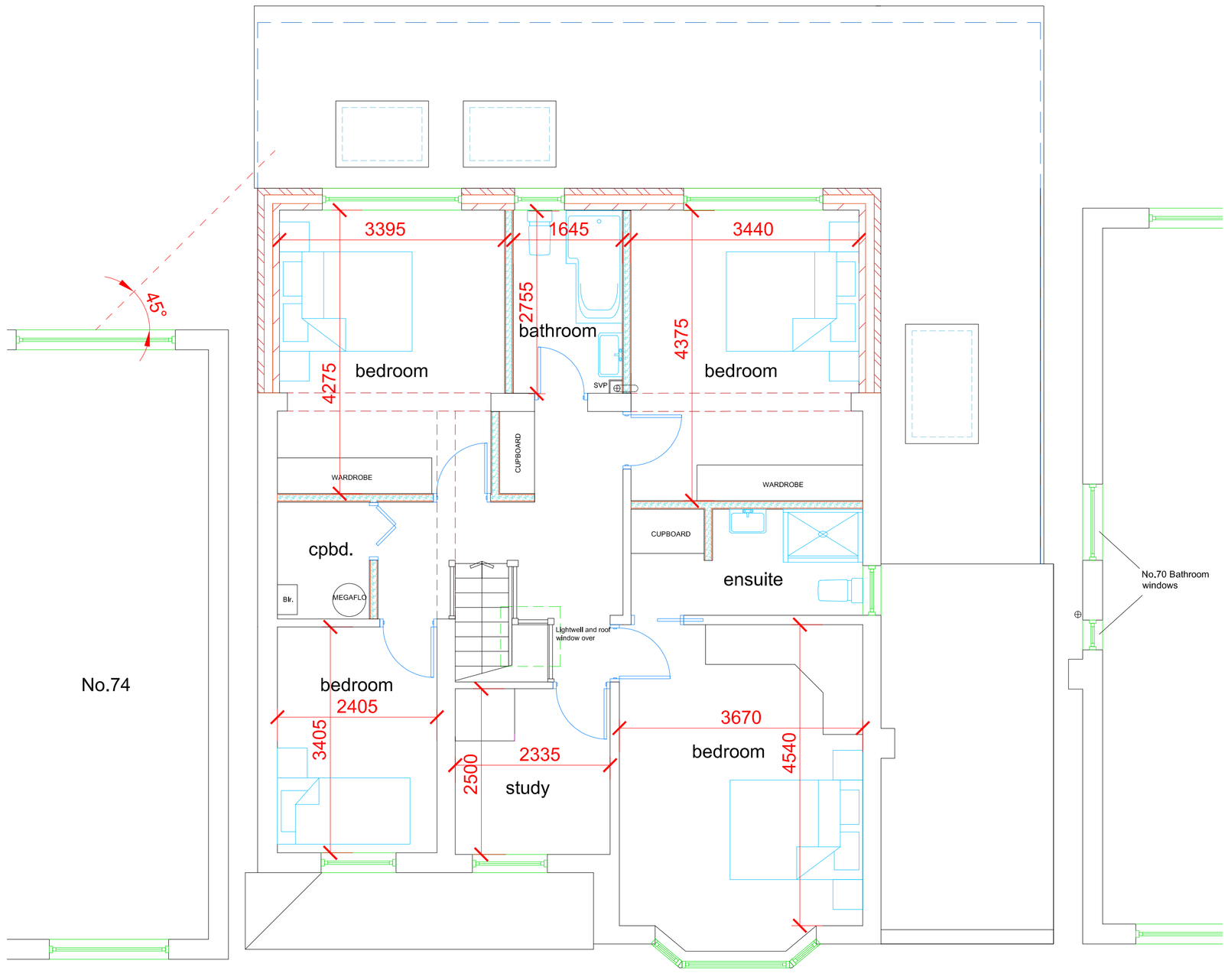
Drawing Title
EXISTING FLOOR AND ROOF PLANS

Scale	Paper Size
1:50 1:100 1:200	A1
Date	Drawn By
MAY 25	NRH

Job No	Drg No	Rev
NRH26	01	



PROPOSED GROUND FLOOR PLAN 1:50



PROPOSED FIRST FLOOR PLAN 1:50

Notes:
All dimensions must be checked on site and not scaled from this drawing

0.2 0.4 0.6 0.8 1m 1:20
0.5 1m 1.5 2m 2.5 1:50
1m 2m 3m 4m 5m 1:100
0 200m 400m 600m 1:1250

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Job Title
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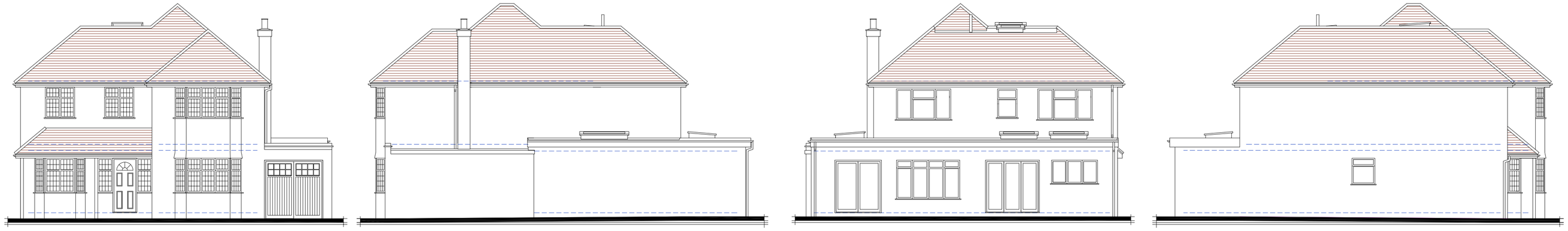
72 PARK AVENUE
RUISLIP
HA4 7UJ

Drawing Title
PROPOSED FLOOR PLANS

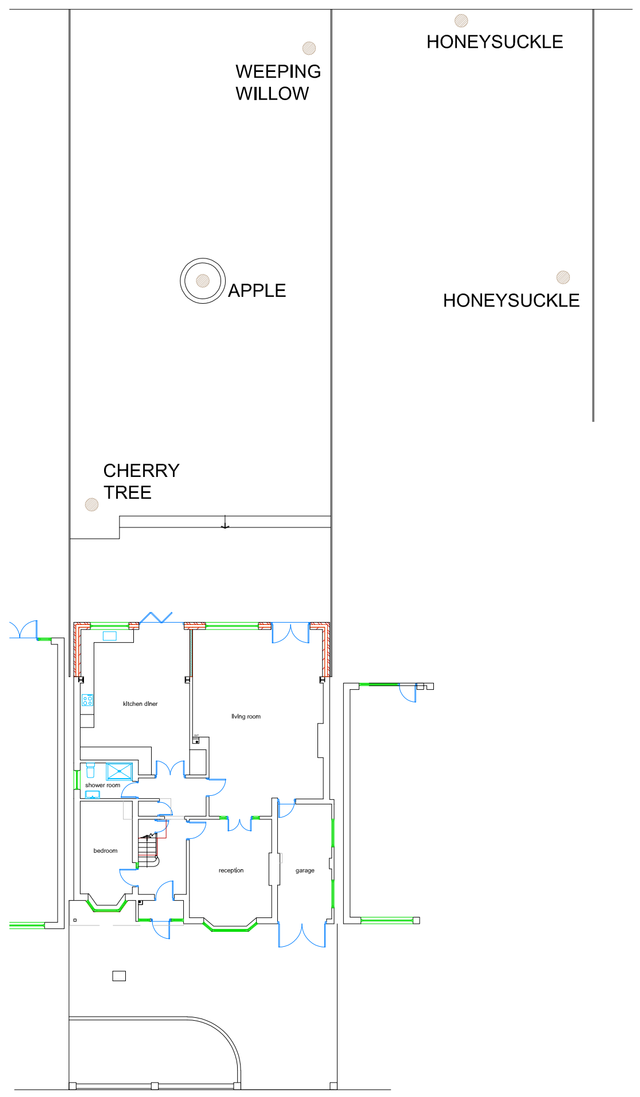
Scale	Paper Size
1:50	A1
Date	Drawn By
MAY 25	NRH

Job No	Drg No	Rev.
NRH26	02	

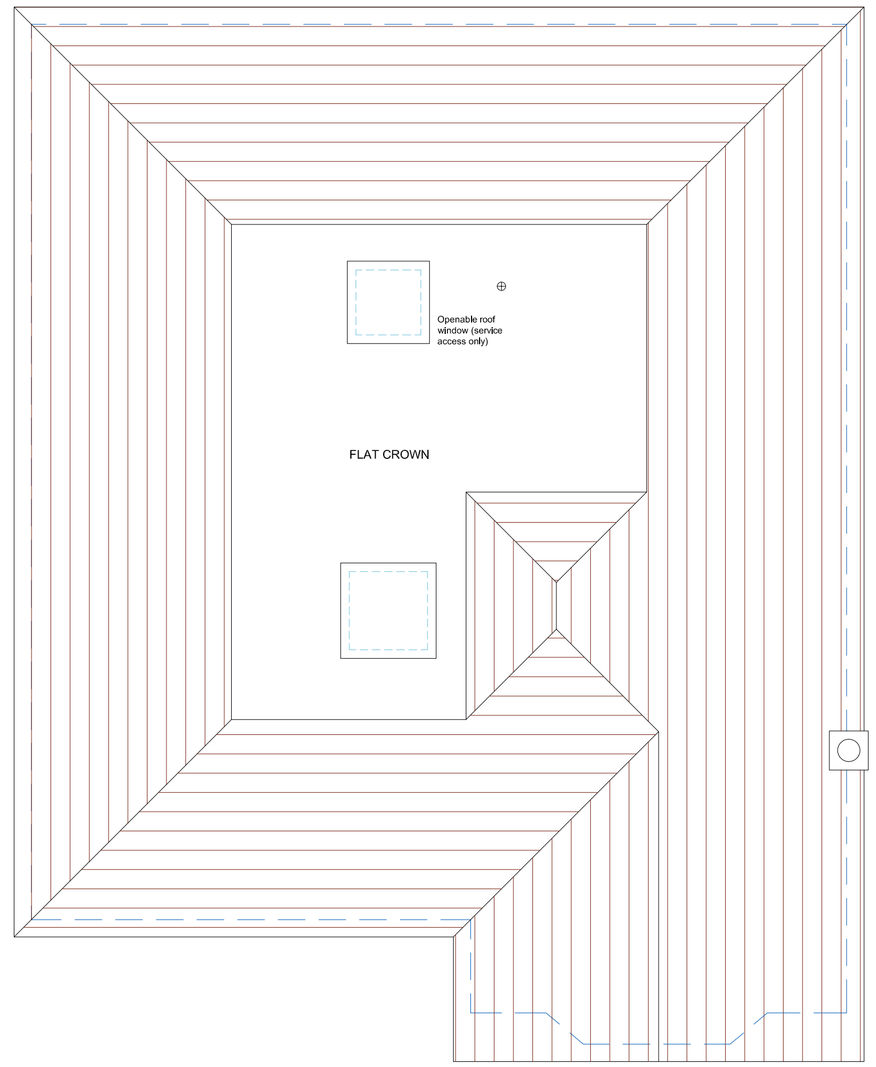


FRONT SIDE REAR SIDE

EXISTING ELEVATIONS 1:100



PROPOSED SITE PLAN 1:200



PROPOSED ROOF PLAN 1:50

Notes:
All dimensions must be checked on site and not scaled from this drawing

0.2 0.4 0.6 0.8 1m 1:20
0.5 1m 1.5 2m 2.5 1:50
1m 2m 3m 4m 5m 1:100
0 200m 400m 600m 1:1250

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Job Title
Extensions and Alterations at
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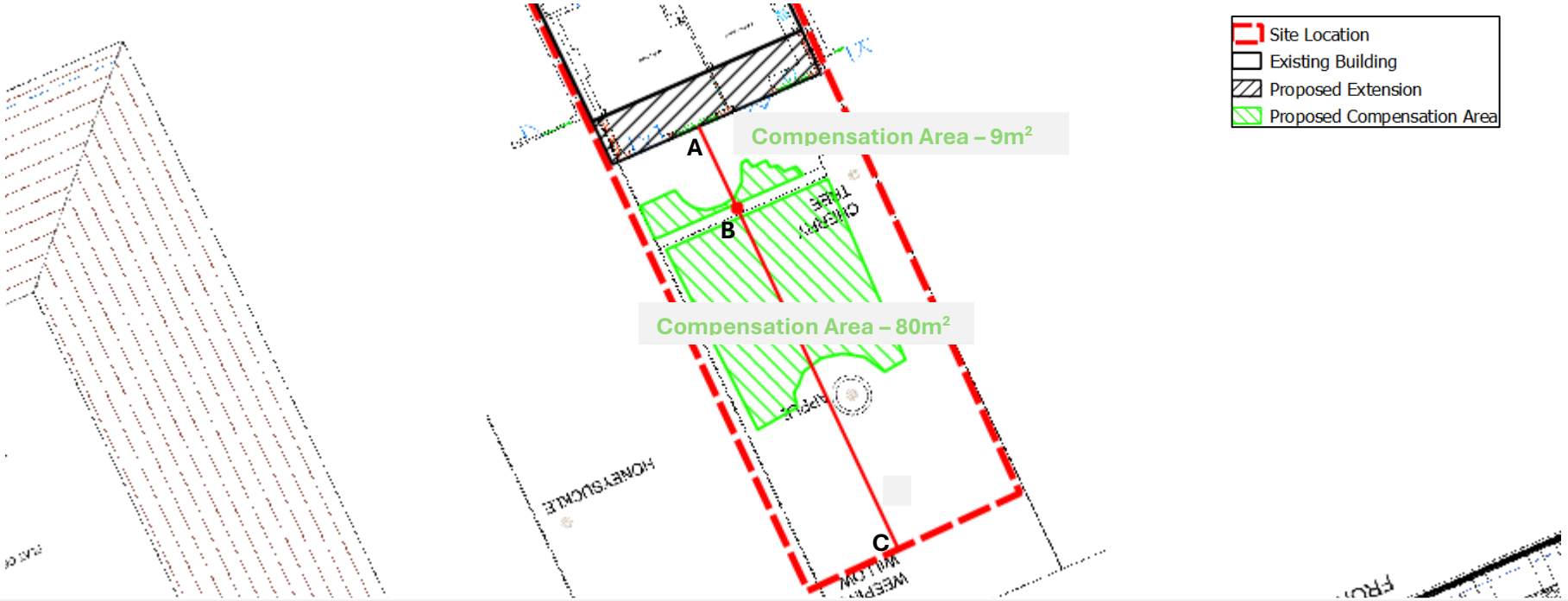
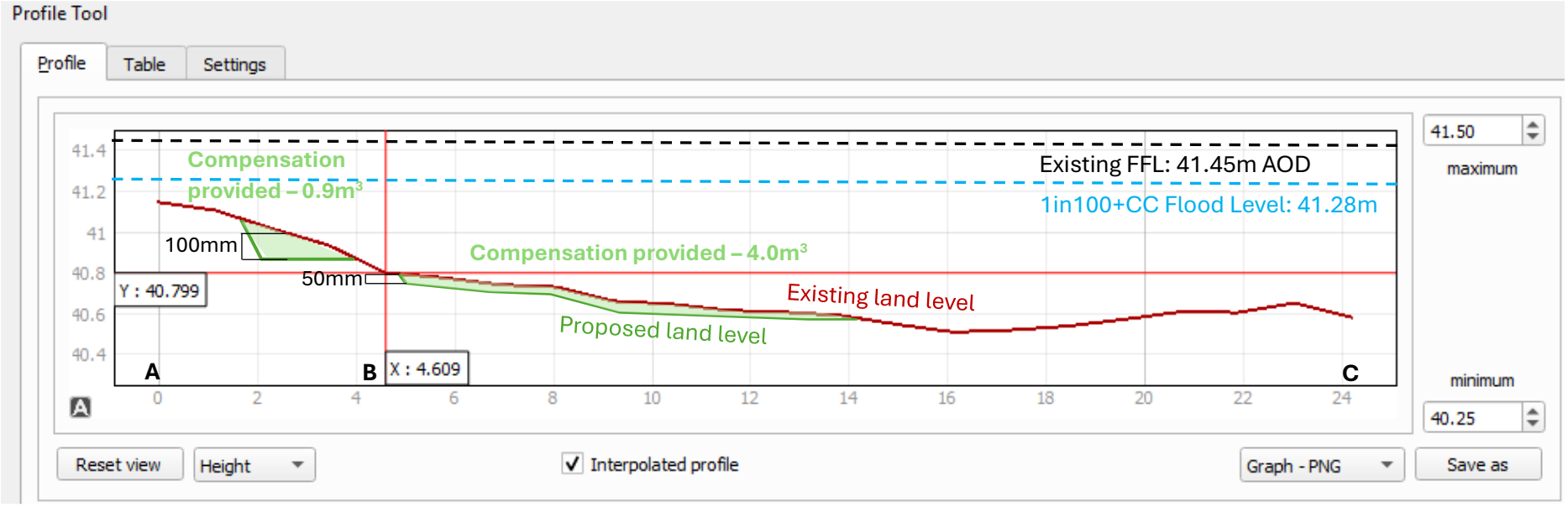
Drawing Title
PROPOSED SITE PLAN, ROOF PLAN AND ELEVATIONS

Scale	Paper Size
1:50 1:100 1:200	A1
Date	Drawn By
MAY 25	NRH

Job No	Drg No	Rev
NRH26	03	

Appendix B - CFS Summary


Site Location
Existing Building
Proposed Extension
Proposed Compensation Area
Compensation Area – 9m²
Compensation Area – 80m²
A
B
C


Profile Tool
Profile
Table
Settings
Compensation provided – 0.9m³
Existing FFL: 41.45m AOD
1in100+CC Flood Level: 41.28m
100mm
Compensation provided – 4.0m³
50mm
Y : 40.799
Existing land level
Proposed land level
X : 4.609
A
B
C
41.4
41.2
41
40.8
40.6
40.4
0
2
4
6
8
10
12
14
16
18
20
22
24
41.50
maximum
minimum
40.25
Reset view
Height
Interpolated profile
Graph - PNG
Save as