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Flood risk, water and environment

Flood Risk Assessment AEG02612_M21_Manchester_01

Site Address: 154 Brantingham Road
Chorlton-Cum-Hardy
Manchester
M21 0TS

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

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Site Location: 154 Brantingham Road, Chorlton-Cum-Hardy, Manchester, M21 0TS

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Summary

Development Description	Existing	Proposed
Development Type	A residential dwelling	An extension to the existing dwelling and a construction of a rear outbuilding to be used for storage
EA Vulnerability Classification	More Vulnerable	More Vulnerable
Ground Levels	Ground elevations varies between approximately 28.55mAOD and 29.15mAOD across the site based on EA LiDAR data (1m resolution)	No change. Finished Floor Levels (FFLs) of the extensions and outbuilding should be set no lower than the existing FFLs in line with EA Standing Advice for Minor Developments
Level of Sleeping Accommodation	First Floor	No change
Surface Water Drainage	N/A ¹	Proposed to manage runoff via existing surface water drains on site. Small scale SuDS recommended in external areas.
Site Size	Approximately 370m ²	No change
Risk to Development	Summary	Comment
EA Flood Zone	Flood Zones 1 and 2	
Flood Source	Fluvial	Chorlton Brook and Corn Brook
SFRA Available	Manchester City, Salford City and Trafford Councils Level 1 Hybrid SFRA (Manchester, Salford and Trafford, 2010) Greater Manchester Level 1 Strategic Flood Risk Assessment (Greater Manchester Combined Authority (Manchester City Council, 2019)	
Management Measures	Summary	Comment
Ground floor level above extreme flood levels	Yes	Site unaffected in modelled 1 in 100 year +CC event but partially affected in 1 in 1000 year event. Finished Floor Levels (FFLs) of the extension should be set no lower than the existing FFLs in line with EA Standing Advice for Minor Developments.
Safe Access/Egress Route	Yes	Access/ egress arrangements would not differ from existing as the proposal is a Minor Development. Safe access and egress should be possible via Brantingham Road
Flood Resilient Design	Yes	Extension should be constructed in flood resilient manner in accordance with CLG <i>Report Improving the Flood Performance of</i>

Site Drainage Plan		<i>New Buildings – Flood Resilient Construction¹ (2007).</i>
	N/A ¹	Runoff from extension could be discharged via existing system given that proposal is Minor Development. Betterment could be provided through small-scale SuDS such as rainwater planters and water butts.
Flood Warning & Evacuation Plan	N/A ¹	Site owners should sign up to nearby Flood Warning Area – Chorlton and Platt Brooks at Whalley Rang and Chorlton-cum-Hardy – if not done so already.
Offsite Impacts	Summary	Comment
Displacement of floodwater	Negligible	Site unaffected in modelled 1 in 100 year +CC event. Proposal is considered a Minor Development which may not result in significant impact of floodplain storage in isolation.
Increase in surface run-off generation	N/A	Runoff from extension could be discharged via existing system given that proposal is Minor Development. Betterment could be provided through small-scale SuDS such as rainwater planters and water butts.
Impact on hydraulic performance of channels	Negligible	The proposed development should not affect any watercourses. The Chorlton Brook (main river) is located approximately 916m south of the site.

¹ not required for this assessment. ² data not available.

1

https://assets.publishing.service.gov.uk/media/602d673ee90e0709e8d085d8/Improving_the_Flood_Resilience_of_Buildings_Through_Improved_Materials_Methods_and_Details_Technical_Report.pdf

1. Introduction

- 1.1. Aegaea were commissioned by LDMG 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 154 Brantingham Road, Chorlton-Cum-Hardy, Manchester, M21 0TS (Figure 1).

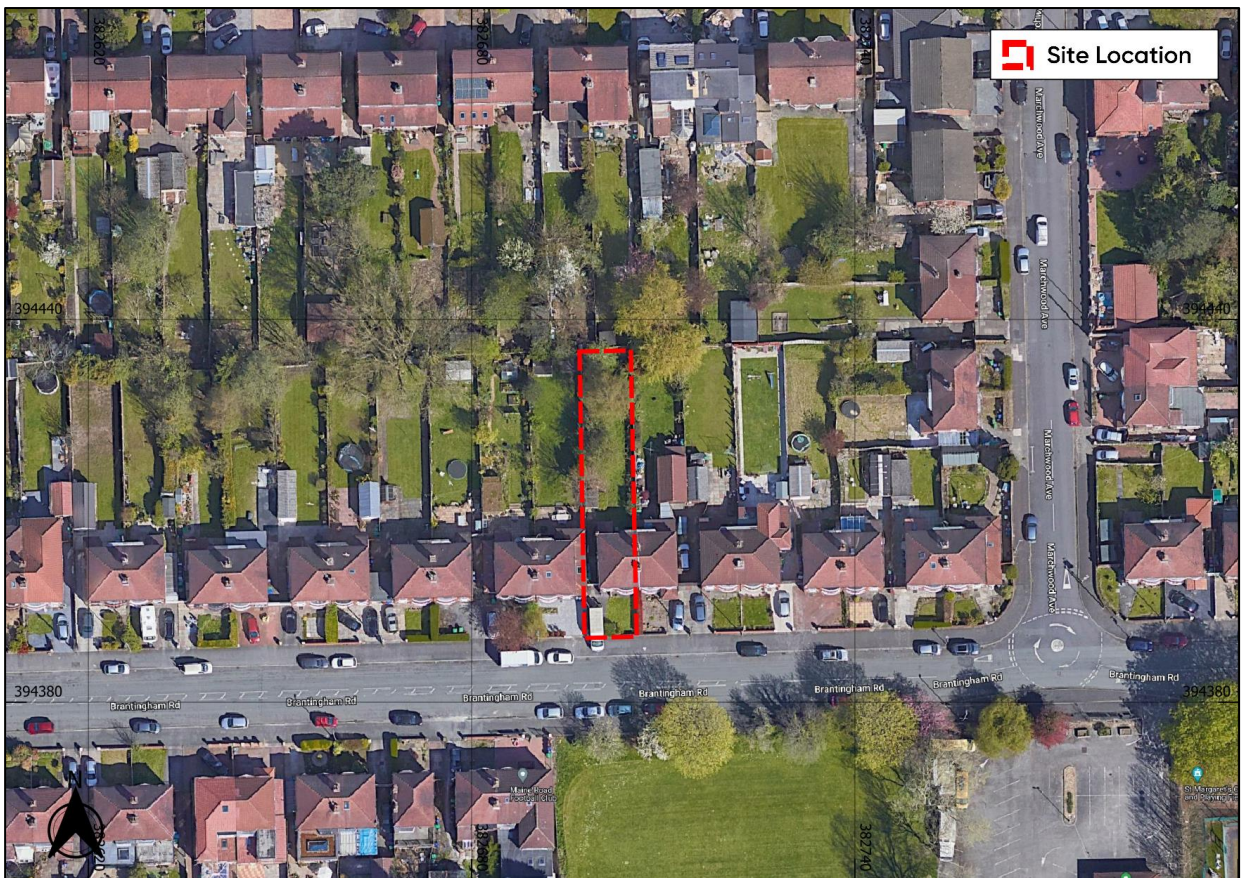


Figure 1: Site Location (source: Google Satellite Imagery)

- 1.4. It is understood that the proposed development is for the construction of an extension to the existing dwelling, in addition to construction of a rear outbuilding to be used for storage as

shown in Figure 2. A full set of development proposals can be found in Appendix A of this report.

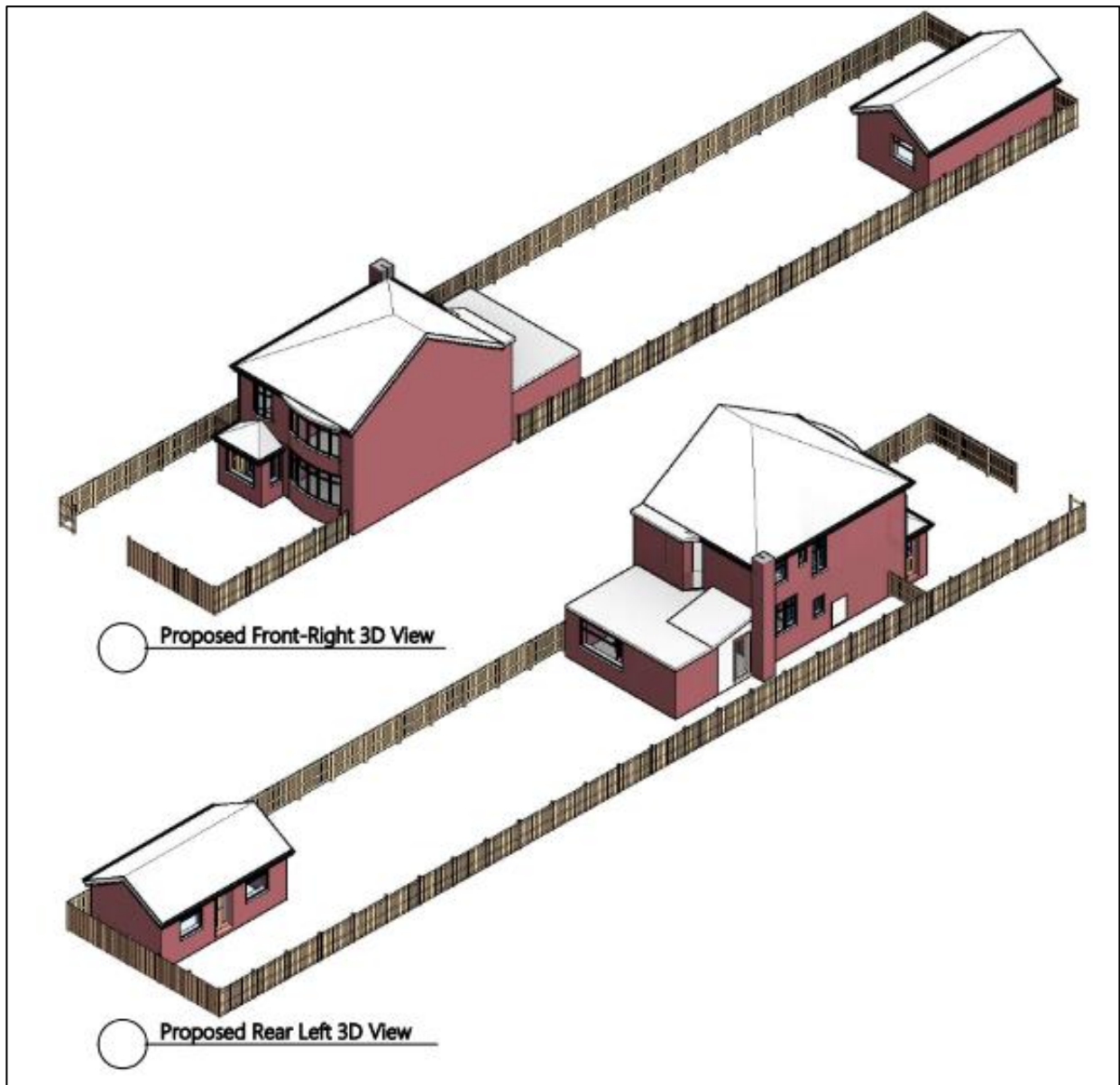


Figure 2: Proposed Development showing the rear extension and storage.

1.5. In the absence of a topographical survey, Environment Agency Light Detection and Ranging (LiDAR) data Digital Terrain Model (1m resolution) has been used to review the topography of the site (Figure 3). Analysis of the 1m LiDAR data shows that the ground elevation varies between approximately:

- 28.55m AOD (meters Above Ordinance Datum) and 29.15m AOD across the site;
- 28.73m AOD and 29.05m AOD at the location of the proposed rear extension; and

- 28.75mAOD and 28.96mAOD at the location of the proposed rear outbuilding (storage).

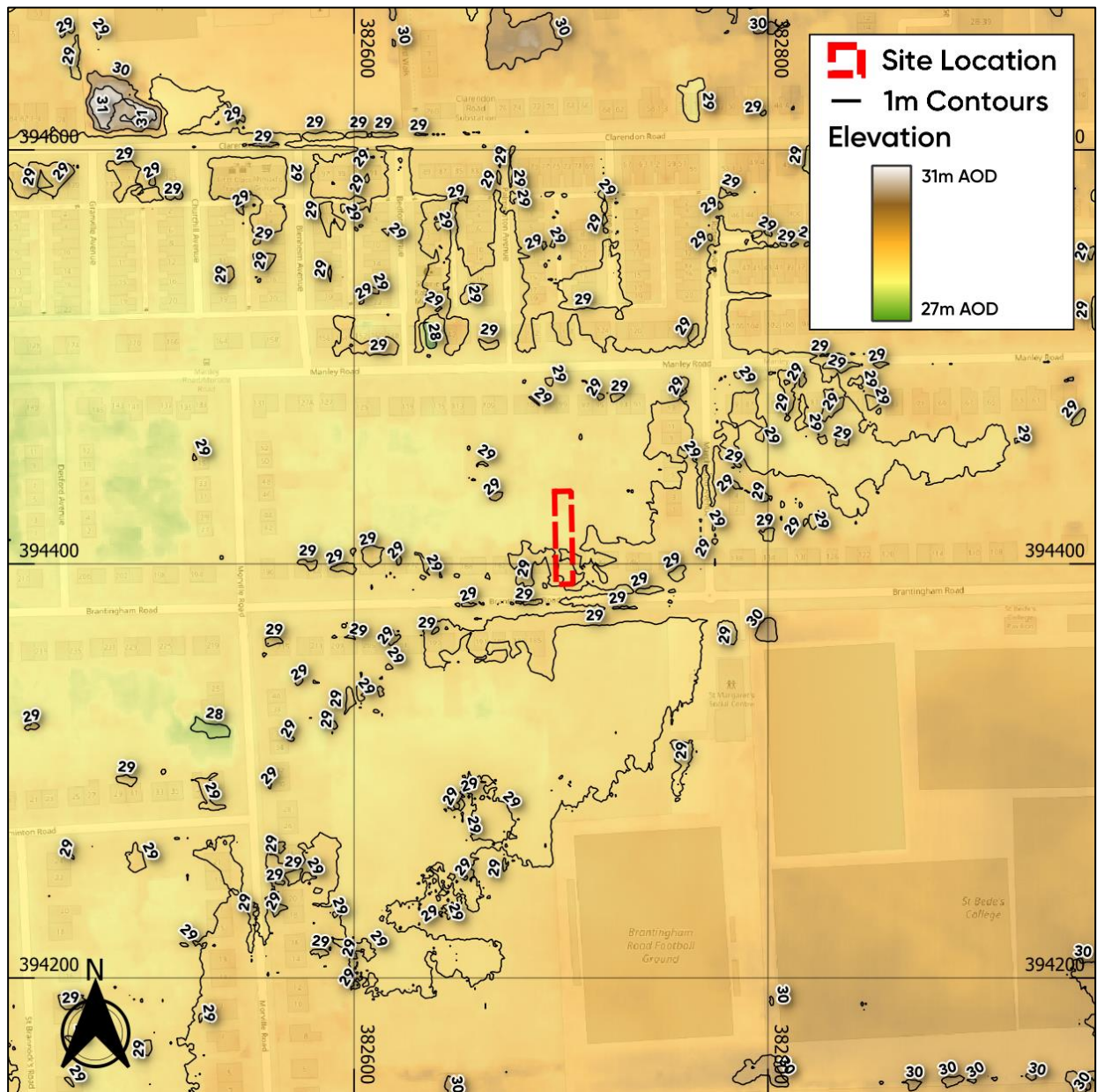


Figure 3: Site Topography (Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © <https://www.openstreetmap.org> and contributors. Contains public sector information licensed under the Open Government Licence v3.0).

- 1.6. Manchester City 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 Greater Manchester Merseyside and Cheshire region.

Planning Policy and Guidance

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

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

1.8. The site is partially in Flood Zone 2 therefore the NPPF states that an FRA is required.

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

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

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

2. Planning Policy

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

National Planning Policy Framework (NPPF)

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

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

167. When determining any planning applications, local planning authorities should ensure that flood risk is not increased elsewhere. Where appropriate, applications should be supported by a site-specific flood-risk assessment. Development should only be allowed in areas at risk of flooding where, in the light of this assessment (and the sequential and exception tests, as applicable) it can be demonstrated that:

- a) within the site, the most vulnerable development is located in areas of lowest flood risk, unless there are overriding reasons to prefer a different location;*
- b) the development is appropriately flood resistant and resilient such that, in the event of a flood, it could be quickly brought back into use without significant refurbishment;*
- c) it incorporates sustainable drainage systems, unless there is clear evidence that this would be inappropriate;*

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

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

168. 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 55. "

2.3. 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.*

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

2.5. Footnote 55 of the NPPF states:

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

2.6. 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.

Local Plan - Manchester City Council

- 2.8. The Local Plan prepared by the Local Planning Authority, Manchester City Council, sets out the policies for development in the local area. The proposed development lies under the jurisdiction of this LPA and therefore will be required to adhere to the local plan policies. The policy related to flood risk is presented below:

Policy EN 14 - Flood Risk

- In line with the risk-based sequential approach contained within PPS25, development should be directed away from sites at the greatest risk of flooding, and towards sites with little or no risk of flooding; this should take account of all sources of flooding identified in the Manchester-Salford-Trafford Strategic Flood Risk Assessment (SFRA).*
- In addition to the requirements for site-specific Flood Risk Assessments (FRAs) set out in PPS25, an appropriate FRA will also be required for all development proposals, including changes of use, on sites greater than 0.5ha within Critical Drainage Areas (CDAs) and Canal Hazard Zones identified in the SFRA.*
- All new development should minimise surface water run-off, including through Sustainable Drainage Systems (SUDS) and the appropriate use of Green Infrastructure. Developers should have regard to the surface water run-off rates in the SFRA User Guide. In CDAs, evidence to justify the surface water run-off approach / rates will be required.*
- The City of Manchester contains many sections of rivers which are culverted or 'hidden'; where these are indicated in the SFRA beneath the proposed development site, further investigation will be required and the development proposal should take this into account; where feasible and appropriate development should seek to open up culverted/hidden rivers to reduce the associated flood risk and danger of collapse, taking advantage of opportunities to enhance biodiversity and Green Infrastructure.*

Sequential and Exception Tests

- 2.9. 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.
- 2.10. Under the NPPF all new planning applications should undergo a Sequential Test unless a minor household development or a change of use application in accordance with paragraph 168 and footnotes 55 and 56.
- 2.11. Paragraph 168 of the 2021 NPPF states that:

168. 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 55. "

- 2.12. Therefore, in accordance with Paragraph 168 and footnotes 55 and 56 of the NPPF, the proposed development is classified as a minor development and should not be subject to the sequential or exception tests but should still meet the requirement for the site-specific flood risk assessments.

Summary

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

3. Consultation and Review

Consultation

- 3.1. The site sits within the Environment Agency's Greater Manchester Merseyside and Cheshire region. Product 4 data was requested and received from the EA. This data has been reviewed in Section 4 of this report and a full copy of the data received is included in Appendix B of this report.

Documents and Online Mapping

- 3.2. 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.
- 3.3. The following sources of information have been reviewed for this assessment:
- Flood Map for Planning on the Environment Agency website <https://flood-map-for-planning.service.gov.uk/>
 - Long Term Flood Risk Information on the Environment Agency website <https://www.gov.uk/check-long-term-flood-risk>
 - National Planning Policy Framework (NPPF) (Department for Levelling Up, Housing and Communities, 2021)
 - Planning Practice Guidance - Flood Risk and Coastal Change (Department for Levelling Up, Housing and Communities, 2022)
 - Geoindex Onshore (British Geological Survey, 2022)
 - Core Strategy 2012-2027 (Manchester City Council, 2012)⁴

⁴ https://www.manchester.gov.uk/downloads/download/5672/core_strategy

- Preliminary Flood Risk Assessment (Manchester City Council, 2011) and Preliminary Flood Risk Assessment Addendum (Manchester City Council, 2017)⁵
- Greater Manchester Level 1 Strategic Flood Risk Assessment (Greater Manchester Combined Authority – Manchester City Council, 2019)⁶
- Manchester City, Salford City and Trafford Councils Level 1 Hybrid SFRA (Manchester, Salford and Trafford, 2010)⁷
- Local Flood Risk Management Strategy (Manchester City Council, 2014)⁸

Preliminary Flood Risk Assessment (PFRA)

- 3.4. The PFRA, published in 2011 and 2017 (Addendum), is a high-level appraisal of flood risk across Lead Local Flood Authority Manchester City 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.
- 3.5. The PFRA summarises historical flood incidents in Manchester City Council. The site is not recorded as having been affected by any flood event.

Strategic Flood Risk Assessment (SFRA)

- 3.6. The SFRAs, published in 2010 and 2019, provides the evidence base for the Local Planning Authority Manchester City Council Local Plan and guidance for consideration when determining planning applications.

5 <https://webarchive.nationalarchives.gov.uk/ukgwa/20140328165058/http://cdn.environment-agency.gov.uk/flho1211bvmm-e-e.pdf>

6 <https://www.salford.gov.uk/planning-building-and-regeneration/salfords-natural-environment/flood-risk/strategic-flood-risk-assessment/>

7 https://www.manchester.gov.uk/download/downloads/id/26462/final_mst_level_1_sfra_mar_2010.pdf
<https://www.greatermanchester->

8

https://www.manchester.gov.uk/info/500207/planning_and_regeneration/5905/manchesters_local_flood_risk_management_strategy_lfrms/2

- 3.7. The SFRA seeks to place new development into areas of lower flood risk taking into account current flood risk, future flood risk, and the effect a proposed development would have on the risk of flooding.
- 3.8. The SFRA mapping provided by Manchester City 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)

- 3.9. The Local Flood Risk Management Strategy (2014) 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. The Manchester City Council LFRMS is used within this report to identify any flood management infrastructure and historical incidences of flooding.

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.

Main Rivers and Ordinary Watercourses

- 4.2. The nearest EA main river to the site is the Chorlton Brook, formed at the confluence of Platt Brook and Shaw Brook, approximately 916m south of the site. The river flows through Chorlton Ees Nature Reserve into the River Mersey.
- 4.3. Additionally, Corn Brook (a main river, according to product 4 data) is located approximately 1612m north of the site (see Product 4 data in Appendix B)

EA Flood Map for Planning

- 4.4. The EA Flood Map for planning (Figure 4) shows the site is located within Flood Zone 2 (medium risk) and Flood Zone 1 (low risk). The Flood Zones are defined as follows;
- Flood Zone 2 is denoted as land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding.
 - Flood Zone 1 is denoted as land having less than 1 in 1,000 (0.1%) annual probability of river or sea flooding.
- 4.5. The entire proposed storage and the northern section of the rear proposed extension are located in Flood Zone 2. However, the southern section of the extension is shown to be located in Flood Zone 1.

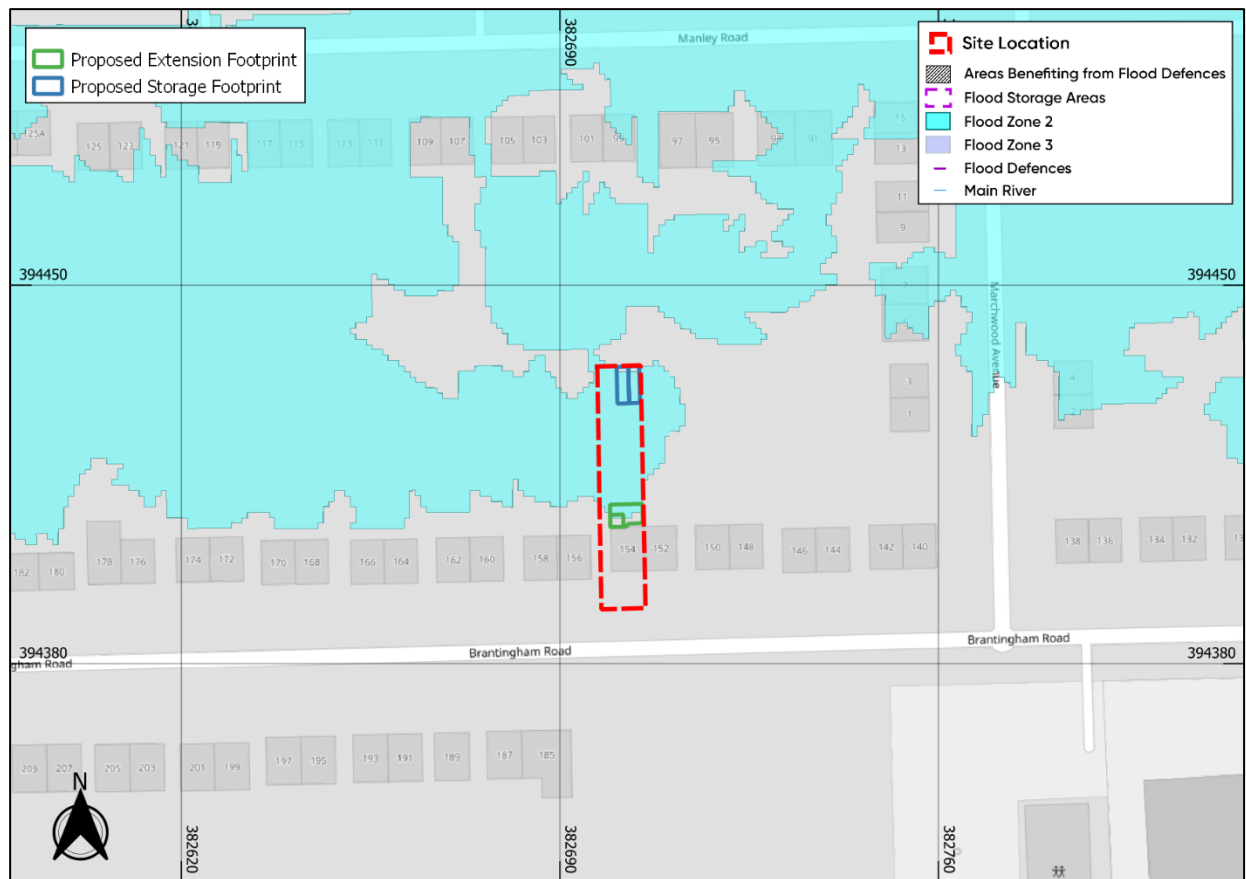


Figure 4: EA Flood Map for Planning (Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © <https://www.openstreetmap.org> and contributors. Contains public sector information licensed under the Open Government Licence v3.0.

Climate Change

- 4.6. The site is located within the Irwell Management Catchment, which has updated central peak flow river allowances of 12% for the 2020s, 19% for the 2050s, and 35% for the 2080s. As the proposal is for a more vulnerable development and that the design life is understood to reach at least until 2080s, a peak flow allowance of 35% would be required for fluvial flood flows.

EA Product 4 Data - Corn Brook (2017) Model

- 4.7. The EA have provided detailed modelling results for the site location in the form of Product 4 information extracted from the Chorlton Platt Gore (2012) and the Corn Brook (2017) fluvial models.
- 4.8. The data includes data for several return periods including climate change allowance scenarios. However, at nodes 7 and 8 only the undefended 0.1%AEP and 0.1%AEP+30%CC events have been included. A full set of the Product 4 data will be included in Appendix B of this report.
- 4.9. The map in Figure 5 shows the location of the modelled 1D in channel nodes and 2D nodes. 2D flood level nodes (Nodes 7 and 8) which lies within the curtilage of the site have been included.
- 4.10. Review of the data indicates that the 2D flood levels at the site are only provided from the Corn Brook (2017) Model and thus this data will be used to determine the fluvial flood risk to the site.
- 4.11. It should be noted that in the Product 4 data tables provided, the 2D node results have been mislabelled as nodes 4 and 5, when after cross reference with the Eastings and Northings of the node locations, should clearly be labelled nodes 7 and 8. As such, the 2D levels for Node 7 and 8 have been used to determine the flood risk to the proposed development.
- 4.12. Note that only the undefended model scenario for Nodes 7 and 8 (site location) were provided. No defended scenario was provided even for the in-channel nodes on Corn Brook and thus, the undefended scenario is considered to be appropriate.

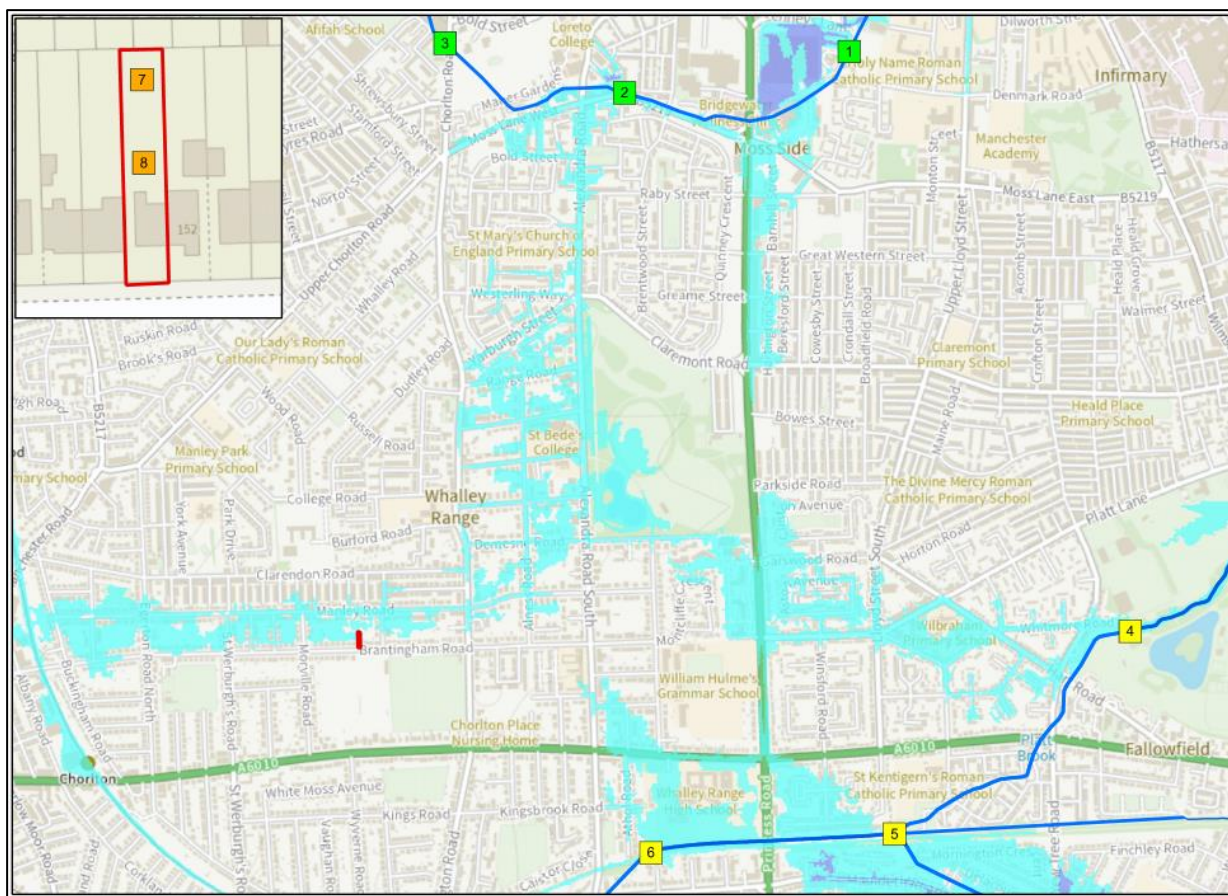


Figure 5: EA Model Node Locations (Contains Environment Agency information © Environment Agency and/or database rights. Contains Ordnance Survey data © Crown copyright 2023 Ordnance Survey 100024198)

- 4.13. No modelled flood levels are provided at Nodes 7 and 8 for all events smaller than 1 in 1000 year (such as 1 in 100 year +CC). It is understood that the site is unaffected in these smaller events.
- 4.14. Node 7 is shown to experience flooding in only the undefended modelled 0.1%AEP+30%CC allowance event and Node 8 is shown to experience flooding in the undefended modelled 0.1%AEP and 0.1%AEP+30%CC allowance event.
- 4.15. Node 8 could experience a flood level of 28.86m AOD in the 0.1%AEP event. The modelled flood level at both Nodes 7 and 8 in the 0.1%AEP+30%CC event is 28.94m AOD.
- 4.16. Based on the lowest ground elevation (EA LiDAR data), the flood depths within the proposed rear extension curtilage (Node 8) could range up to 0.13m in the modelled undefended 0.1%AEP and up to 0.21m in the modelled undefended 0.1%AEP+30%CC allowance event. The flood depth at the location of the proposed storage building could range up to 0.19m in the modelled undefended 0.1%AEP+30%CC allowance event.

- 4.17. As the proposed constitutes a Minor Development, the Finished Floor Levels (FFLs) of the proposed extensions should be set no lower than the existing dwelling FFLs in accordance with the EA Standing Advice for Minor Developments.

Historical Fluvial Flooding

- 4.18. The EA Recorded and Historical Flood Outlines shows that there is no record of historical fluvial flooding on-site (Figure 6).

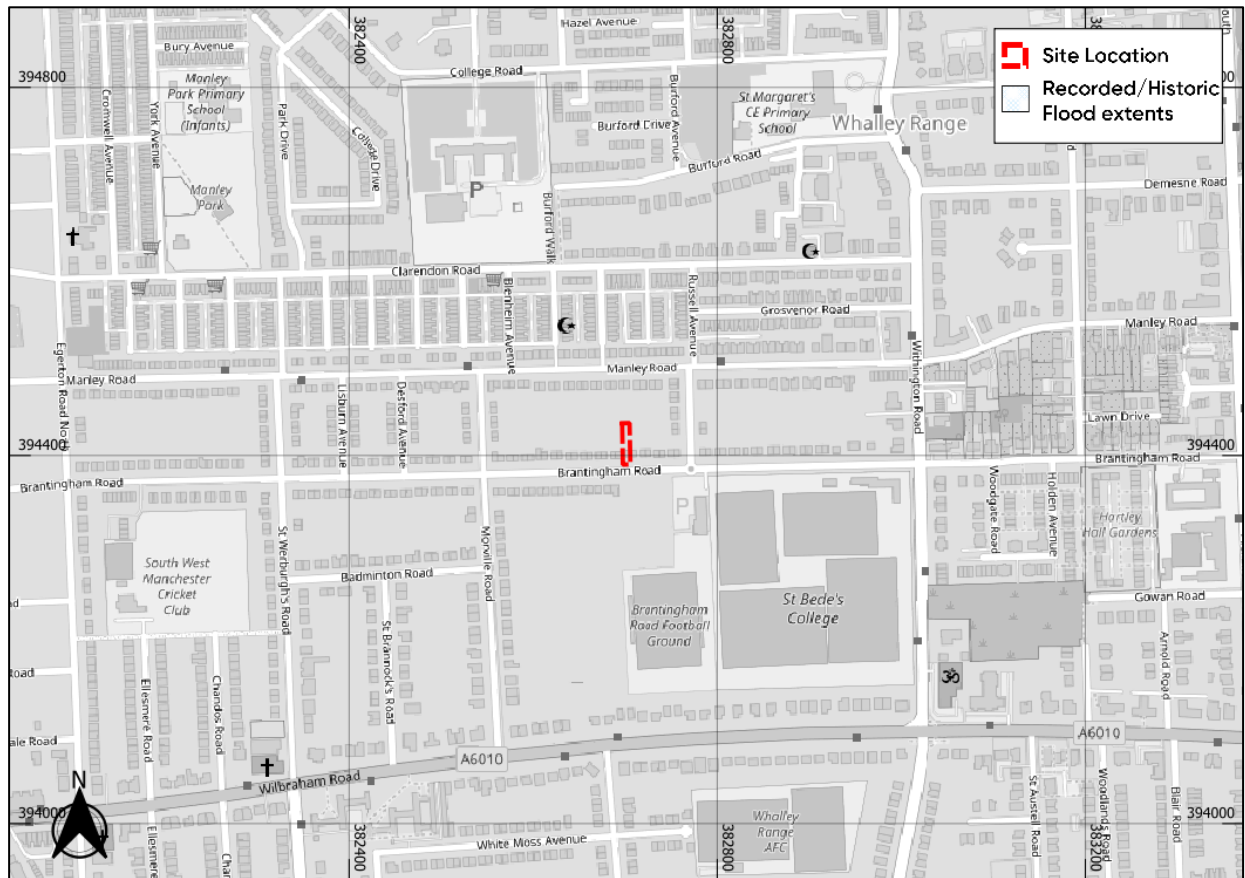


Figure 6: EA Historic Flood Mapping Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © <https://www.openstreetmap.org> and contributors. Contains public sector information licensed under the Open Government Licence v3.0.

Fluvial Flood Risk Summary

- 4.19. As such, based on the information above, the flood risk to the site is considered to be 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 riverbank or river defences when tide levels are high.
- 4.21. 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. 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. Water in a canal is typically maintained at predetermined levels by control weirs. When rainfall or other water enters the canal, the water level rises and flows out over the weir. If the level continues rising it will reach the level of the storm weirs. The control weirs and storm weirs are normally designed to take the water that legally enters the canal under normal conditions. However, it is possible for unexpected water to enter the canal or for the weirs to become obstructed. In such instances the increased water levels could result in water overtopping the towpath and flowing onto the surrounding land.
- 4.24. Flooding can also occur where a canal is impounded above surrounding ground levels and the retaining structure fails.
- 4.25. There are no canals identified within 1,000m of the site.
- 4.26. The risk of flooding to this site from canals is considered to be low.

Pluvial

- 4.27. 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.
- 4.28. 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).

4.29. Examination of the EA's Flood Risk from Surface Water mapping (Figure 7) for High Risk, Medium Risk, and Low Risk AEP flood events shows the site is at risk of flooding in the modelled 'Low Risk' surface water flood event.

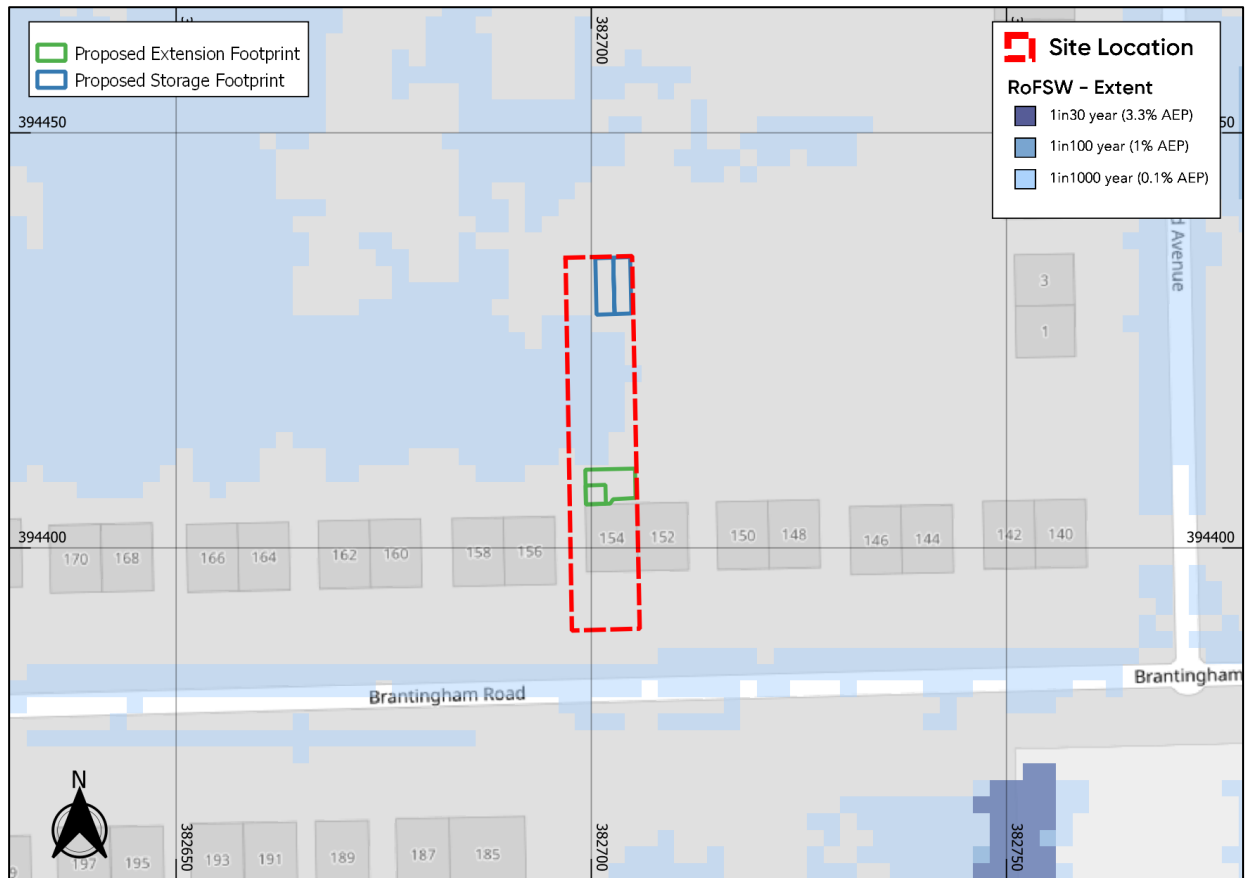


Figure 7: EA Surface Water Flood Risk Mapping (Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © <https://www.openstreetmap.org> and contributors). Contains public sector information licensed under the Open Government Licence v3.0.

4.30. Review of the EA low risk, 1 in 1000 year, surface water event, demonstrates that the site could be affected by flooding. The rear garden of the site could experience flood depths between 300mm to 600mm. However, the proposed rear extension and storage building remain unaffected by flooding (Figure 8).

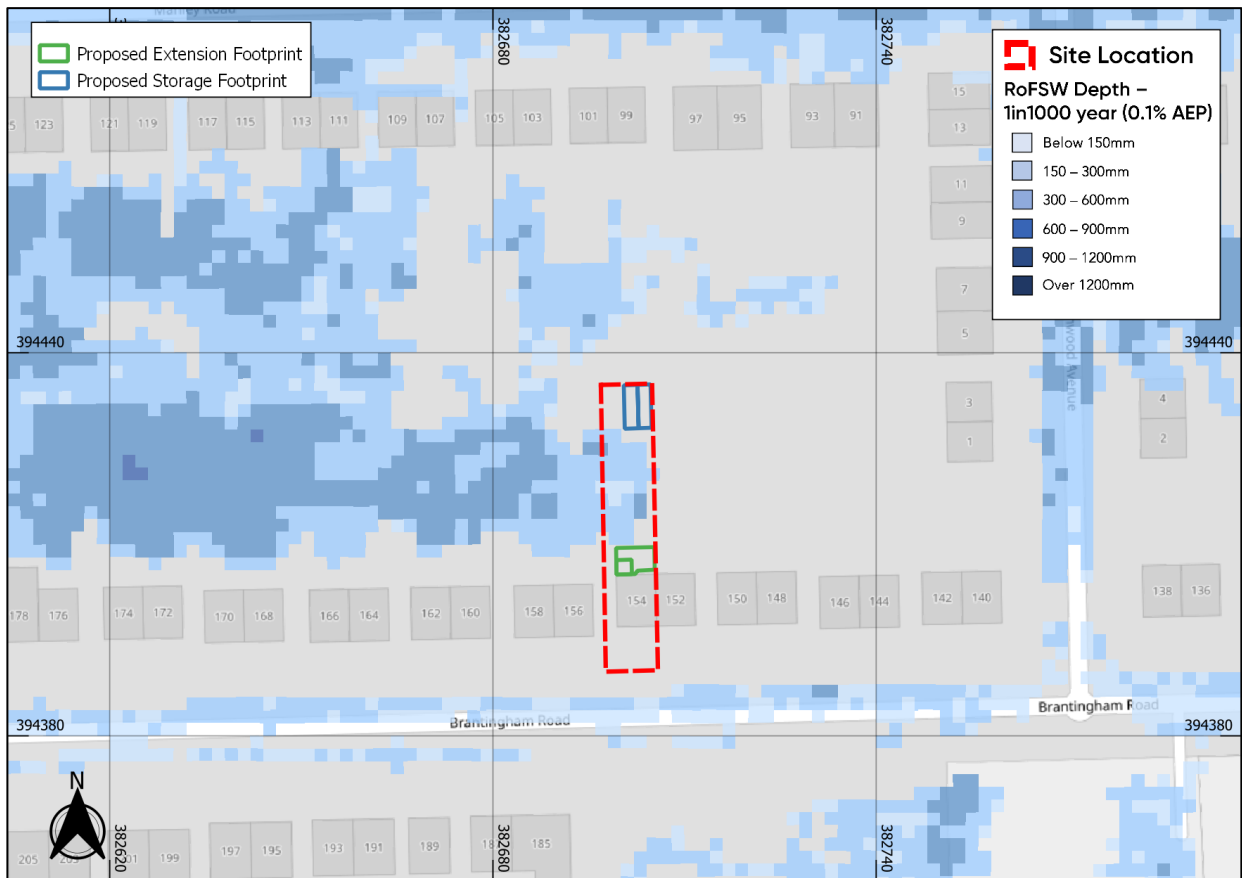


Figure 8: EA Surface Water Depth map (1in1000Year) - (Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © <https://www.openstreetmap.org> and contributors). EA RoFSW: © Environment Agency copyright and/or database right 2015.

- 4.31. The EA hazard rating for the flood extent to the south of the site via Brantingham Road is shown to be 'Low' during the modelled Low Risk (1 in 1000 year) surface water event. As such, safe access and egress could be possible via this route (Figure 9).

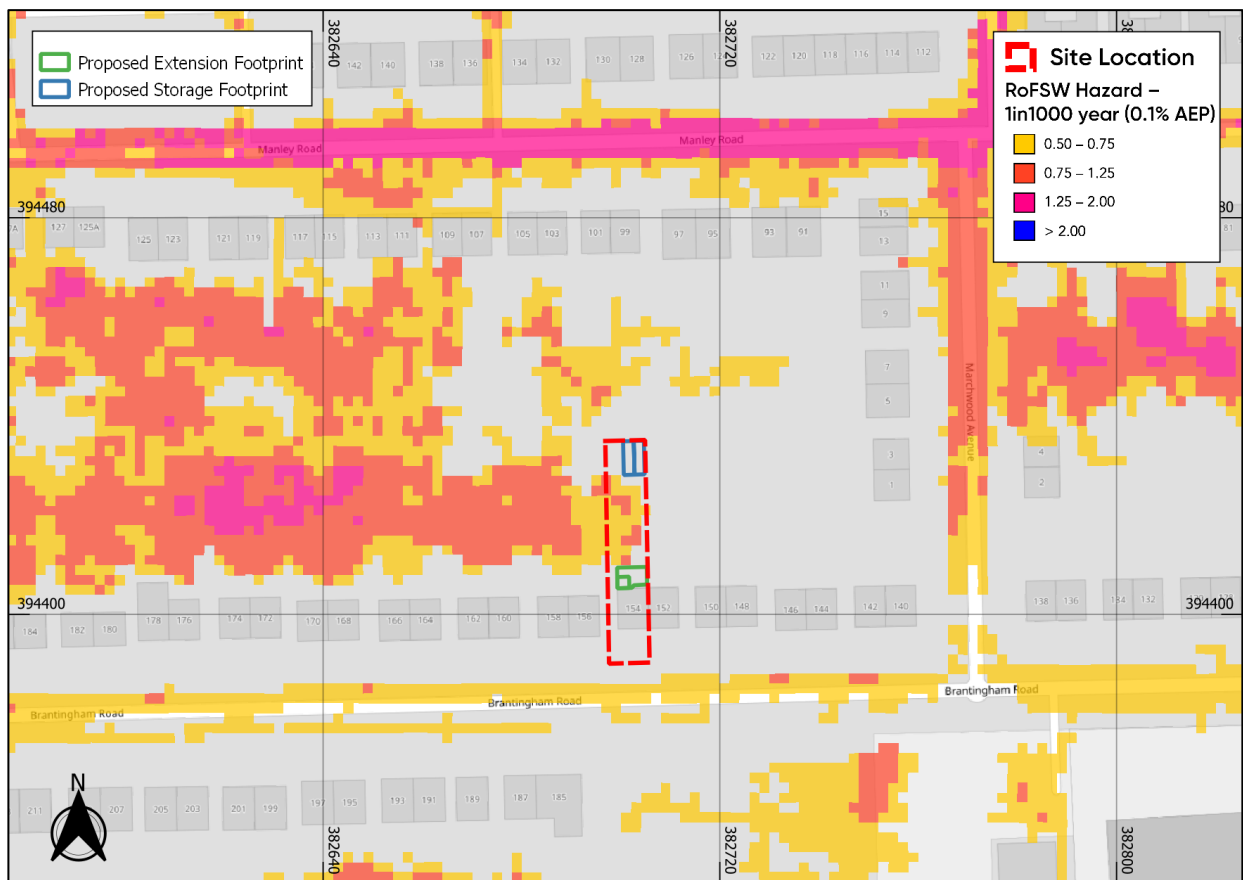


Figure 9: RoFSW Hazard map - 1in1000 Year (Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © <https://www.openstreetmap.org> and contributors, EA RoFSW: © Environment Agency copyright and/or database right 2015. All rights reserved.)

Pluvial Flood Risk Summary

- 4.32. Based on the information above, the risk of flooding from pluvial source is considered to be low.

Reservoirs

- 4.33. Flooding can occur from large waterbodies or reservoirs if they are impounded above the surrounding ground levels or are used to retain floodwater. Although unlikely, reservoirs and large waterbodies could overtop or breach leading to rapid inundation of the downstream floodplain.
- 4.34. According to the EA's Flood Risk from Reservoirs mapping (Figure 10) the site is at risk of flooding in the event of a breach at multiple reservoirs. The worst reservoir failure model is a

'dry day' scenario meaning that it could be caused by reservoir walls failing due to old age, accident, or because excess flood water has been added to the reservoir.

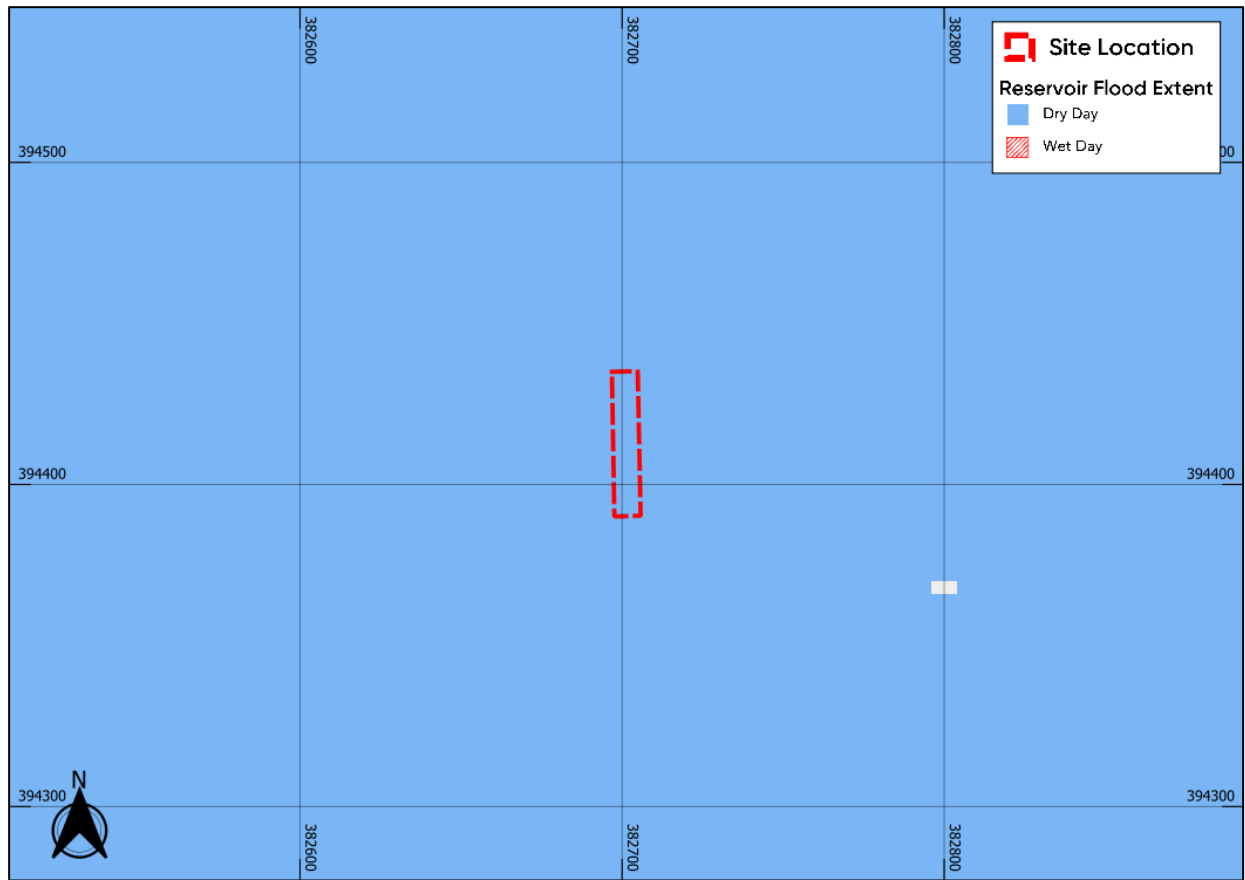


Figure 10: EA Reservoir Flood Risk Mapping Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © <https://www.openstreetmap.org> and contributors. © Environment Agency copyright and/or database right 2015. All rights reserved).

- 4.35. All large reservoirs must be inspected and supervised by reservoir panel engineers as detailed by the Reservoirs Act 1975 in England and Wales. The EA are responsible to ensure that reservoirs are inspected regularly, and essential safety work carried out. As reservoirs are highly managed the maximum flood extent provided in the EA Risk of Flooding from Reservoirs mapping is considered a worst-case scenario.
- 4.36. 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

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

- 4.38. The British Geological Survey's (BGS) mapping shows superficial deposits of Glaciofluvial Sheet Deposits, Devensian comprised of sand and gravel underlying the site which are designated as 'Secondary A' Aquifers. These are permeable layers capable of supporting water supplies at a local rather than strategic scale and in some cases, they form an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers.
- 4.39. The bedrock underlying the site is Wilmslow Sandstone Formation comprised of sandstone which is designated as 'Principal' Aquifer. These rocks have high permeability and water storage capacity.
- 4.40. The nearest historical borehole record (ref: SJ89SW573) is located approximately 235m south of the site. However, records data are not accessible (Confidential).
- 4.41. The MST SFRA (2010) contains mapping of areas at risk or susceptible to groundwater flooding which shows that the site is not in an area with any known groundwater issues (Figure 11).

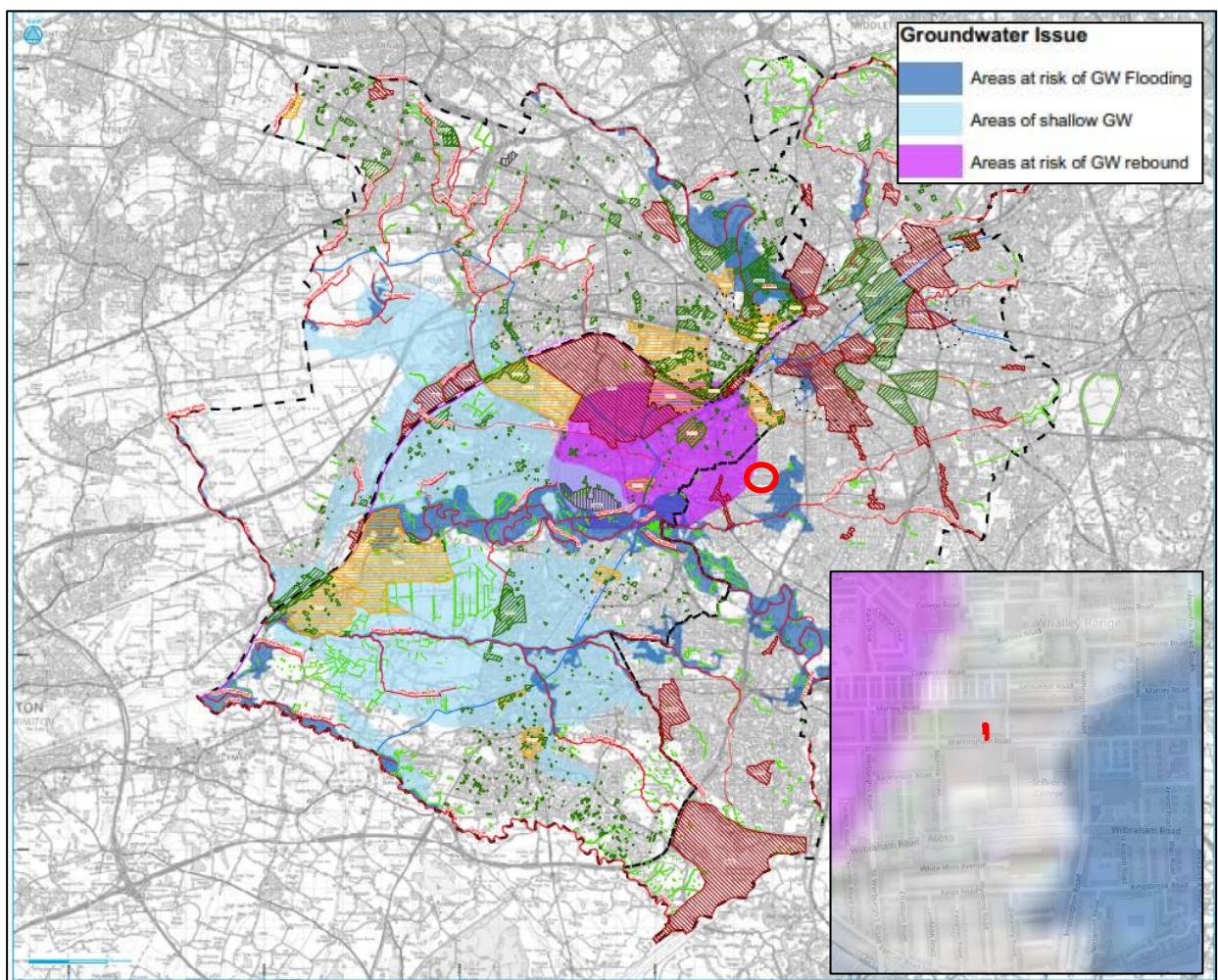


Figure 11: Groundwater Flooding (source: MST SFRA, 2010); the approximate site location is indicated by the red circle.

- 4.42. As the development proposals do not include any proposed basements, the risk from groundwater to the development is considered to be low.

Sewers

- 4.43. 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.
- 4.44. Figure 12 contains mapping of the DG5 sewer records provided by United Utilities which show that no incidents of sewer flooding have been recorded within the vicinity of the site. The MST SFRA (2010) notes that the "DG5 register alone has limited usefulness in predicting future flooding locations", due to the fact that it records only properties that have already flooded due to capacity issues rather than properties at risk of flooding.

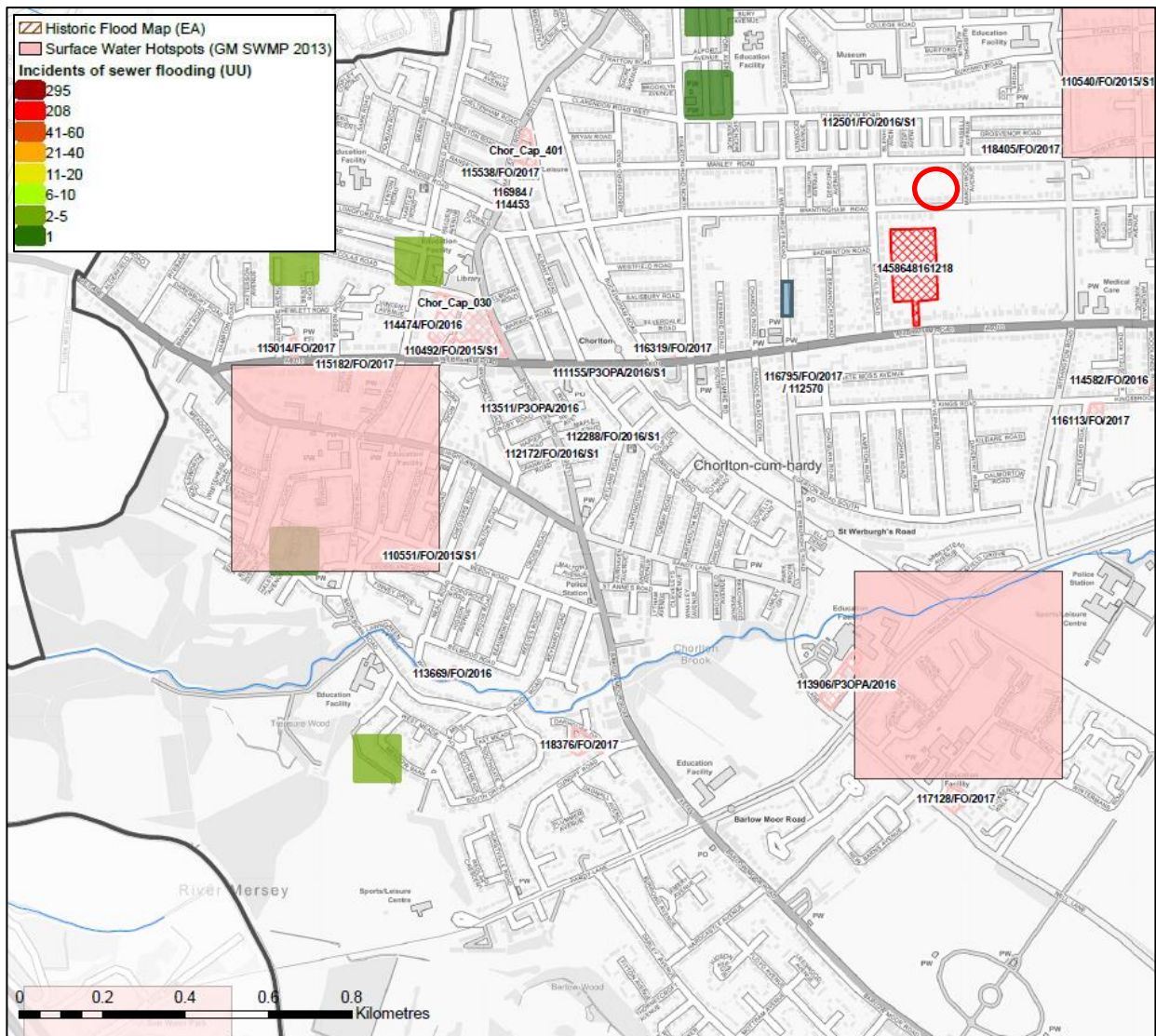


Figure 12: Flooding Hotspots (source; Greater Manchester SFRA Interactive Mapping; the approximate location of the site is indicated by the red circle).

- 4.45. There are no available records that indicate historical sewer surcharging incidents has directly affected the site. Additionally, local policy documentation indicates that the site is not within a Critical Drainage Area. As such, the development is considered to be at low risk of flooding from sewers.

5. Flood Risk Mitigation

Fluvial

- 5.1. Based on the detailed EA Product 4 data the fluvial flood risk could be considered to be low to moderate.
- 5.2. The proposal is a Minor Development and should adhere to the EA Standing Advice for Minor Developments. The Finished Floor Levels (FFLs) of the proposed extension will be set no lower than those of the existing dwelling.
- 5.3. Furthermore, given that the site could be affected by flooding in the modelled undefended scenario, the extension should be constructed in a flood resilient manner in accordance with the CLG Report, *Improving the Flood Performance of New Buildings - Flood Resilient Construction (2007)* including, where practical, measures such as the below:
 - Solid (i.e. concrete floors) with waterproof screed.
 - Raised wiring and power outlets at ground level.
 - Units to be raised on legs above plinth.
 - Waterproof plasterboard used at ground floor.
 - Air brick covers to be installed (if applicable).
 - Damp Proof Membranes (d.p.m.) should be included in any design to minimise the passage of water through ground floors.
 - Patio 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.
 - Non-return valves to be installed (if applicable)

Pluvial

- 5.4. The site is considered to be at low risk from surface water flooding. The mitigation measures listed above are deemed sufficient mitigation against this risk.

Other sources

- 5.5. Flood risk from tidal, canals, reservoirs, groundwater and sewers is considered to be low, therefore mitigation is not required.

Increase to Flood Risk Elsewhere

- 5.6. It is understood that the proposed development is for the construction of an extension to the existing dwelling, in addition to a rear outbuilding to be used for storage. 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.

Conclusions

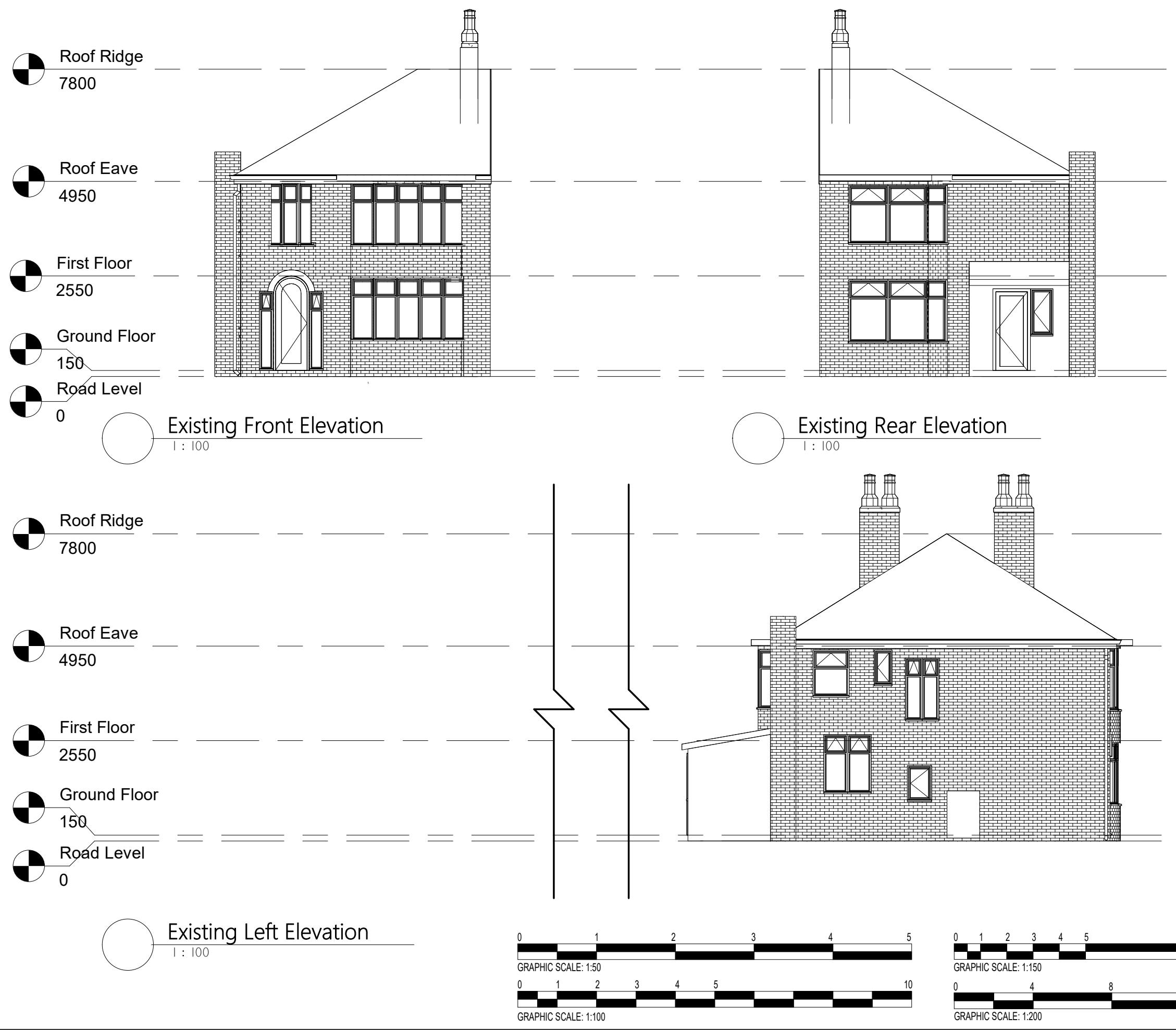
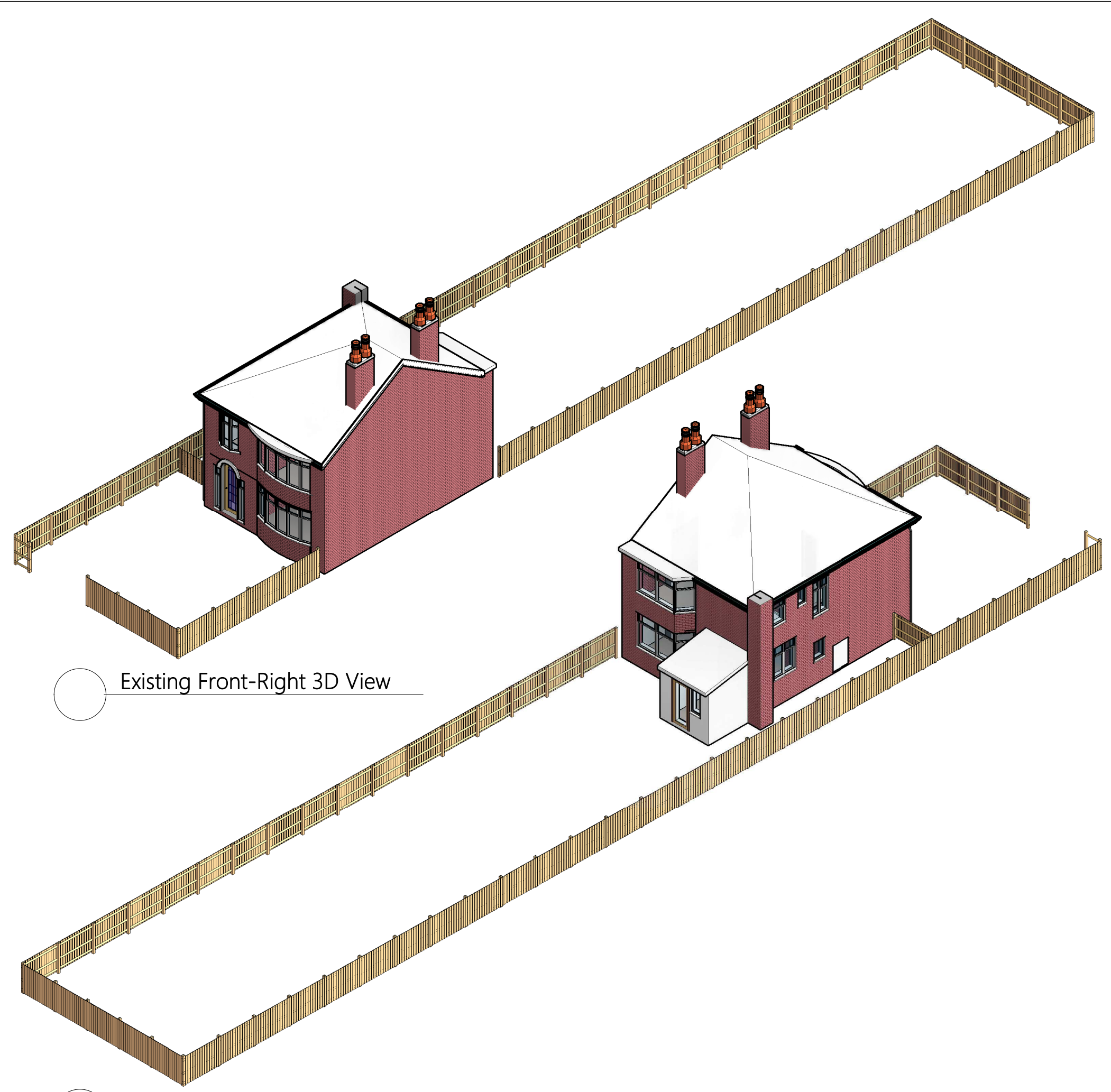
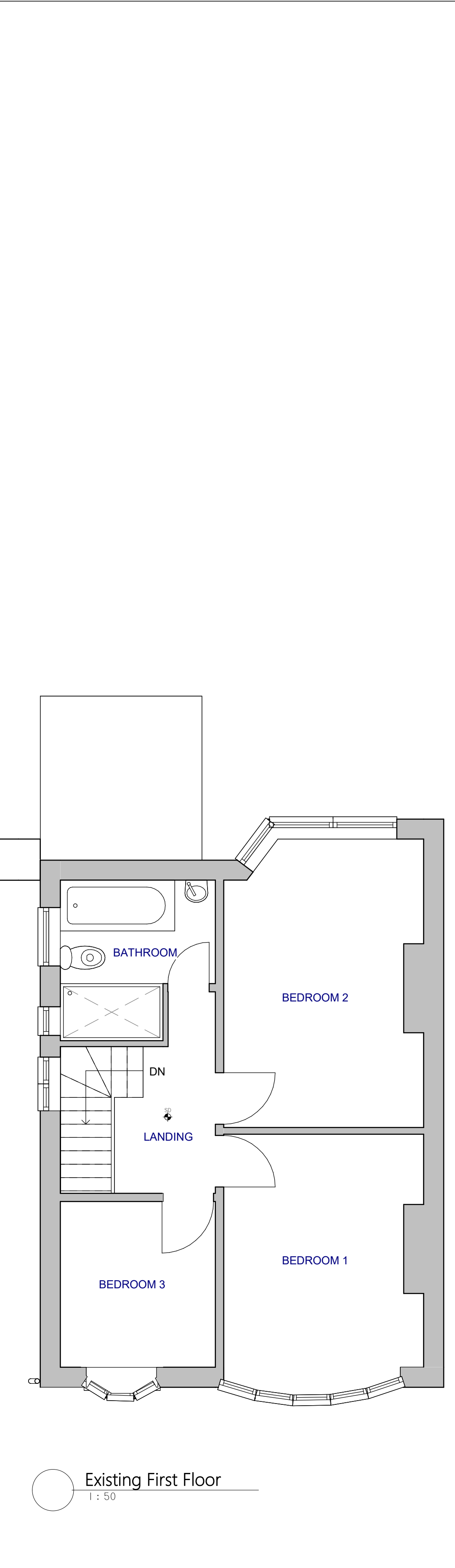
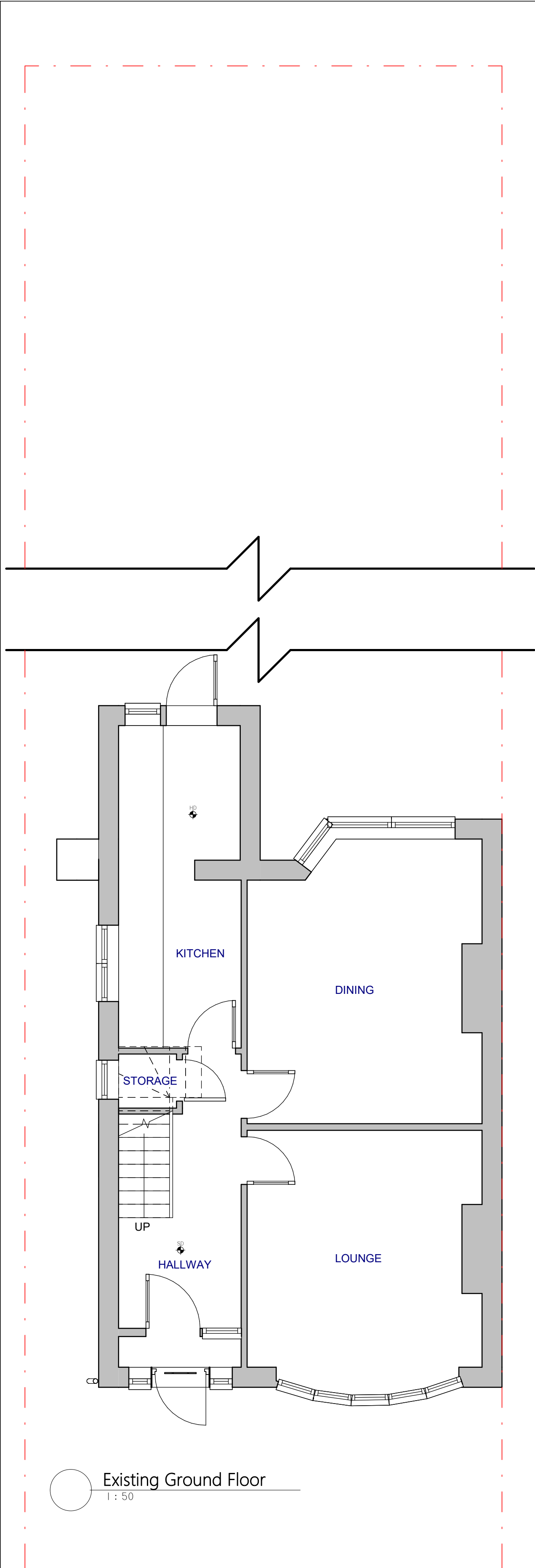
- 5.9. This FRA has been undertaken with reference to the requirements of NPPF and Planning Practice Guidance with respect to the development at 154 Brantingham Road, Chorlton-Cum-Hardy, Manchester, M21 0TS. It has been written to support a planning application and has been prepared with due consideration to the nature of the proposed development to provide the appropriate level of detail.
- 5.10. 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	Based on the detailed EA Product 4 data the fluvial flood risk could be considered to be low to moderate. As such flood mitigation measures are recommended in section 5.
Pluvial Tidal Reservoirs Groundwater Sewers Canals	The site is considered to be at low risk from other sources.

- 5.11. 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.
- 5.12. The development is for a minor development in accordance with EA standing advice as a householder extension.
- 5.13. Access/egress arrangements would not differ from existing as the proposal is a Minor Development. Safe access and egress should be possible via Brantingham Road in all the modelled events.

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

Appendix A - Development Proposals



This drawing is the copyright of LDM Design. All dimensions to be checked on site. Do not scale. All levels to be checked on site and refer to the Ordnance Survey Datum Newlyn unless alternative datum given. All errors and omissions to be reported to the Architect prior to commencement. This drawing must be read in conjunction with the relevant specification clauses. This drawing must not be used on site unless issued for construction.

1:1250
25m 0 25m 50m 75m 100m 125m

KEY

- Proposed (Exterior) Walls
- Proposed (Interior) Walls
- Proposed Floor
- Proposed Roof
- Wall Upgrade
- Floor Upgrade
- Roof Upgrade

KEY

- Smoke Detector
- Heat Detector
- 30 Minute Fire Resistant Door
- Escape Windows
- Fire Rated Wall Construction, minimum 30 minute fire resistance
- Obscure glass windows

Location Plan
1:1250

Brantingham Road

156 154 152

2122

Proposed Site Plan
1:200

LDM

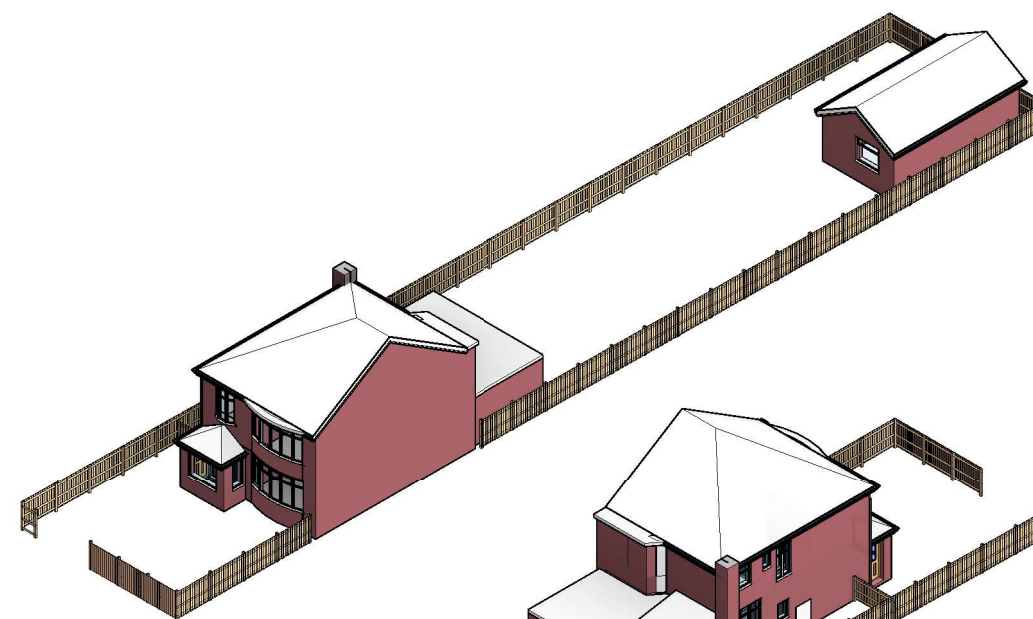
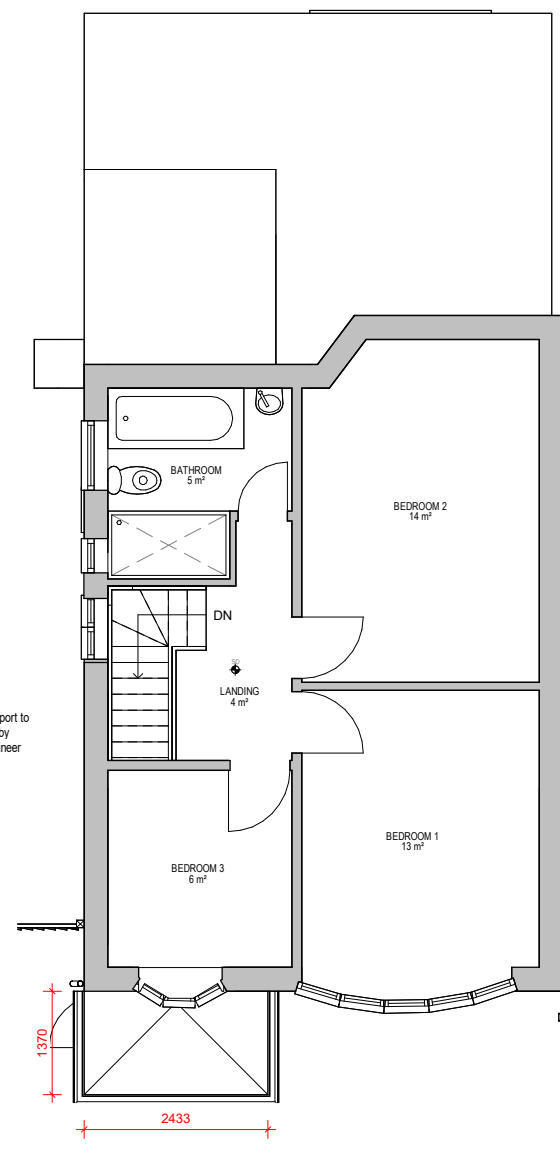
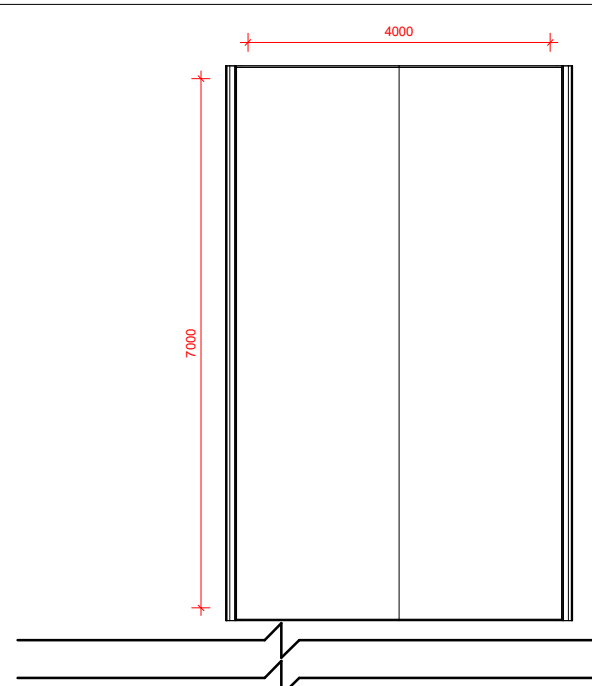
LDM Design

PROJECT 154 Brantingham Road, Chorlton-Cum-Hardy, Manchester M21 0TS

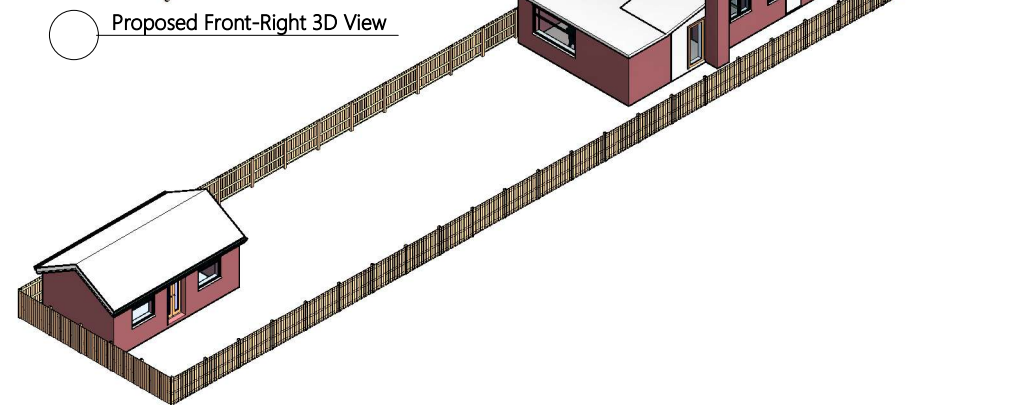
SHEET Planning Drawings.

CLIENT Ms Wan Koon CHUA

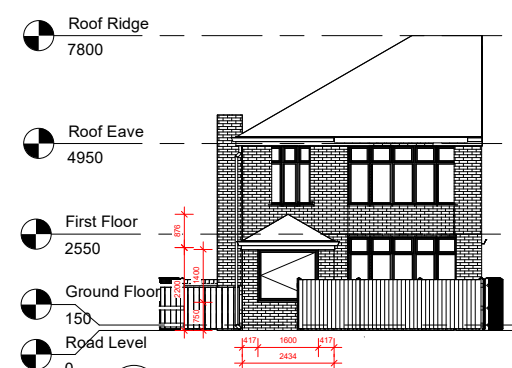
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Drawn by	BA	DRAWING NUMBER
Checked by	KK	A01- A
		REV



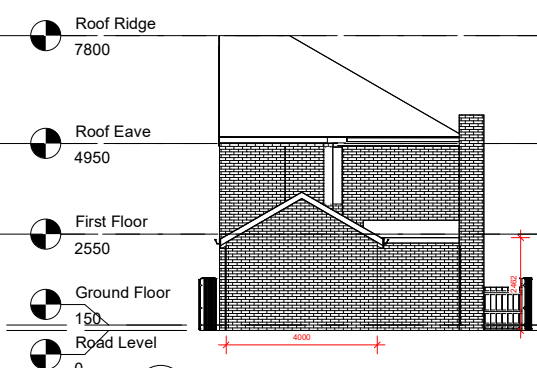
Proposed Front-Right 3D View



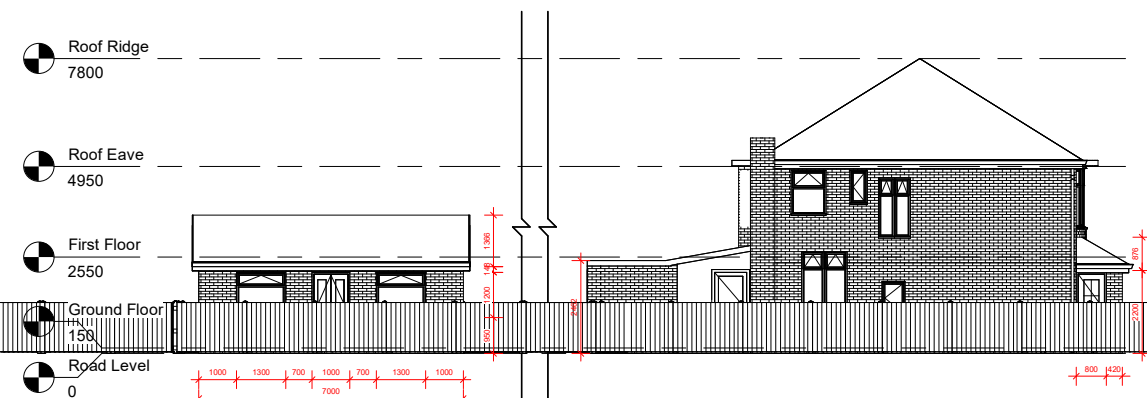
Proposed Rear Left 3D View



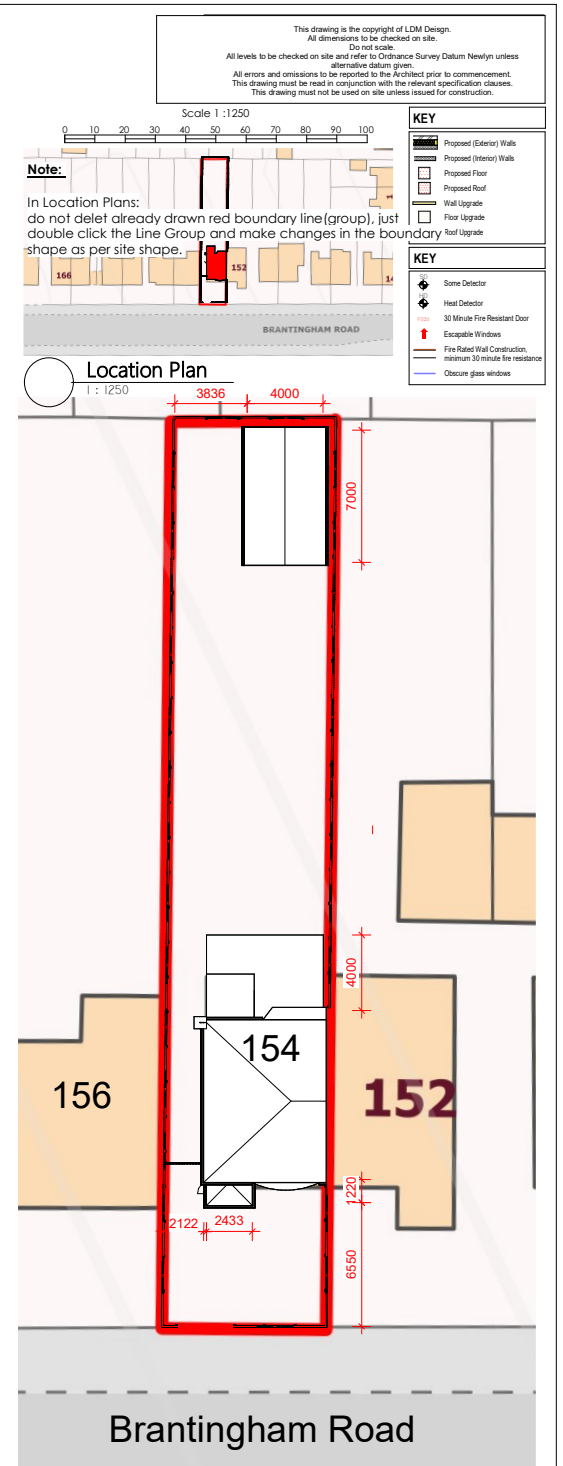
Proposed Front Elevation



Proposed Rear Elevation



Proposed Left Elevation



Proposed Site Plan

1 : 200



LDM Design

PROJECT 154 Brantingham Road, Chorlton-Cum-Hardy,
Manchester M21 0TS

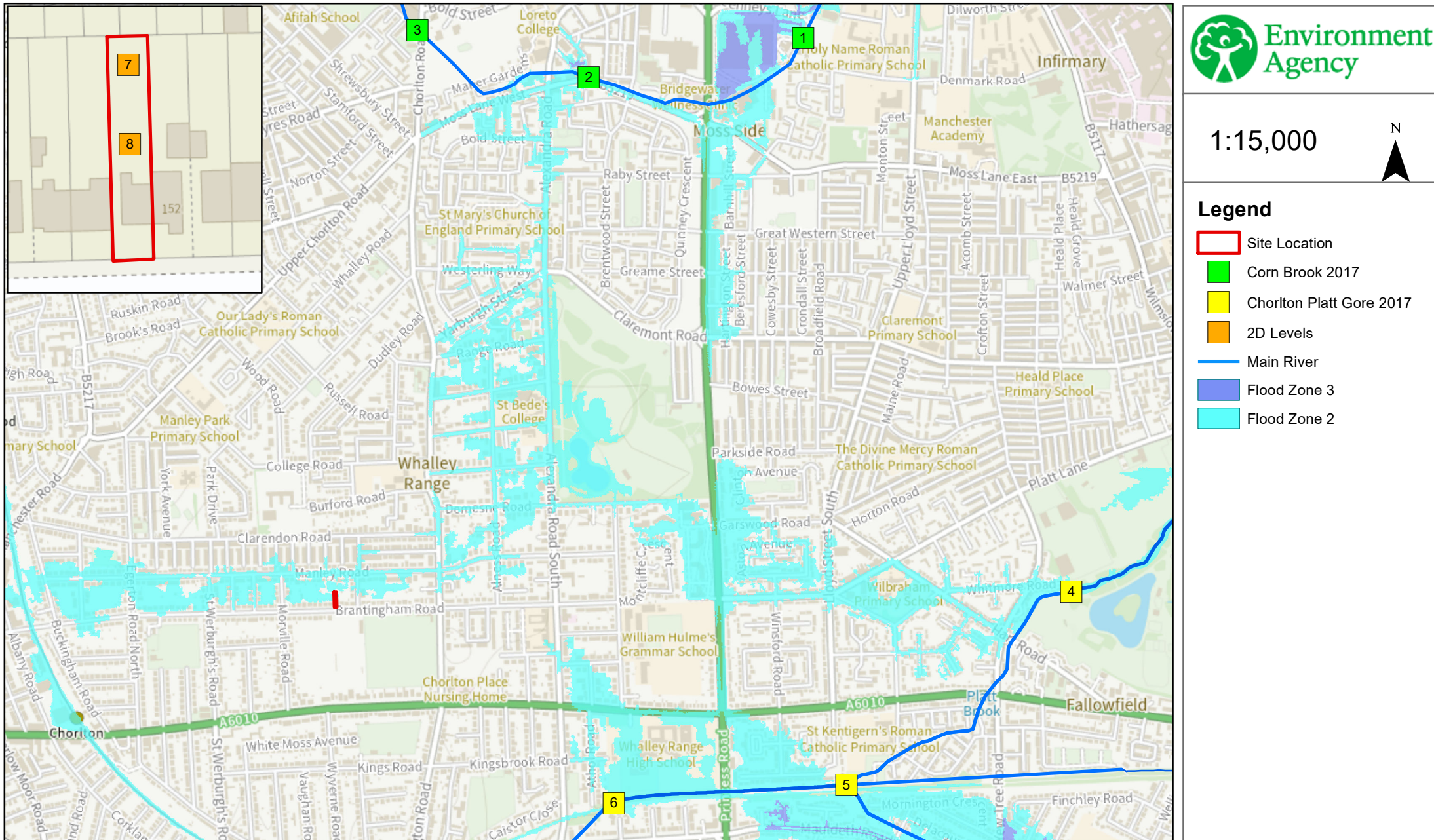
SHEET Planning Drawings

CLIENT **Ms Wan Koon CHUA**

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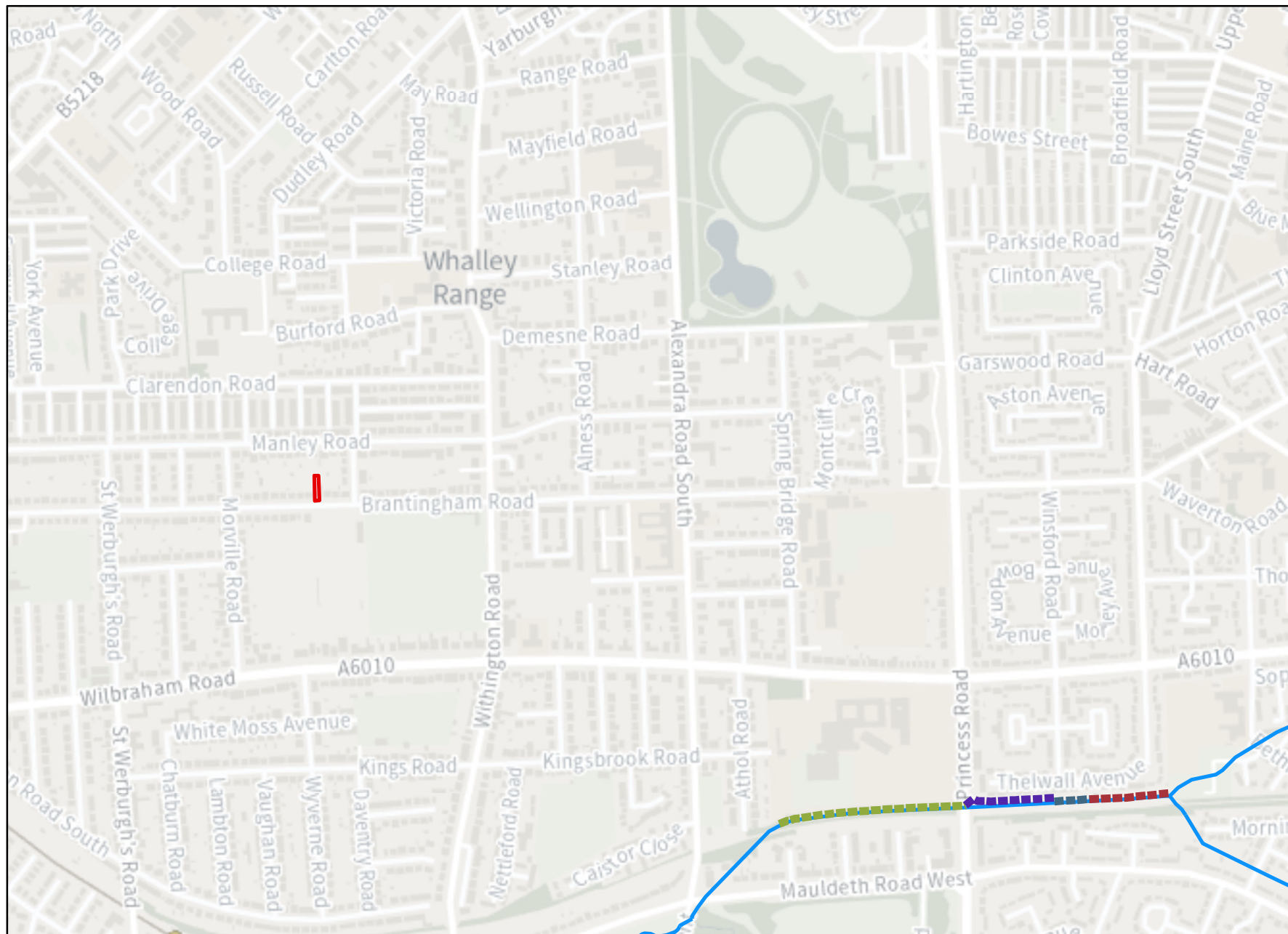
Appendix B - EA Product 4 Data

Detailed Flood Map Centred on Brantingham Road, Chorlton Cum Hardy, Manchester, M21 0QZ. Created 23/05/2023 [GMMC311090SW]



Flood Defence Map Centred on Brantingham Road, Chorlton Cum Hardy, Manchester, M21 0QZ.

Created 23/05/2023 [GMMC311090SW]



1:10,001



Legend

- Main River
- Site Location

Defences

Asset ID

- 120082
- 122064
- 32518
- 59788

Map Reference	Model Node Reference	Existing	Forthright	Date	Climate Change											
					50 % AEP (1 in 2 years)	25 % AEP (1 in 4 years)	10 % AEP (1 in 10 years)	5 % AEP (1 in 20 years)	4 % AEP (1 in 25 years)	2 % AEP (1 in 50 years)	1.5 % AEP (1 in 75 years)	1 % AEP (1 in 100 years)	0.5 % AEP (1 in 200 years) + 20% increase in flow	0.2 % AEP (1 in 500 years) + 20% increase in flow	0.1 % AEP (1 in 1000 years)	0.05 % AEP (1 in 2000 years) + 20% increase in flow
1	m013_0248_cox0808	344119	356120	Modelled Water Level (m aHD)	32.15	32.28	32.37	32.44	32.51	32.77	33.36	33.47	33.75	33.63	34.34	34.46
				Modelled Flow (cumecs)	0.28	0.27	0.34	0.36	0.47	0.83	1.03	1.57	1.63	2.09	3.47	4.53
2	m013_0248_cox0225	353468	355992	Modelled Water Level (m aHD)	30.51	30.71	30.80	30.89	31.01	31.93	32.43	32.98	32.76	32.81	32.99	33.39
				Modelled Flow (cumecs)	0.24	0.34	0.42	0.49	0.58	1.03	1.32	1.57	2.05	2.11	2.46	5.99
3	m013_0248_cox0287	342950	356137	Modelled Water Level (m aHD)	29.22	29.38	29.45	29.55	29.63	29.85	30.07	30.16	30.34	30.39	30.62	31.09
				Modelled Flow (cumecs)	0.29	0.37	0.46	0.53	0.63	1.13	1.48	2.34	2.38	2.93	3.47	6.43

Map Reference	Model Node Reference	Existing	Forthright	Date	Climate Change	
					0.1 % AEP (1 in 1000 years)	0.2 % AEP (1 in 500 years) + 20% increase in flow
4	2D Levels	362701	354429	Modelled Water Level (m aHD)	28.94	28.94
				Modelled Flow (cumecs)	28.95	28.94

Model data taken from Carr Brook 2017

AEP - Annual Exceedance Probability

m aHD - metres above ordnance datum Newlyn

cumecs - cubic metres per second

Notes:

*Climate Change Scenarios - 20%, 25% and 75% increases in flow calculated for the 2050 (2070 - 2115). Please see <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances> for more information regarding the new climate change guidance. The location of the site and the type (category) of development determine the climate change allowances to consider in any flood risk assessment.

Map Reference	Model Node Reference	Existing	Forthright	Date	Climate Change											
					50 % AEP (1 in 2 years)	25 % AEP (1 in 4 years)	10 % AEP (1 in 10 years)	5 % AEP (1 in 20 years)	4 % AEP (1 in 25 years)	2 % AEP (1 in 50 years) + 20% increase in flow	1.5 % AEP (1 in 75 years) + 20% increase in flow	1 % AEP (1 in 100 years)	0.5 % AEP (1 in 200 years) + 20% increase in flow	0.2 % AEP (1 in 500 years) + 20% increase in flow	0.1 % AEP (1 in 1000 years)	0.05 % AEP (1 in 2000 years) + 20% increase in flow
4	m013_Musli_CHCP02_0010	364620	354438	Modelled Water Level (m aHD)	33.08	33.20	33.40	33.45	34.36	34.56	35.04	35.17	35.64	35.45	36.80	36.95
				Modelled Flow (cumecs)	5.89	6.10	10.49	11.23	13.77	13.96	15.69	15.83	16.89	16.89	18.12	18.63
5	m013_Musli_CHCP01_47706	364247	350893	Modelled Water Level (m aHD)	31.39	31.61	31.81	31.84	31.89	32.11	32.13	32.17	31.39	31.61	32.18	32.28
				Modelled Flow (cumecs)	10.15	11.82	16.35	17.93	21.54	21.87	23.54	24.07	21.14	21.93	24.19	24.19
6	m013_Musli_CHCP01_40574	363543	350799	Modelled Water Level (m aHD)	27.65	28.08	28.67	28.68	30.34	30.52	30.95	30.95	27.69	27.63	28.07	28.05
				Modelled Flow (cumecs)	10.10	11.67	17.48	17.48	20.05	20.27	21.11	21.17	18.08	18.08	19.19	19.19

Model data taken from Chertton P166 Gate 2012

AEP - Annual Exceedance Probability

m aHD - metres above ordnance datum Newlyn

cumecs - cubic metres per second

Notes:

*Climate Change Scenarios - 20%, 25% and 75% increases in flow calculated for the 2050 (2070 - 2115). Please see <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances> for more information regarding the new climate change guidance. The location of the site and the type (category) of development determine the climate change allowances to consider in any flood risk assessment.

Flood Defences					
Start Date	Asset Type	Asset ID	Standard of Protection	Upstream Actual Crest Level (m aHD)	Downstream Actual Crest Level (m aHD)
01/01/1996	Embankment	125082	100	31.38	30.75
01/01/1996	Wall	122064	100	31.90	31.88
01/01/1996	Wall	32518	100	31.84	31.48
01/01/1996	Embankment	34196	100	30.60	31.26