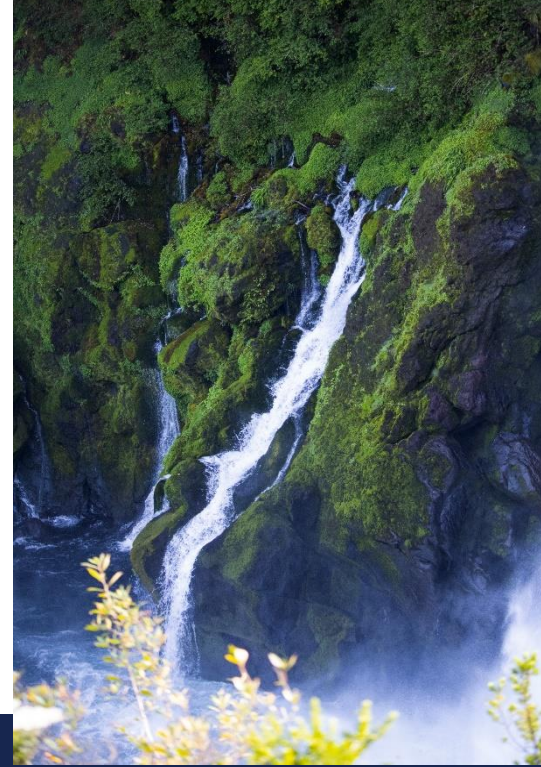




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Flood Risk Assessment AEG4918_OL15_Littleborough_01

Site Address: 12 Holme House Street
Littleborough
OL15 9QU

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: Andrew Duckworth

Reference: AEG4918_OL15_Littleborough_01

Site Location: 12 Holme House Street, Littleborough, OL15 9QU

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Summary

Development Description	Existing	Proposed
Development Type	A residential dwelling	An extension at ground and first floors
EA Vulnerability Classification	More Vulnerable	More Vulnerable
Ground Floor Level	Based on 1m LiDAR, levels vary between approximately 171m AOD and 176m AOD at the Application Site	FFLs are to be set no lower than those of the existing ground floor level in accordance with the EA's Standing Advice for Minor Developments.
Level of Sleeping Accommodation	First floor only	No change
Impermeable Surface Area	N/A ²	Increase by 35m ² (footprint of extension)
Surface Water Drainage	N/A ¹	Runoff to be discharged via the existing system. Small scale SuDS such as rainwater planters and water butts could be installed in outdoor areas to provide betterment
Site Size	Approximately 605m ²	No change
Risk to Development	Summary	Comment
EA Flood Zone	Flood Zones 2 and 3 as per the EA Flood Map for Planning. The detailed hydraulic model provided by the Environment Agency suggests an estimated 1%AEP35CC flood level of 172.64m AOD at the Application Site.	
Flood Source	Pluvial	Site shown to mostly located at 'very low' risk from pluvial flooding, with the exception of the lower parts of the garden
SFRA Available	Strategic Flood Risk Assessment Volume I and Volume III for Bury, Rochdale and Oldham (November 2009)	

Management Measures	Summary	Comment
Ground floor level above extreme flood levels	The ground levels were assessed to be over 3m higher than the estimated 1%AEP35CC flood level from River Roch	FFLs are to be set no lower than existing levels, in accordance with the EA Standing Advice for Minor Developments
Safe Access/Egress Route	Safe access/egress via Holme House Street might be compromised for extreme pluvial events	It is recommended that users remain within the Application Site for extreme pluvial events as the flood hazard in the internal access roads that lead to Todmorden Road may represent 'danger to all' under certain circumstances
Flood Resilient Design	Not	On the basis that FFL's are set no lower than existing levels
Site Drainage Plan	N/A ¹	Runoff to be discharged via the existing drainage arrangements. Small scale SuDS such as rainwater planters and water butts could be installed in outdoor areas to provide betterment
Flood Warning and Evacuation Plan	N/A	Recommended that occupier monitor Met Office Weather Warnings for extreme weather events.
Offsite Impacts	Summary	Comment
Displacement of floodwater	N/A ¹	The new extension will be placed above the 1%AEP35CC flood level, thus not displacing any flood volume
Increase in surface run-off generation	N/A ¹	Runoff to be discharged via the existing system. Small scale SuDS such as rainwater planters and water butts could be installed in outdoor areas to provide betterment
Impact on hydraulic performance of channels	Negligible	No change

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

1. Introduction

- 1.1. Aegaea were commissioned by Andrew Duckworth 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.

Site Overview

- 1.2. The site of the proposed development is 12 Holme House Street, Littleborough, OL15 9QU. The site location plan can be found in Figure 1.
- 1.3. The site is bound by River Roch to the southeast, which is of particular relevance to this Flood Risk Assessment.

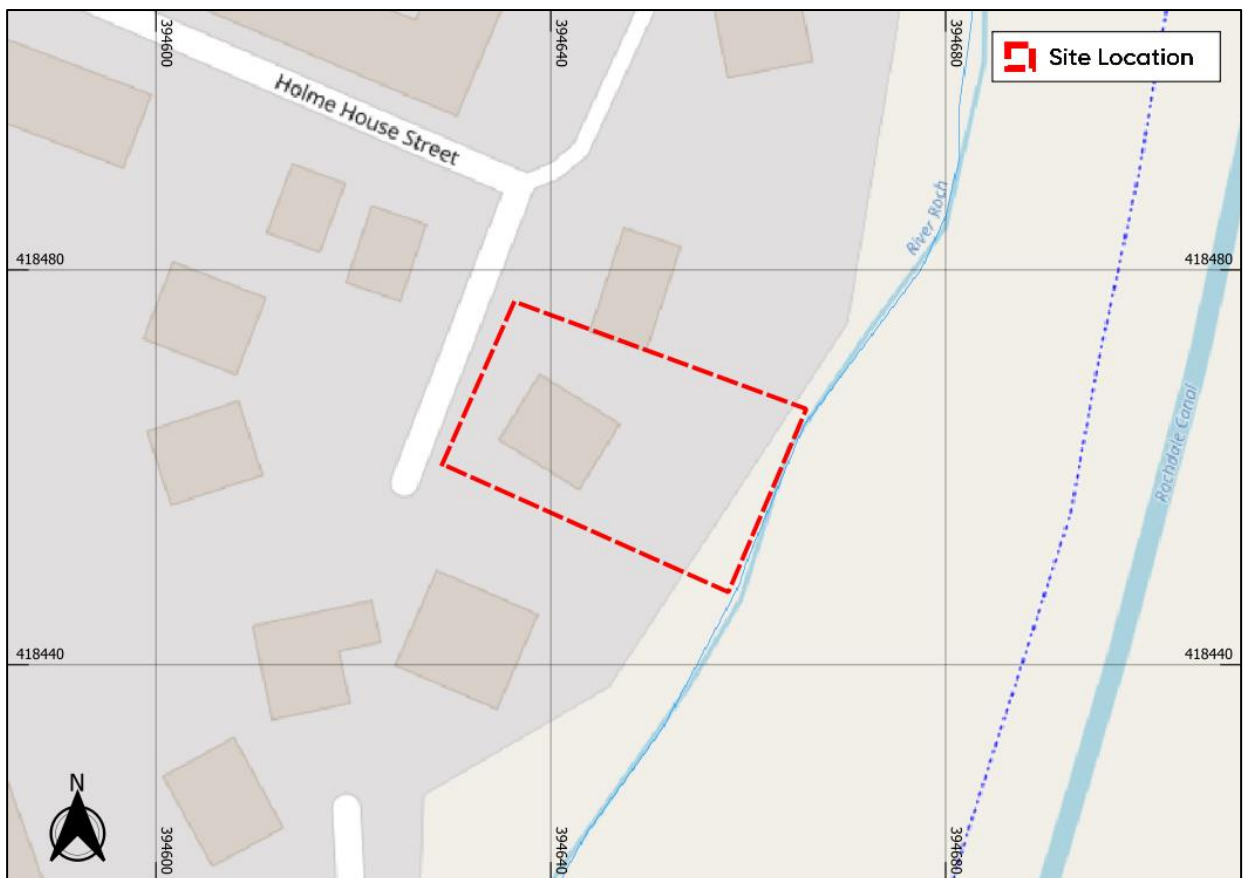


Figure 1: Site Location (Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © <https://www.openstreetmap.org> and contributors)

- 1.4. 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.
- 1.5. Ground Levels at the application site were found to vary between approximately 171m AOD (near River Roch) and 176m AOD at the development location (Figure 2).

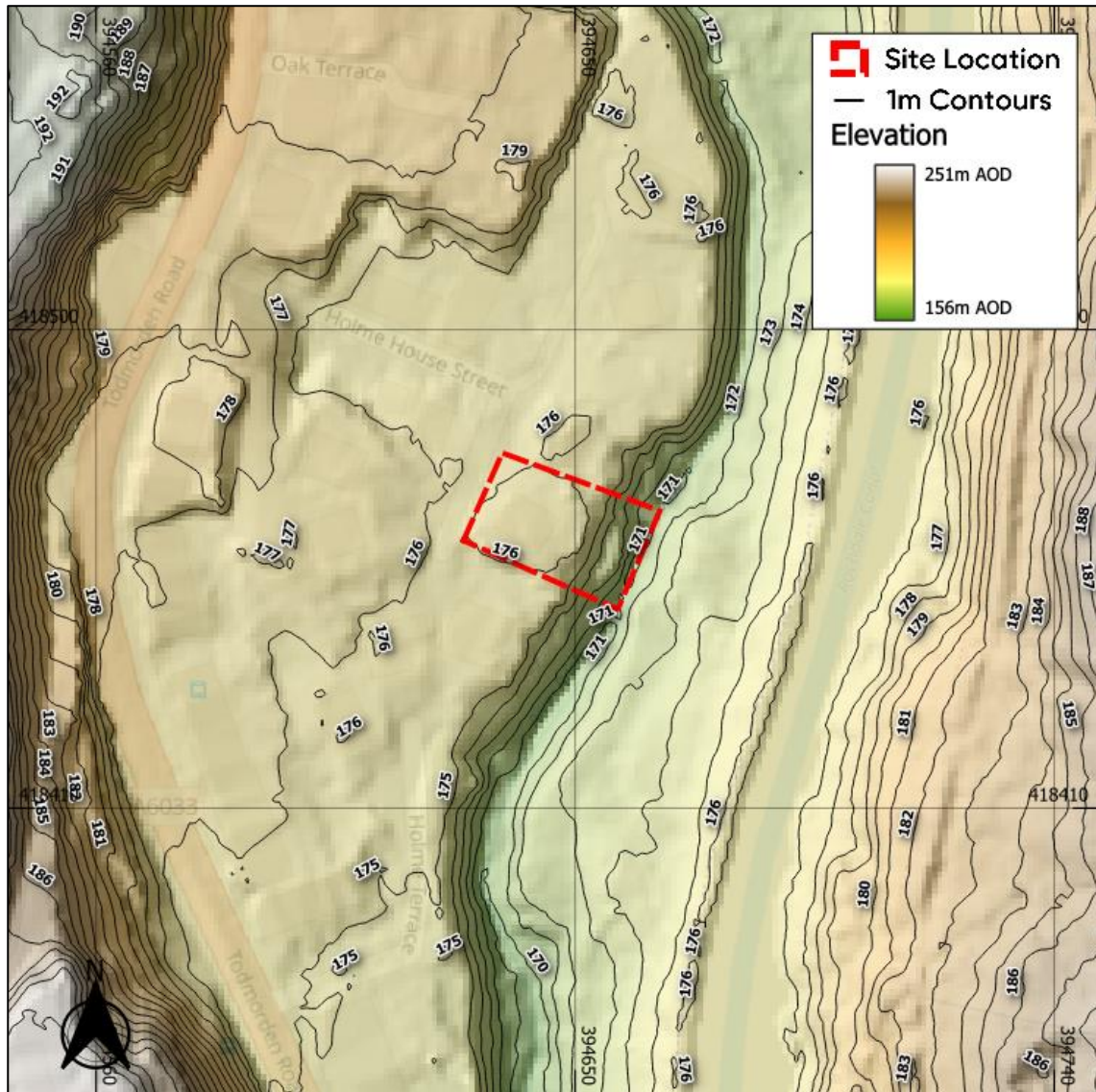


Figure 2: Site Topography (Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © <https://www.openstreetmap.org> and contributors. Contains public sector information licensed under the Open Government Licence v3.0)

- 1.6. Rochdale Borough 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.

Development Proposals

- 1.7. It is understood that the proposed development is for the construction of a two-storey side/rear extension, Juliet balcony, and extension of the patio of the existing dwelling. The proposals can be found in **Appendix A**.
- 1.8. The proposals are for the side extension of an existing dwelling, which will include new rooms at ground and first floors.
- 1.9. A new kitchen and utility room will be created at ground floor, whilst the upper floor will comprise a new bedroom, dressing room, toilet and bathroom.
- 1.10. No sleeping accommodation will therefore be created at ground level as a result of the proposals.

Planning Policy and Guidance

- 1.11. UK government planning guidance states¹ 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*

- 1.12. 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:

¹<https://www.gov.uk/guidance/flood-risk-assessment-for-planning-applications#when-you-need-an-assessment>

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

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 Framework² (NPPF) (DLUHC, 2023) which includes UK Government policy on development and flood risk states:

165. 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.

173. 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 2023

- 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.*

174. 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 59.

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 59 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

- 2.8. The Adopted Core Strategy 2016 prepared by the Local Planning Authority, Rochdale Borough Council, forms part of the Local Plan and sets out the policies for development in the local area.

2.9. Policy G8 Managing water resources and flood risk outlines the requirements for new development within the area. It states:

We will ensure that new development (including flood risk mitigation measures) does not lead to any form of increased flooding locally or further downstream, does not impede natural water and flood risk management, is not detrimental to existing or potential flood storage areas, contributes where possible to alleviating existing flood risk, is itself well protected from flood risk and ensures prudent use of water resources. We will require:

a. Compliance with a 'sequential' approach to new development and flood risk, directing development away from areas of high risk, in accordance with the National Planning Policy Framework;

b. Full regard to and compliance with the advice of the Environment Agency (or equivalent agency) and the objectives and priorities for flood risk management set out in the Local Flood Risk Management Strategy, including any mitigation measures recommended for particular sites;

c. Full regard to the published evidence of local flood risk and its significance as included in Strategic Flood Risk Assessments, Surface Water Management Plans and other recognised sources of flood risk data and the production of additional Flood Risk Assessments (FRAs) as appropriate;

d. Incorporation of appropriate measures for the management of surface and flood water, including flood storage areas, Sustainable Urban Drainage Systems (SUDS) and the protection of 'overland flow paths';

e. Compliance with any Surface Water Management Plan or drainage strategies produced, such as for the identified critical drainage areas of Littleborough and Heywood;

f. The avoidance of culverting, and support the opening up of existing culverts wherever possible;

g. The incorporation of measures for the conservation of water to minimise potable water consumption, including rainwater collection measures, which should be integral to the design of buildings and spaces;

h. Development that does not directly or indirectly lead to pollution of existing water resources such as watercourses and groundwater or the derogation of the quantity of groundwater;

i. The incorporation of measures to improve water quality; and

j. The taking of opportunities to improve the habitat value of watercourses and water bodies. In addition, we will identify additional flood storage areas which will be protected from development.

Sequential and Exception Tests

- 2.10. 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.
- 2.11. The proposed development is viewed as minor development in accordance with the EA standing advice. In accordance with NPPF paragraph 174, minor developments should not be subject to the sequential or exception tests but should still meet the requirements for site-specific flood risk assessments set out in footnote 59.

3. Consultation and Review

Consultation

- 3.1. The Environment Agency was consulted to provide output data from the local detailed hydraulic modelling, which models the fluvial flood risk from River Roch – **Appendix B**.

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, 2023)
 - Planning Practice Guidance - Flood Risk and Coastal Change (Department for Levelling Up, Housing and Communities, 2022)
 - Geoindex Onshore (British Geological Survey, 2023)
 - Rochdale Adopted Core Strategy (Rochdale Borough Council, 2016) and 1996-2016 Local Plan (Rochdale Borough Council, 2006)
 - Bury, Rochdale and Oldham Strategic Flood Risk Assessment Volume 1 User Guide (Rochdale Borough Council, 2009)
 - Bury, Rochdale and Oldham Strategic Flood Risk Assessment Volume 3 Level 2 (Rochdale Borough Council, 2009)
 - Rochdale Borough's Strategy for Flood Risk Management 2014- 2024 (Rochdale Borough Council, 2014)

Preliminary Flood Risk Assessment (PFRA)

- 3.4. The PFRA, published in 2009, is a high-level appraisal of flood risk across Lead Local Flood Authority Rochdale Borough 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 Rochdale Borough Council. Littleborough is flagged as a particular area at significant flood risk, including River Roch.
- 3.6. The document refers that the River Roch at Wardleworth in central Littleborough is designated as a flash flooding area.

Strategic Flood Risk Assessment (SFRA) Volume I and Volume III

- 3.7. The SFRA Volume I Volume III, published in 2009, provides the evidence base for the Local Planning Authority Rochdale Borough 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 SFRA mapping provided by Rochdale Borough 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)

- 3.10. The Local Flood Risk Management Strategy sets out roles and responsibilities for flood risk management, assesses the risk of flooding in the area, where funding can be found to manage flood risk, and the policies, objectives, and actions of the Lead Local Flood Authority.
- 3.11. The Rochdale Borough Council LFRMS is used within this report to identify any flood management infrastructure and historical incidences of flooding.
- 3.12. The LFRMS identifies a Critical Drainage Area in Littleborough, however no visual representation of this area was found in the documents.

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

- 4.2. River Roch forms the eastern boundary of the site and it is an EA designated Main River.

Ordinary Watercourses

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

EA Flood Map for Planning

- 4.4. The site is located within Flood Zones 3 and 2. Flood Zone 3 denotes a risk of flooding from fluvial sources greater than 1 in 100 (1%). Flood Zone 2 denotes a risk of flooding from fluvial sources between 1 in 100 (1%) and 1 in 1000 (0.1%).
- 4.5. The site appears to be affected by a flooding area triggered by the culverted section of River Roch below an industrial site adjacent to Todmorden Road.

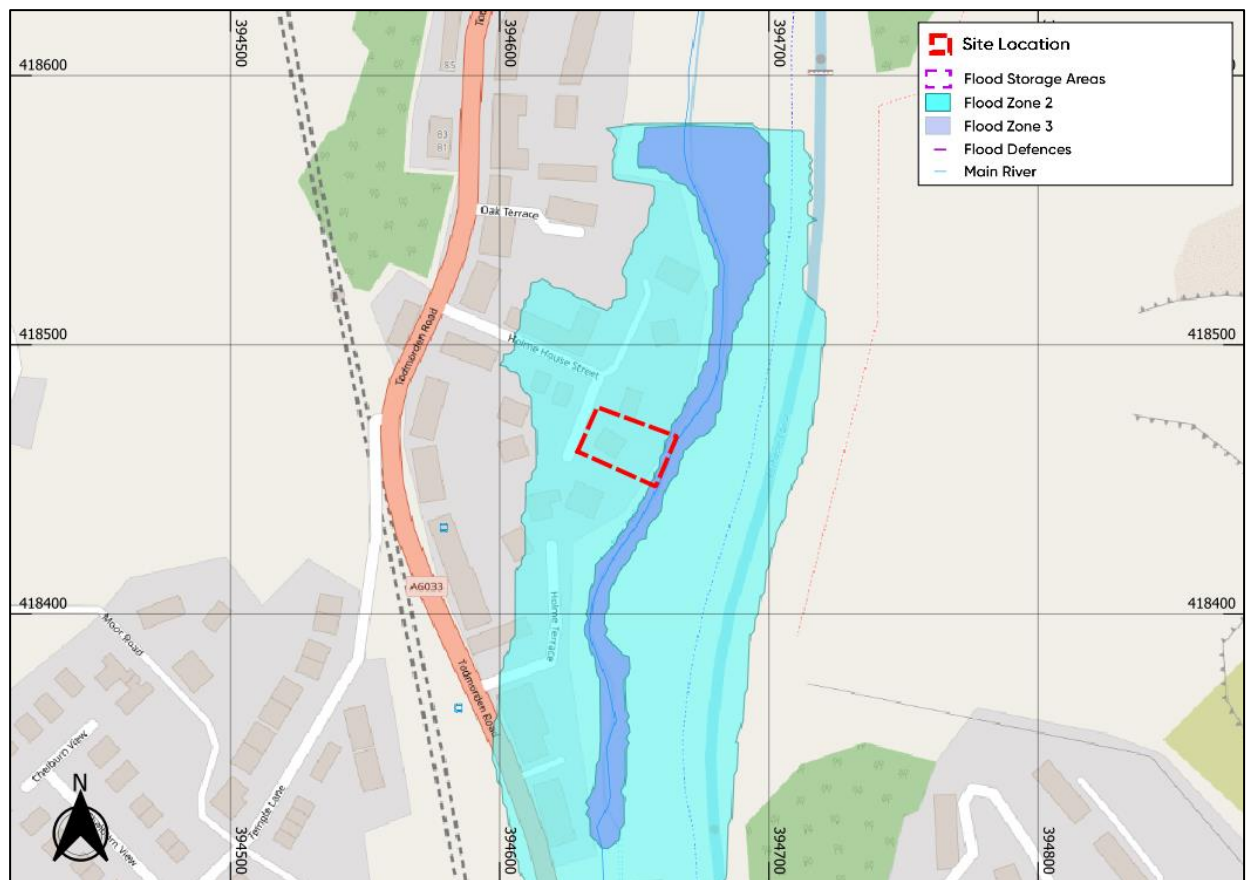


Figure 3: EA Flood Map for Planning (Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © <https://www.openstreetmap.org> and contributors. Contains public sector information licensed under the Open Government Licence v3.0)

EA Flood Model Data

- 4.6. Detailed hydraulic modelling data (Product 5, Product 6 and Product 7) was requested from the Environment Agency and the modelling outputs for nodes 2 and 3 were adopted to inform the present flood risk assessment - Figure 4. This enabled an estimate of the design flood level, which corresponds to the 1%AEP flood event, with a 35% central climate change allowance for the 2080's (Irwell Management Catchment) – henceforth referred to as the 1%AEP35CC event.
- 4.7. Node 2 shows a local flood level of 172.51m AOD and 172.55m AOD for the 1%AEP and 1%AEP20CC respectively. The 1%AEP35CC was extrapolated as 172.553m AOD by assuming a linear variation between the 1%AEP and 1%AEP20CC. Albeit extrapolation is not considered to lead to accurate estimates of flood levels, it is considered acceptable given the scale of the present development.

- 4.8. Node 3 shows a local flood level of 170.08m AOD and 171.54m AOD for the 1%AEP and 1%AEP20CC respectively. The 1%AEP35CC was extrapolated as 172.64m AOD by assuming a linear variation between the 1%AEP and 1%AEP20CC. Albeit extrapolation is not considered to lead to accurate estimates of flood levels, it is considered acceptable given the scale of the present development.
- 4.9. The 1%AEP35CC flood level at the Application Site was estimated by taking the highest between the two estimates i.e. 172.64m AOD.

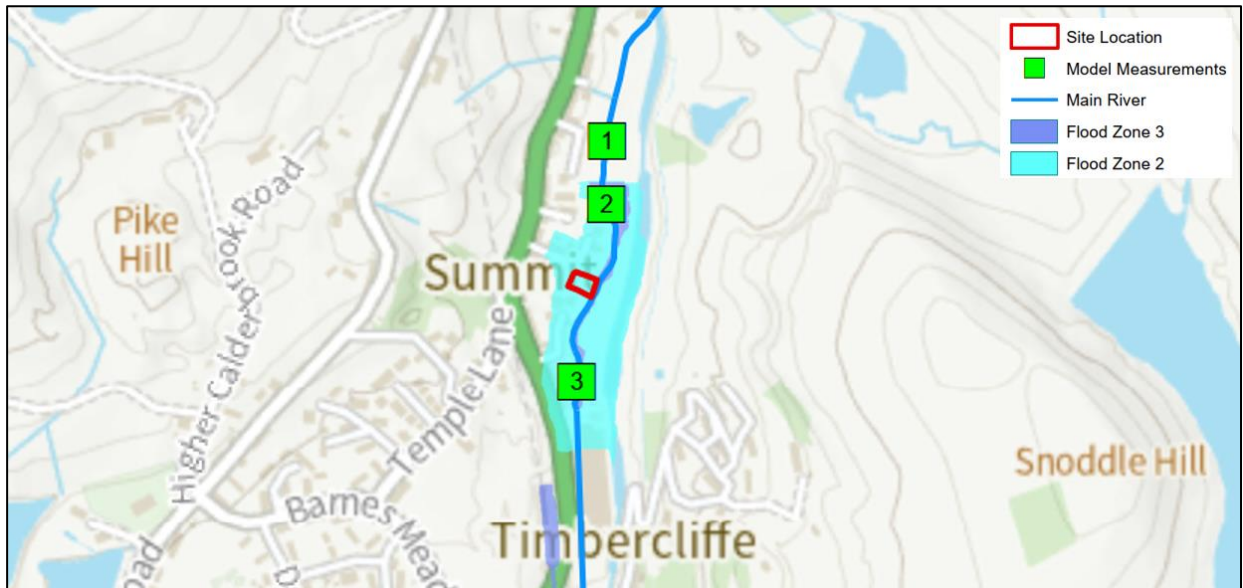


Figure 4: Extract from Environment Agency's detailed hydraulic modelling data (EA Product 4 Data)

- 4.10. As shown in Figure 5, for the 1%AEP35CC the lower part of the garden would be affected but neither the dwelling nor the new extension would be affected, thus remaining safe from flooding up to this event.

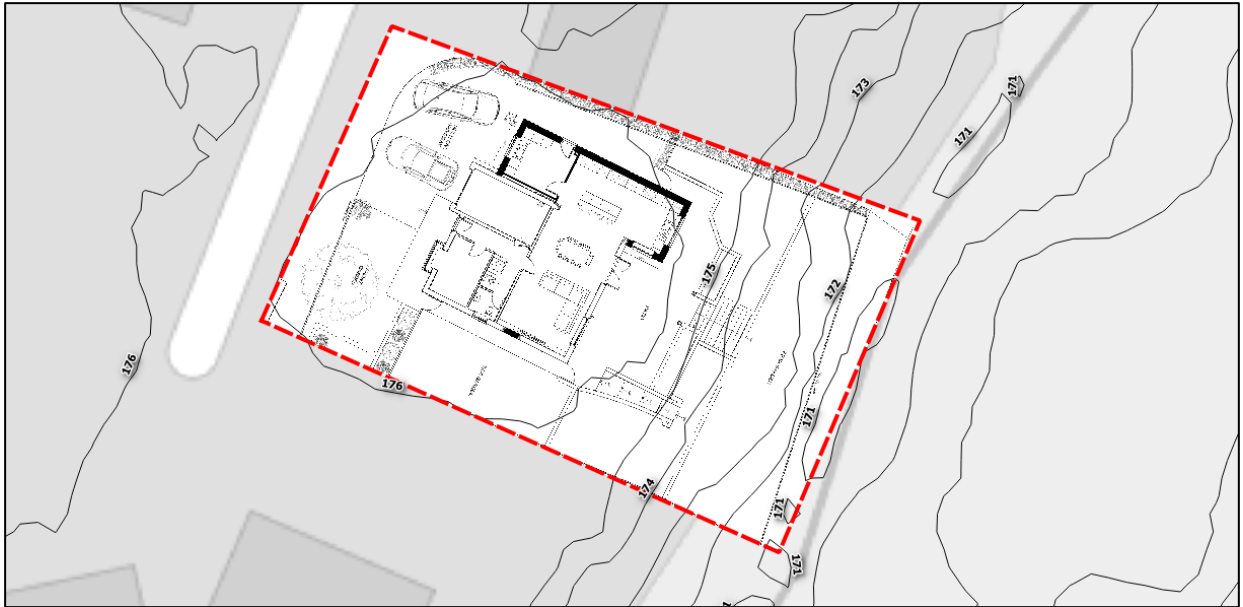


Figure 5: Comparison between site proposals and LiDAR STM DTM elevation dataset (Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © <https://www.openstreetmap.org> and contributors. Contains public sector information licensed under the Open Government Licence v3.0).

Historical Fluvial Flooding

- 4.11. The EA's 'Historic Flood Map' dataset does not show any historical flood records to affect the site.
- 4.12. Neither the Level 1 SFRA nor the LFRMS suggest the site was affected by previous flood incidents.

Tidal

- 4.13. Tidal flooding occurs when a high tide and high winds combine to elevate sea levels. An area behind coastal flood defences can still flood if waves overtop the defences or break through them. Tidal flooding can also occur a long way from the coast by raising river levels. Water may overtop the river bank or river defences when tide levels are high.
- 4.14. There is no record of historical tidal or sea flooding on-site.
- 4.15. 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.
- 4.16. The risk of flooding from tidal sources is low.

Canals

- 4.17. The Canal and River Trust (CRT) generally maintains canal levels using reservoirs, feeders, and boreholes and manages water levels by transferring it within the canal system.
- 4.18. The site is approximately 60m from the Rochdale Canal.
- 4.19. Water in a canal is typically maintained at predetermined levels by control weirs. When rainfall or other water enters the canal, the water level rises and flows out over the weir. If the level continues rising it will reach the level of the storm weirs. Control weirs and storm weirs are normally designed to take the water that legally enters the canal under normal conditions. However, it is possible for unexpected water to enter the canal or for the weirs to become obstructed. In such instances the increased water levels could result in water overtopping the towpath and flowing onto the surrounding land.
- 4.20. Flooding can occur where a canal is impounded above surrounding ground levels and the retaining structure fails.
- 4.21. Water levels within the canal will be maintained as described above.
- 4.22. Albeit the top of the top of bank level of the canal is roughly at the same level as the site, a breach of its banks is unlikely as there is approximately 20m of soil between Rochdale Canal and River Roch, at the location of the Application Site.
- 4.23. The risk of flooding from this source is therefore considered to be low.

Pluvial

- 4.24. 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.
- 4.25. 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).

4.26. Examination of the EA's Flood Risk from Surface Water mapping shows the site and its immediate vicinity is mostly at 'very low' risk from surface water flooding, with exception of the lower garden, which is affected by flooding from River Roch - Figure 6.

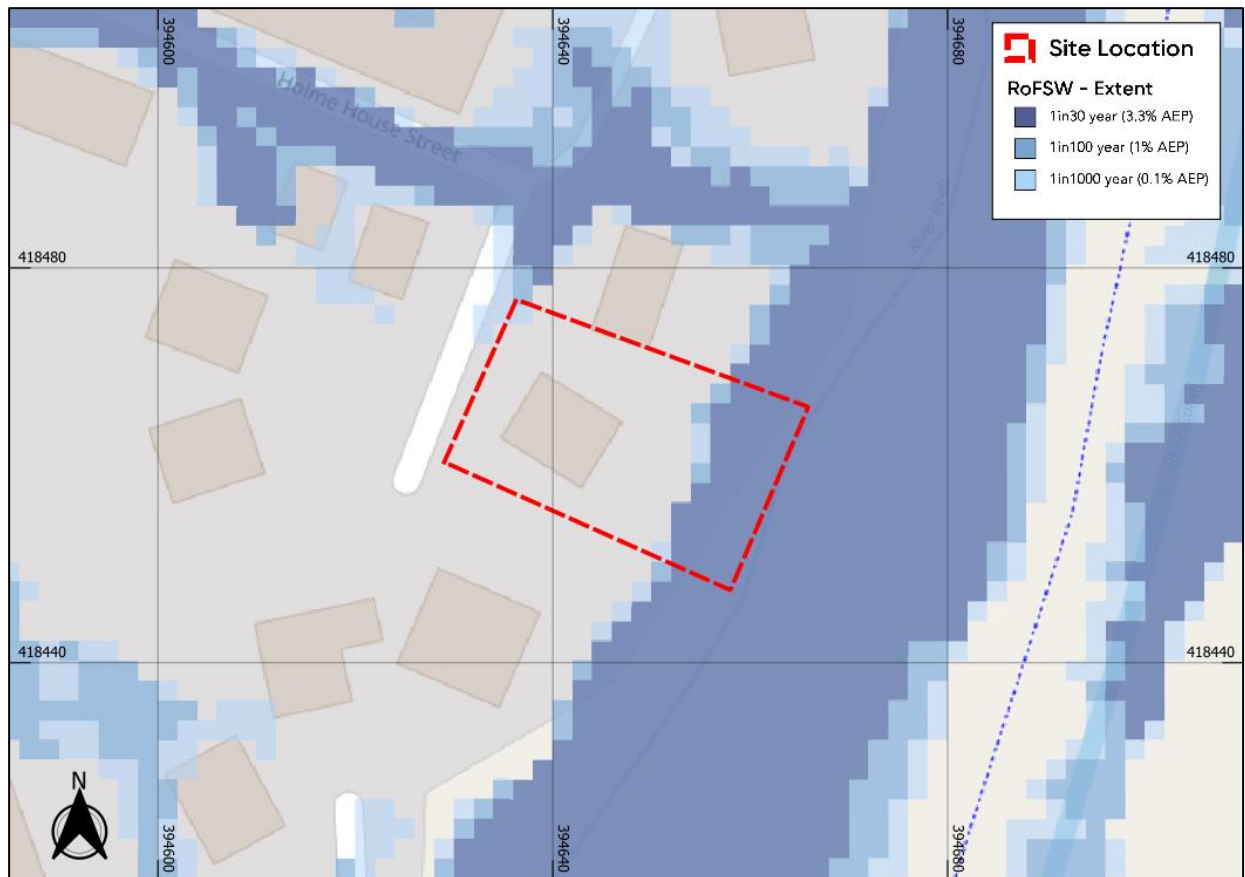


Figure 6: EA Surface Water Flood Risk Mapping (Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © <https://www.openstreetmap.org> and contributors. Contains public sector information licensed under the Open Government Licence v3.0)

- 4.27. The surface water flood depths and hazards for the 0.1% AEP event are shown in Figure 8. This event is often perceived as the 1%AEP climate change design scenario (1%AEPC), and hence taken as the design scenario. The design scenario shows the site to be affected by flood depths of up to over 1200mm for the 0.1%AEP event – albeit this is associated with River Roch.
- 4.28. The flood hazard along the eastern boundary of the site reaches 2.00 ('extreme'), which would be expected given the presence of River Roch. The access road (Home House St) leading out of the residential area towards Todmorden Road is affected by 'extreme' (> 2.00) flood hazard, meaning 'danger for all' when evacuating the area.

- 4.29. The 1%AEP return period flood depths and hazard are also shown in Figure 7. For this event, access/egress appears to be more favourable, albeit the access road leading to Todmorden Road is still affected by a relevant degree of flooding i.e. 'danger for all'. It is therefore concluded that access/egress off the residential estate would be limited during extreme conditions, albeit the site would still remain safe.
- 4.30. It is however important to note that the proposed development is for an extension to an existing dwelling and thus the access/ egress arrangements would not differ from the existing scenario.

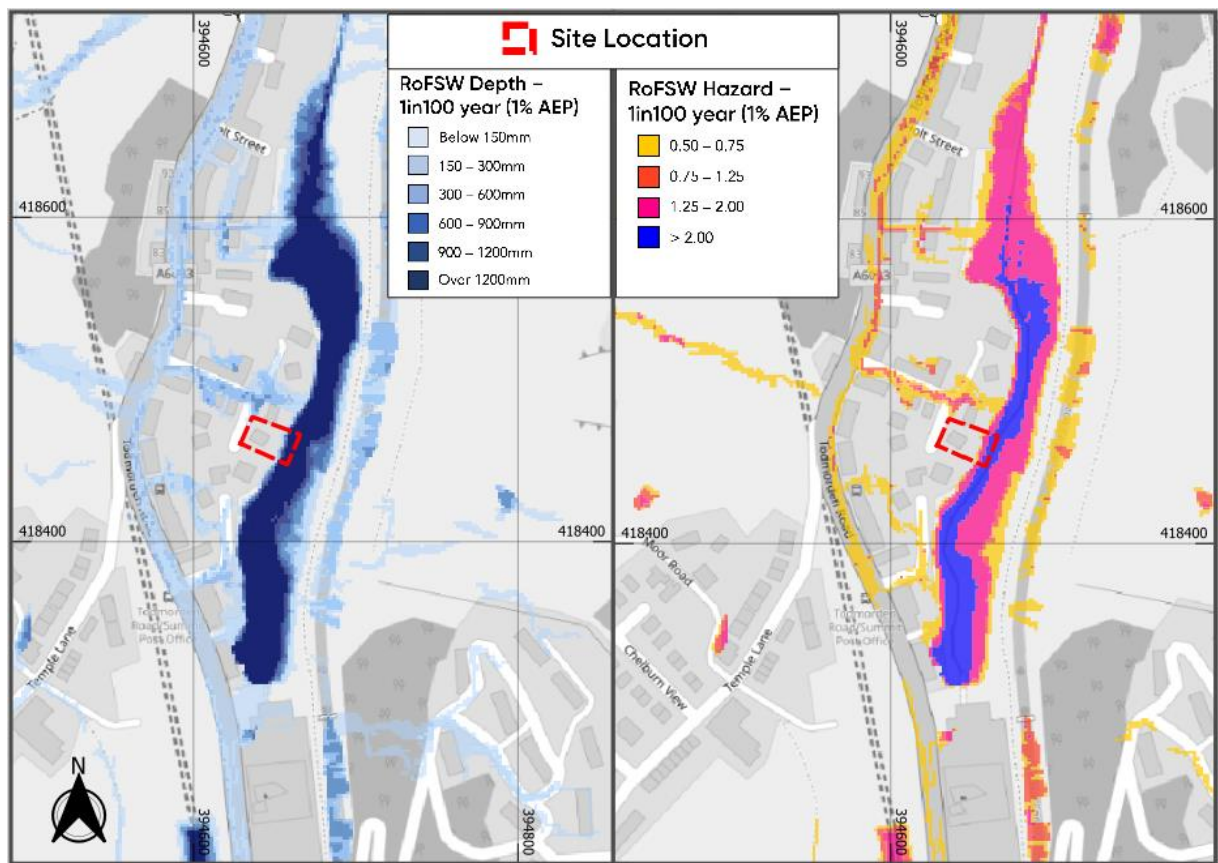


Figure 7: EA Surface Water Flood Risk Mapping 1% AEP (Source: Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © <https://www.openstreetmap.org> and contributors, © EA copyright and/or database right 2015)

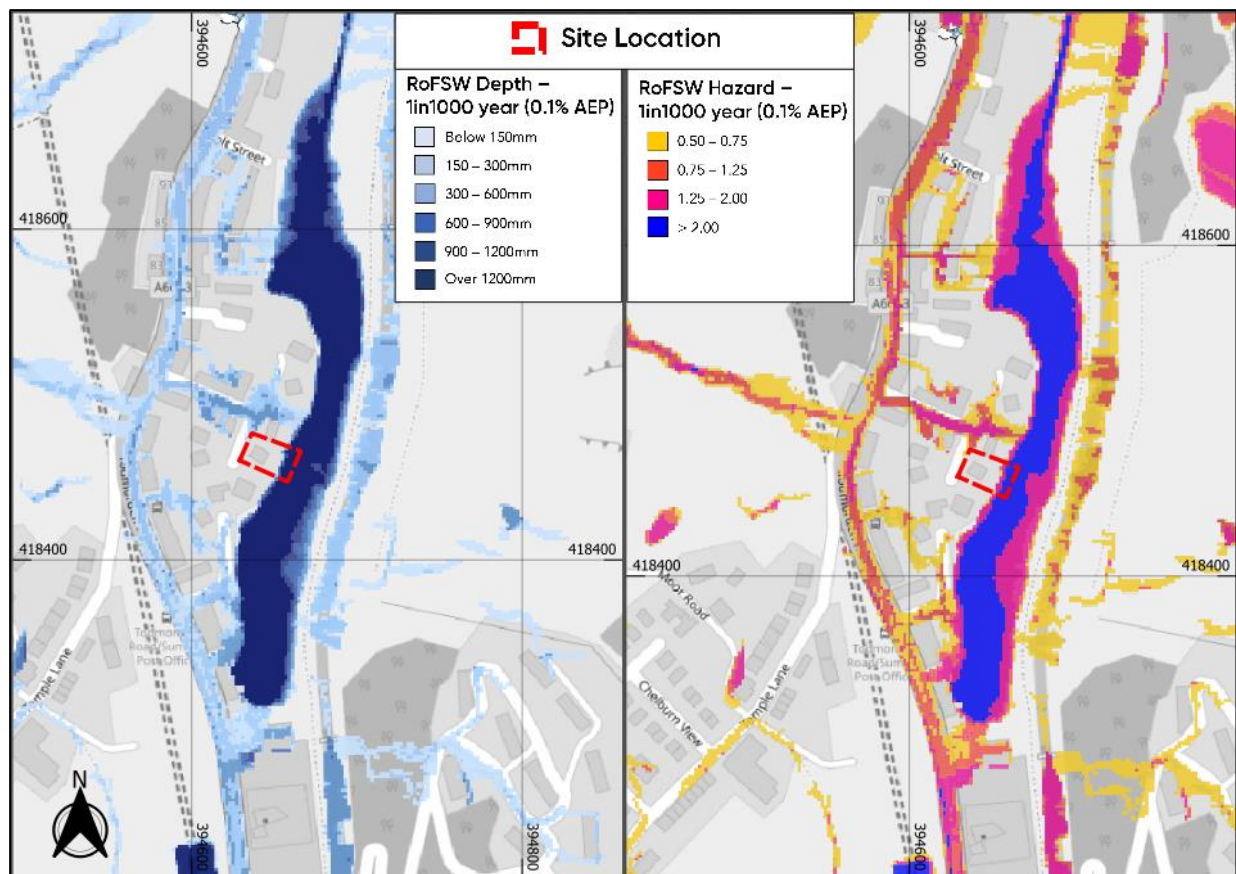


Figure 8: EA Surface Water Flood Risk Mapping 0.1% AEP (Source: Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © <https://www.openstreetmap.org> and contributors, © EA copyright and/or database right 2015)

Reservoirs

- 4.31. 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.
- 4.32. According to the EA's Flood Risk from Reservoirs mapping the site is at risk of flooding in the event of a breach at the Chelburn Upper reservoir (Figure 9). The reservoir failure model is a 'dry day' scenario. This scenario predicts the flooding that would occur if the dam or reservoir failed when rivers are at normal levels meaning that it could be caused by reservoir walls failing due to old age, accident, or because excess flood water has been added to the reservoir.
- 4.33. 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.

- 4.34. A comparison between the local LiDAR elevation dataset and the 'wet day' extents suggests the reservoir inundation level could reach approximately 177m AOD, albeit this is considered a residual risk only.

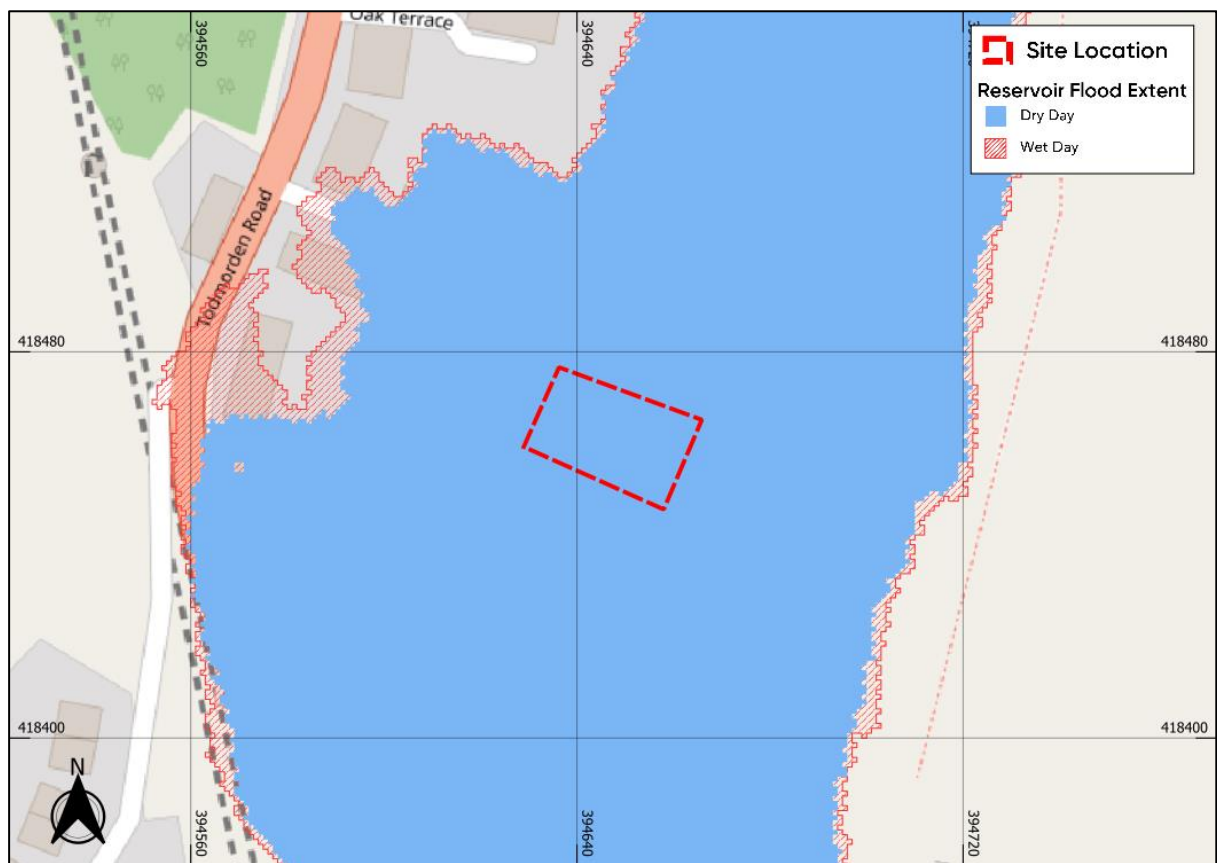


Figure 9: EA Reservoir Flood Risk Mapping (Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). ©<https://www.openstreetmap.org> and contributors. Contains public sector information licensed under the Open Government Licence v3.0)

Groundwater

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

- 4.36. The British Geological Survey's (BGS) mapping shows superficial deposits of Alluvium comprising clay, Alluvium comprising silt, Alluvium comprising sand, and Alluvium comprising gravel underlying the site. The bedrock underlying the site is Guiseley Grit comprising Sandstone.
- 4.37. There are no borehole records within the vicinity of the site that are deemed to be representative of the local geology.
- 4.38. Albeit the risk of groundwater flooding cannot be quantified, as the development proposals do not include any proposed basements, nor any change to the foundations or fabric of the existing building, the risk from groundwater flooding is considered to be low.

Sewers

- 4.39. 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.
- 4.40. No sewer flood records were made available at the date this report was written.
- 4.41. The LFRMS identifies a Critical Drainage Area in Littleborough, however no visual representation of this area was found in the documents.
- 4.42. However, Streetview Imagery shows the existing dwelling to be slightly elevated in relation to the internal access road levels – .Therefore above ground flooding from a sewer is not expected to be directed towards the site.



Figure 10: Streetview imagery at Holme House Street. 12, Holme House St on the left © <https://www.google.com/maps>

5. Flood Risk Mitigation

Fluvial

- 5.1. The site is shown to be located in Flood Zone 2 and Flood Zone 3. The design flood level (i.e. 1%AEP35CC) is assessed based on the Environment Agency's detailed hydraulic modelling outputs. This level was estimated as 172.64m AOD at the location of the site.
- 5.2. The Environment Agency's Flood Risk Standing Advice stipulates that minor extensions in Flood Zone 2 should set the respective Finished Floor Levels (FFL) to at least 600mm above the estimated design flood level, where there is a low level of confidence in the flood level estimate. Based on the LiDAR DTM elevation dataset, it can be inferred that existing FFL's are no lower than 176m AOD, which puts the dwelling at least 3m above the estimated 1%AEP35CC flood levels.
- 5.3. Given the uncertainty associated with the estimate of design flood levels, it is recommended that Finished Floor Levels of the new extension are set to no lower than the existing FFL's.
- 5.4. No sleeping accommodation is proposed at ground floor level.

Pluvial

- 5.5. The site is shown to be mostly at 'very low' risk from surface water flooding, with the exception of the lower parts of the garden.
- 5.6. No mitigation measures are deemed required, as the pluvial risk to the site is deemed to be associated with River Roch, which is already managed in the fluvial flood risk section.
- 5.7. Access/egress from the site to its immediate vicinity is likely to be compromised for higher return period events. This suggests that residents should remain within the site for higher return period storm events, as the modelled flood hazard along Holme House St is 'danger for all' for the 0.1% AEP event.

Reservoirs, Groundwater and Sewers

- 5.8. The site is located within an inundation area following the breach of Chelburn Upper Reservoir. The inundation flood level for the wet day is estimated as 177m AOD, which is approximately

1m above the existing Finished Floor Levels. Albeit it is not feasible to raise FFL's above this level, the risk of breach of the reservoir is deemed to be residual.

- 5.9. Albeit the risk of flooding from groundwater cannot be quantified, it is deemed low risk as all the proposals are above ground. Given the local geology, the groundwater is also deemed to be highly correlated with fluvial flows, which should affect the site in the first instance.
- 5.10. The risk of sewer flooding cannot be quantified as part of this assessment as the Level 1 SFRA does not present sewer flooding records by postcode, though some parts of Littleborough are deemed to be located within a Critical Drainage Area. Floodwater is not expected to be directed towards the property based on Streetview Imagery therefore mitigation is not required.

Increase to Flood Risk Elsewhere

- 5.11. The proposed development constitutes a Minor Development under the NPPF. 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.*

- 5.12. As such, the proposed development in isolation should have a negligible impact on flood risk elsewhere.
- 5.13. In terms of on-site generated surface water runoff, the additional runoff is limited to the additional footprint of the new extension (35m²). The additional runoff will be managed via the existing drainage system. Small scale SuDS such as rainwater planters and water butts could be installed in outdoor areas to provide betterment.
- 5.14. Surface water drains are expected in the areas surrounding the site. These would be retained, unchanged. The proposed development does not include any alterations to the existing building and therefore the development would not impede the drainage of surface water.

Flood Warnings

- 5.15. The site is not in an area where the EA provide specific flood alerts and warnings. The occupant of the dwelling should monitor Met Office Weather Warnings to be prepared for extreme weather events.
- 5.16. However, site users are recommended to follow the *met office* web page in the event of heavy rainfall. The list of *met office* warnings can be found below.

Yellow Warning: *Yellow warnings can be issued for a range of weather situations. Many are issued when it is likely that the weather will cause some low level impacts, including some disruption to travel in a few places. Many people may be able to continue with their daily routine, but there will be some that will be directly impacted and so it is important to assess if you could be affected. Other yellow warnings are issued when the weather could bring much more severe impacts to the majority of people but the certainty of those impacts occurring is much lower. It is important to read the content of yellow warnings to determine which weather situation is being covered by the yellow warning.*

Amber Warning: *There is an increased likelihood of impacts from severe weather, which could potentially disrupt your plans. This means there is the possibility of travel delays, road and rail closures, power cuts and the potential risk to life and property. You should think about changing your plans and taking action to protect yourself and your property. You may want to consider the impact of the weather on your family and your community and whether there is anything you need to do ahead of the severe weather to minimise the impact.*

Red Warning: *Dangerous weather is expected and, if you haven't already done so, you should take action now to keep yourself and others safe from the impact of the severe weather. It is very likely that there will be a risk to life, with substantial disruption to travel, energy supplies and possibly widespread damage to property and infrastructure. You should avoid travelling, where possible, and follow the advice of the emergency services and local authorities.*

6. Conclusions

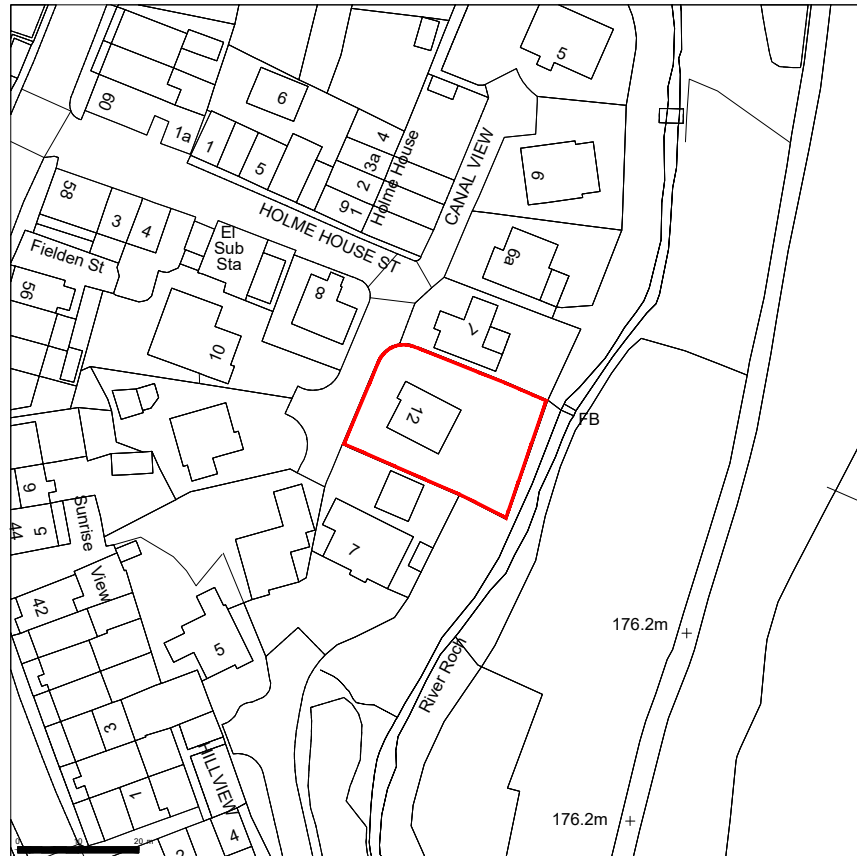
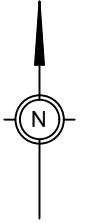
- 6.1. This FRA has been undertaken with reference to the requirements of NPPF and Planning Practice Guidance with respect to the development at 12 Holme House Street, Littleborough, OL15 9QU. It has been written to support a planning application and prepared with due consideration to the nature of the 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 mostly located within Flood Zone 2 with the exception of the lower parts of the garden, which is affected by Flood Zone 3. The fluvial flood risk was assessed in further detail from the detailed hydraulic model made available by the Environment Agency. The 1%AEP35CC flood level was assessed as 172.64m AOD, which suggests existing FFL's are at least over 3m above the design flood level. No mitigation measures are deemed required apart from not setting FFL's any lower than the existing levels.
Pluvial	The site is shown to be mostly at 'very low' risk from pluvial sources, with the exception from the eastern fringe of the site, which is affected by River Roch. No mitigation measures are therefore deemed required as this risk of flooding is mitigated by the mitigation measures proposed as part of fluvial flood risk i.e. FFL's no lower than existing levels.
Tidal Reservoirs Groundwater Sewers Canals	Tidal flood risk is deemed to be low in this location. The inundation level from a failure of a reservoir is estimated as 177m AOD, which is approximately 1m above the existing platform level. Albeit it would not be feasible to raise FFL's above this level, the risk of breach of the reservoir is deemed to be residual. Albeit the risk of flooding from groundwater cannot be quantified, it is deemed to be low risk as all the proposals are above ground. The risk of sewer flooding cannot be quantified as part of this assessment. Streetview Imagery, shows the existing dwelling to be slightly elevated in relation to the internal access road levels and therefore floodwater is not expected to drain towards the

	property. It is understood that some parts of Littleborough are within a Critical Drainage Area. A breach of the canal is unlikely as its western bank has a width of over 20m, albeit at roughly at a similar level of the site
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- 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.

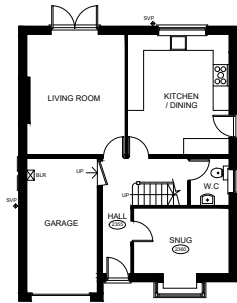
Appendix A - Development Proposals



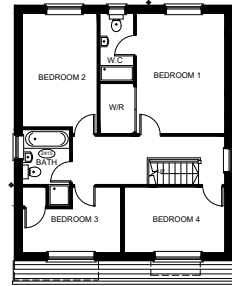
12 HOLME HOUSE STREET
LITTLEBOROUGH
OL15 9QU

LOCATION PLAN

1:1250 SCALE



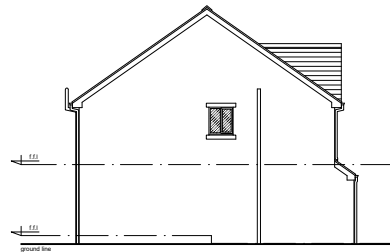
GROUND FLOOR PLAN



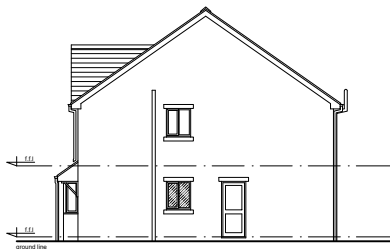
FIRST FLOOR PLAN



FRONT ELEVATION



LEFT SIDE ELEVATION



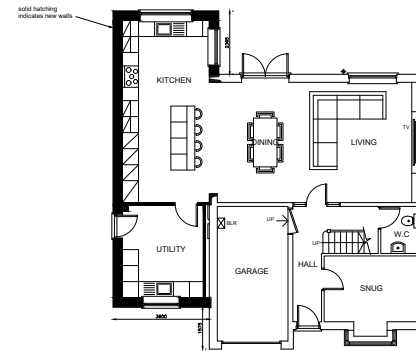
RIGHT SIDE ELEVATION



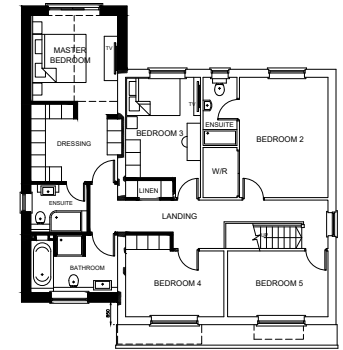
REAR ELEVATION

1:100 scale bar 0 1 2 3 4 5 metres

EXISTING FLOOR PLANS & ELEVATIONS



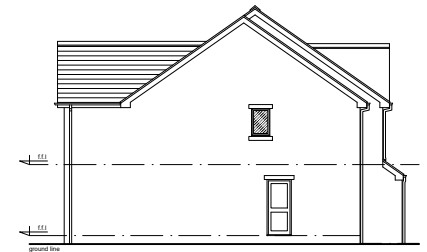
GROUND FLOOR PLAN



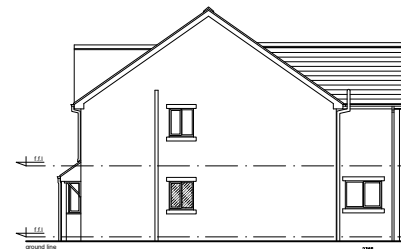
FIRST FLOOR PLAN



FRONT ELEVATION



LEFT SIDE ELEVATION



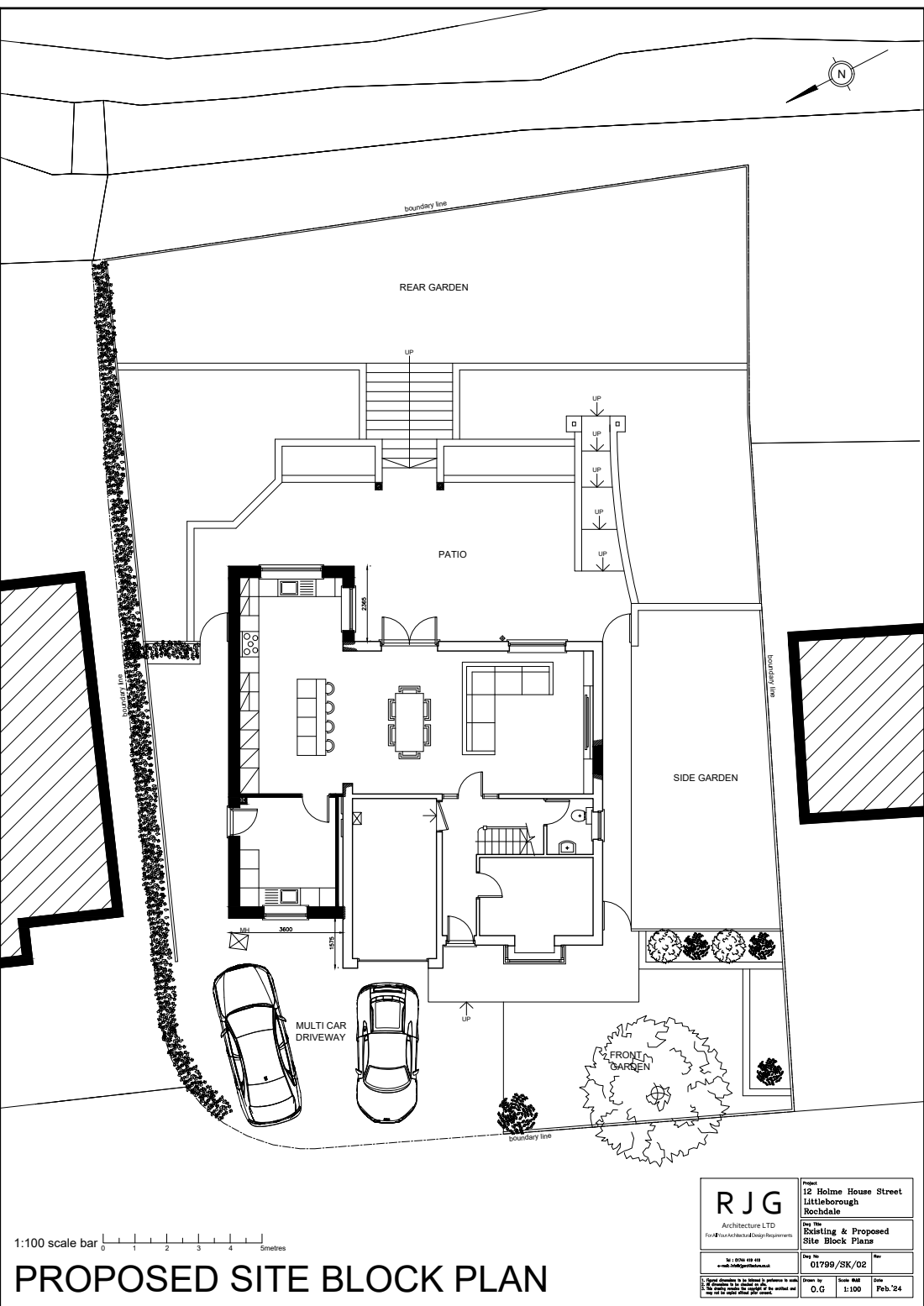
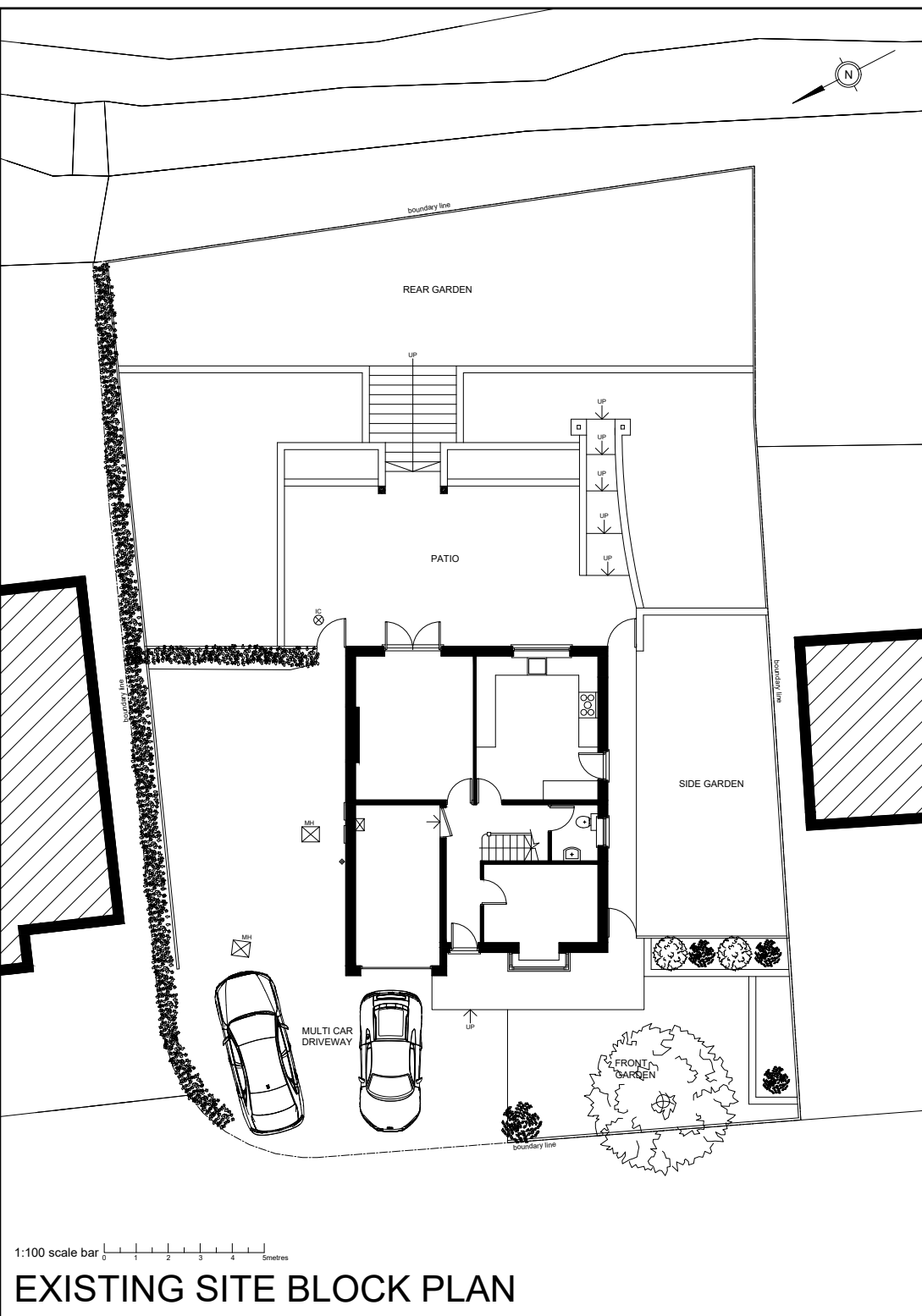
RIGHT SIDE ELEVATION



REAR ELEVATION

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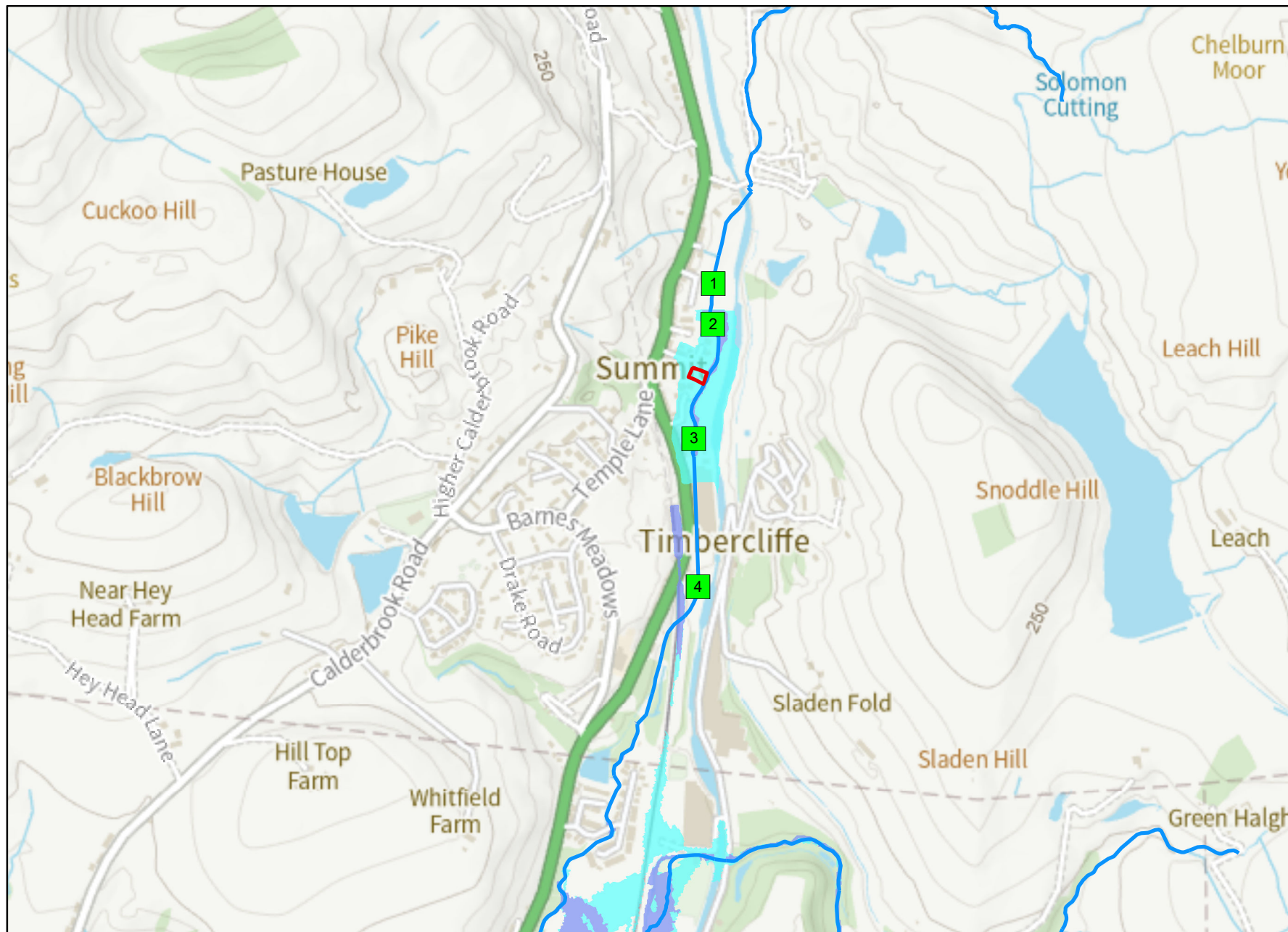
PROPOSED FLOOR PLANS & ELEVATIONS



RJG Architecture LTD For All Architectural Design Requirements Tel: 01799 439 439 www.rjgarchitecture.co.uk	Project 12 Holme House Street Littleborough Rochdale		
	Drawn By Existing & Proposed Site Block Plans		
	Drawn By O.G	Scale 1:100	Date Feb '24
	1. Digital drawings to be printed in accordance with the British Standard BS 1192-2:2011. 2. No liability is accepted for the use of the drawings for any purpose other than that for which they were prepared.		

Appendix B - Consultation

Detailed Flood Map Centred on Holme House Street, Littleborough, OL15 9QU. Created 29/04/2024 [GMMC356777AB]



1:10,001



Legend

- Site Location
- Model Measurements
- Main River
- Flood Zone 3
- Flood Zone 2

Model data taken from River Roch and Tributaries 2007
AEP - Annual Exceedence Probability
m aodN - metres above ordnance datum Newlyn
cumecs - cubic metres per second

Notes: *Climate Change Scenario - We only hold climate change measurements based on the previous climate change guidance (20% increase in flow). The new climate change guidance is available at <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>. The location of the site and the type (vulnerability) of development determine the climate change allowances to consider in any flood risk assessment.