

Prepared for:

Neil Shand

October 2024

Our reference:

94842-091024-Shand-ArthurRd

Location:

68 Arthur Road

Wokingham

RG41 2SY



Document Issue Record

Project: Flood Risk Assessment for Planning
Client: Neil Shand
Location: 68 Arthur Road, Wokingham, RG41 2SY
Application: Single storey rear/side extension along with changes to fenestration, following demolition of the existing storage unit
Our reference: 94842-091024-Shand-ArthurRd
Version: v1.0 211024

Lead Consultant: Miss Jesy Ferry
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1. Key Facts

1.1 Flood Risk Posed:

- EA Flood Zone 2 (Medium Risk).
- The risk would appear to be predominately from a fluvial source originating from the Emm Brook which is approximately 28m south west of the site.
- Modelled flood levels and flood extents have been requested from the EA as part of the Product 4 data request.
- Modelled flood extents and levels have been provided for the River Loddon Lower (JBA, 2008) with Lower Loddon Flood map update (WSP, 2009) study.
- The site is shown to be entirely outside of the modelled 1 in 5 year, 1 in 20 year, 1 in 100 year and 1 in 100 year + 20% climate change flood events.
- Comparison of the in-channel modelled flood levels provided with topographic site levels (48.43mAOD to 51.04mAOD) shows that the site is at least 1.99m above the 100yr + 20% CC modelled flood level.
- The Flood Zone 2 extent at the site is understood to be derived from the historic flood map (recorded flood outlines).
- The EA and 2023 Wokingham Strategic Flood Risk Assessment (SFRA) have records of historical flooding during March 1947 at the site. This was caused by exceedance of channel capacity. The Flood Zone extent at the site matches this 1947 historic flood extent.
- Risk of pluvial flooding the site appears to be "Very Low".
- The site is not located within a Critical Drainage Area.
- Risk of flooding posed to the site by, reservoir inundation, sewer incidents and groundwater would appear to be low.

1.2 Flood Risk Mitigation:

- The proposed planning application is for a 'minor development' – a residential extension.
- The additional footprint created by the development will not exceed 250m².
- There will be no introduction of additional or separate units, no sub-division, and no intensification of usage.
- No new basements or ground floor bedrooms are proposed.
- The proposed development fits within EA standing advice for domestic extensions.
- Finished floor levels will be no lower than existing adjacent floor levels.
- Flood proofing of the house will be incorporated as appropriate.
- The applicant will register with the free Environment Agency Floodline Alert Direct service.

- Due to the small scale of development, a full Surface Water Drainage Strategy is not required at this stage of planning.

Assuming accordance with these flood risk management measures, Unda Consulting Limited consider the proposed application to be suitable in flood risk terms.

2. Introduction

Unda Consulting Limited have been appointed by Neil Shand (hereinafter referred to as “the applicant”) to undertake a Flood Risk Assessment for the proposed development at 68 Arthur Road, Wokingham, RG41 2SY (hereinafter referred to as “the site”). The purpose of the study is to support a planning application for the proposed development.

This report presents our findings based on the readily available information and data relating to the site and surrounding drainage area.

The site appears to be located within Flood Zone 2 as defined by the Environment Agency (EA) on their Flood Map for Planning. Under the National Planning Policy Framework (NPPF), a FRA is required if a proposed development:

- includes building or engineering works in Flood Zone 2 or 3;
- includes building or engineering works on land classified by the Environment Agency as having critical drainage problem;
- changes the use of land or buildings in a location at risk of flooding from rivers or the sea, or with critical drainage problems;
- changes the use of land or buildings in a way that increases the flood vulnerability of the development where it may be subject to other sources of flooding;
- is larger than 1 hectare.

The assessment should demonstrate to the Local Planning Authority (LPA) and EA how flood risk will be managed now and over the development’s lifetime, taking climate change into account, and with regard to the vulnerability of its potential users.

- whether the proposed development is likely to be affected by current or future flooding from any source;
- whether it will increase flood risk elsewhere;
- whether the measures proposed to deal with these effects and risks are appropriate.

3. Existing Situation

3.1 Site Usage:

The site is currently occupied by a three-bedroom detached bungalow. The surrounding area appears to be a residential mix of bungalows and houses.

The site location plan and existing plans are provided in the report Appendix.



Figure 1: Aerial view of the site and immediate surrounding area (Source: Google Earth)

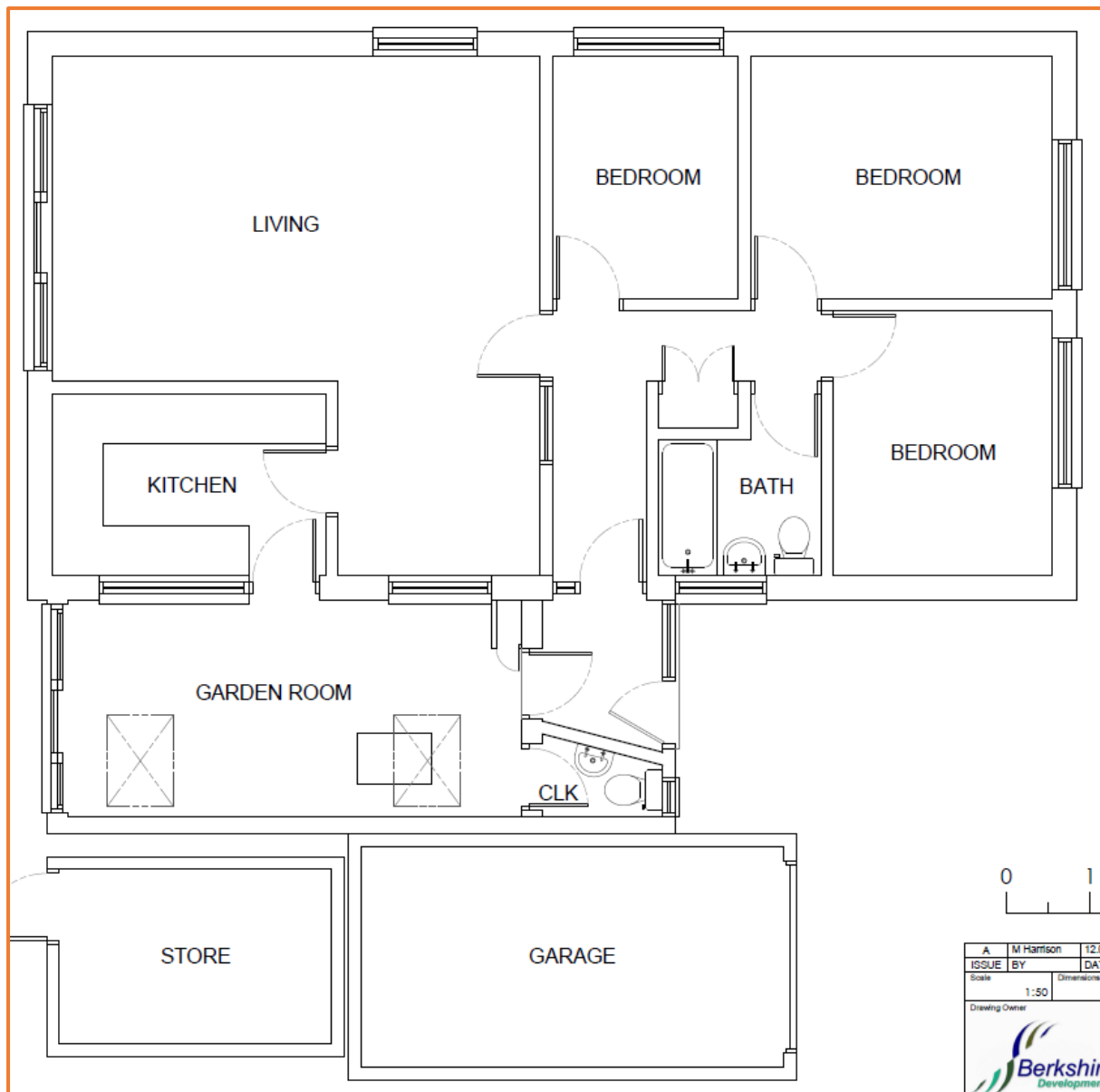


Figure 2: Existing Ground Floor Plan (Source: Berkshire Developments)

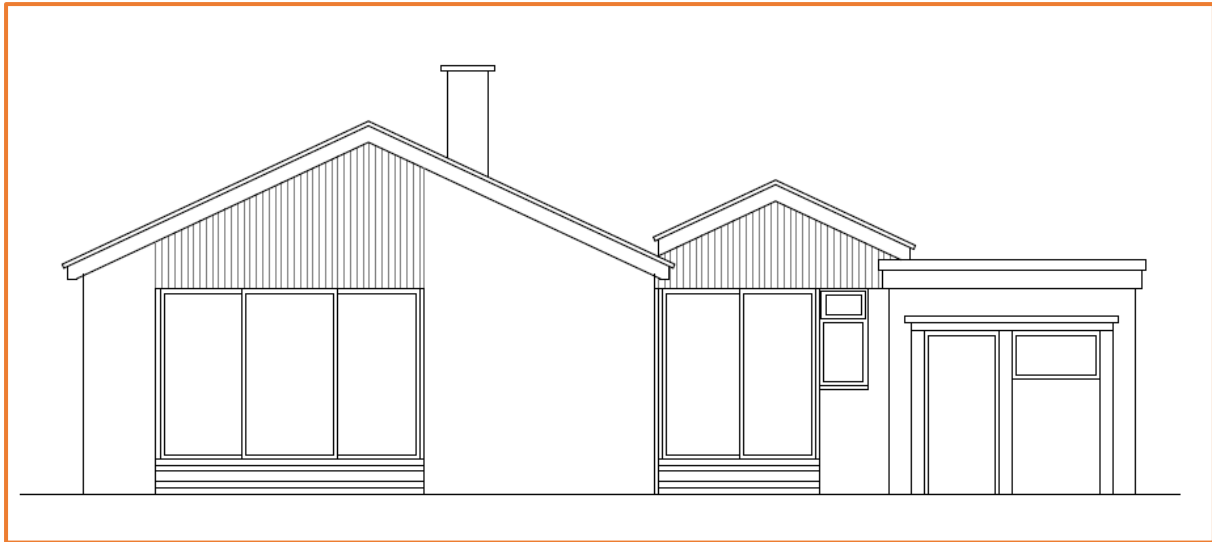


Figure 3: Existing South West Elevations (Source: Berkshire Developments)

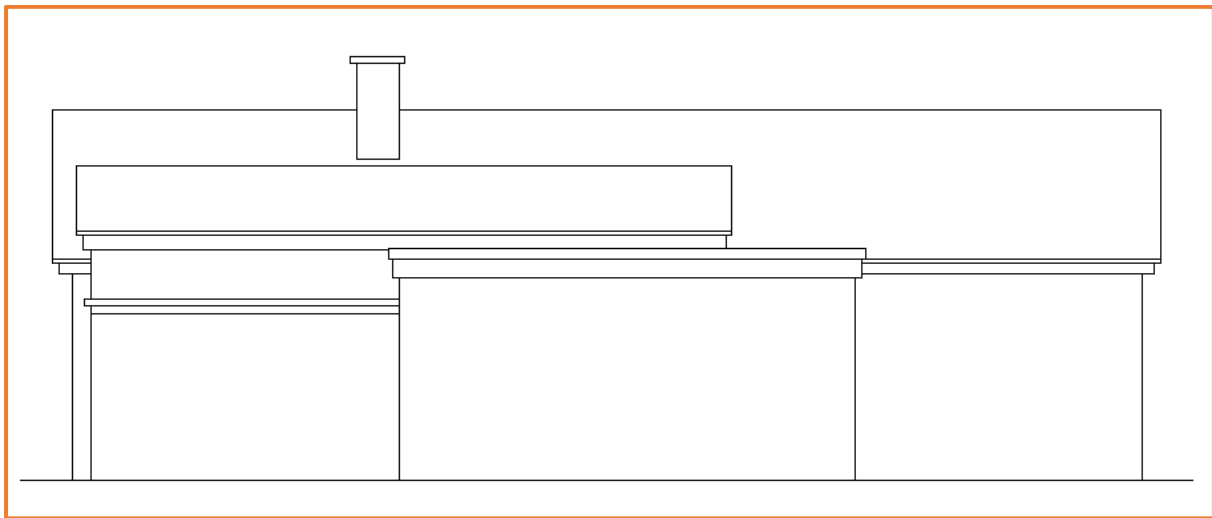


Figure 4: Existing South East Elevations (Source: Berkshire Developments)

3.2 Topography:

Environment Agency LiDAR has been used to assess the topography across the site and wider area. Light Detection and Ranging (LIDAR) is an airborne mapping technique, which uses a laser to measure the distance between the aircraft and the ground surface. Up to 100,000 measurements per second are made of the ground, allowing highly detailed terrain models to be generated at high spatial resolutions. The EA's LIDAR data archive contains digital elevation data derived from surveys carried out by the EA's specialist remote sensing team. Accurate elevation data is available for over 70% of England. The LiDAR technique records an elevation accurate to +0.3m every 2m. This dataset is derived from a combination of the full dataset which has been merged and re-sampled to give the best possible coverage. The dataset can be supplied as a Digital Surface Model (DSM) produced from the signal returned to the LIDAR (which includes heights of objects, such as vehicles, buildings and vegetation, as well as the terrain surface) or as a Digital

Terrain Model (DTM) produced by removing objects from the Digital Surface Model. 1.0m horizontal resolution DTM LiDAR data has been used for the purposes of this study.

LiDAR remotely sensed digital elevation data suggests that the ground topography on site ranges between 48.43mAOD to 51.04mAOD across the site.

3.3 Geology and Soil:

The British Geological Survey (BGS) Map indicates that the bedrock underlying the site is London Clay Formation – Clay, Silt and Sand.

The British Geological Survey (BGS) Map indicates that the superficial deposits underlying the site are Head – Clay, Silt, Sand and Gravel.

The UK Soil Observatory (UKSO) Map indicates the soil of the site is relatively deep of Colluvium parent material with a soil texture ranging from Clayey to Sandy Loam.

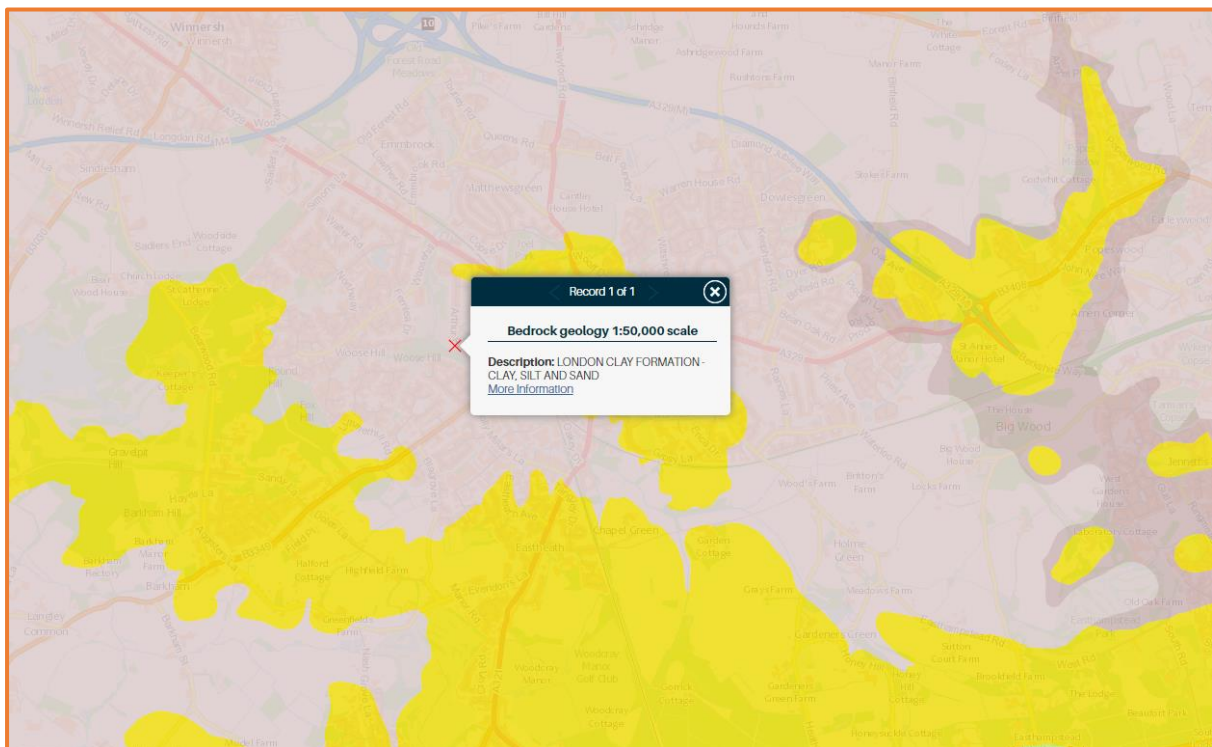


Figure 5: Local Bedrock (Source: BGS)

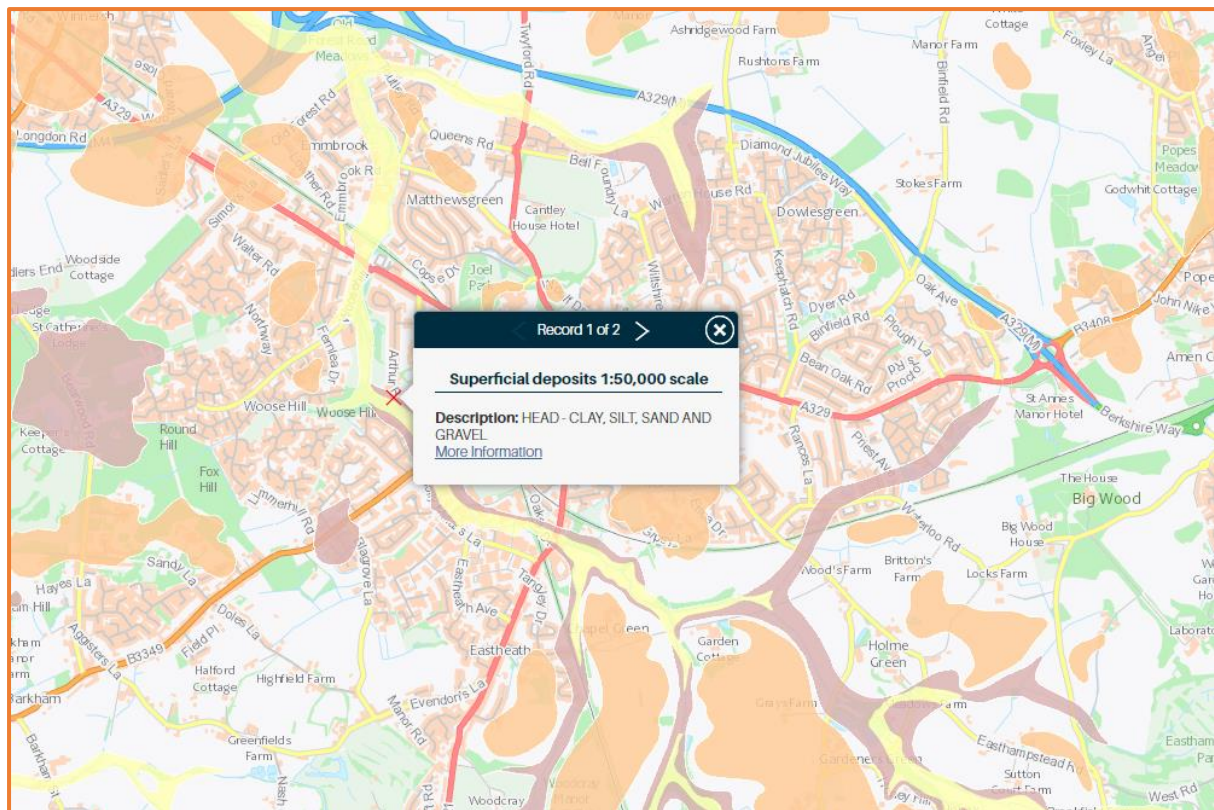


Figure 6: Local Superficial deposits (Source: BGS)

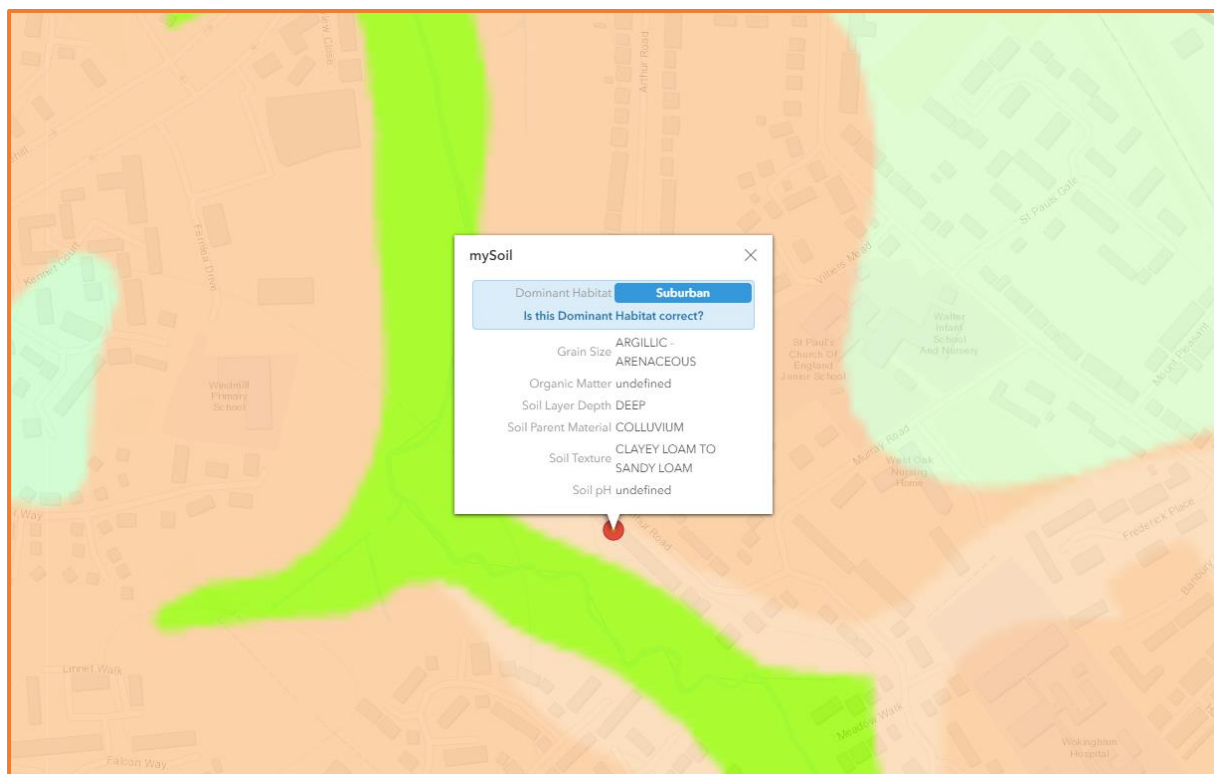


Figure 7: Local Soil Types (Source: UKSO)

4. Development Proposal

The proposed planning application is for the construction of single storey side and rear extension along with changes to fenestration, following demolition of the existing storage unit.

There will be no introduction of additional or separate units, no sub-division, and no intensification of usage. The property will remain a single dwelling. No new basements or bedrooms on the ground floor are proposed as part of the development.

The proposed plans are provided in the report Appendix.

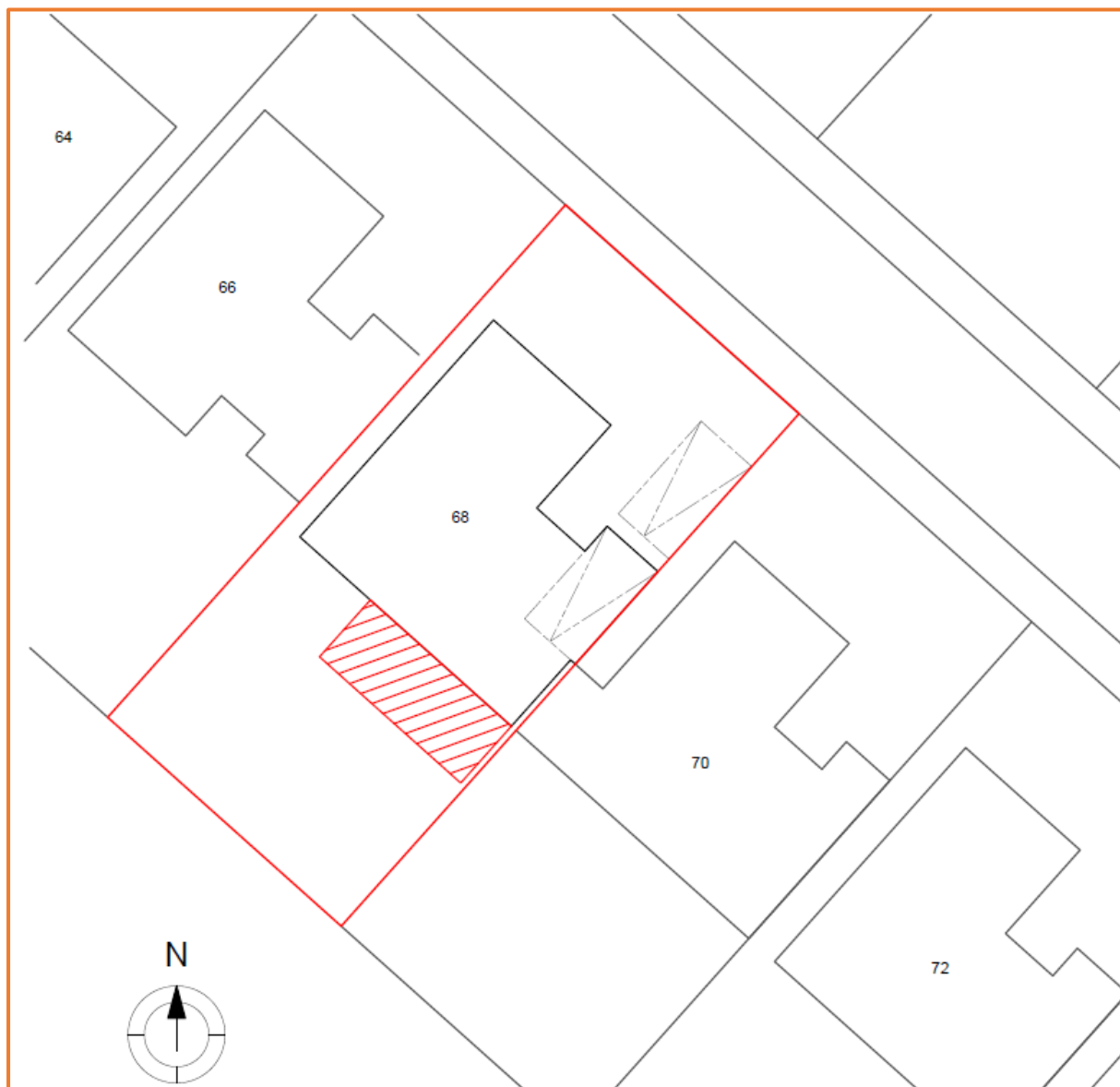


Figure 8: Proposed Site Plan (Source: Berkshire Developments)

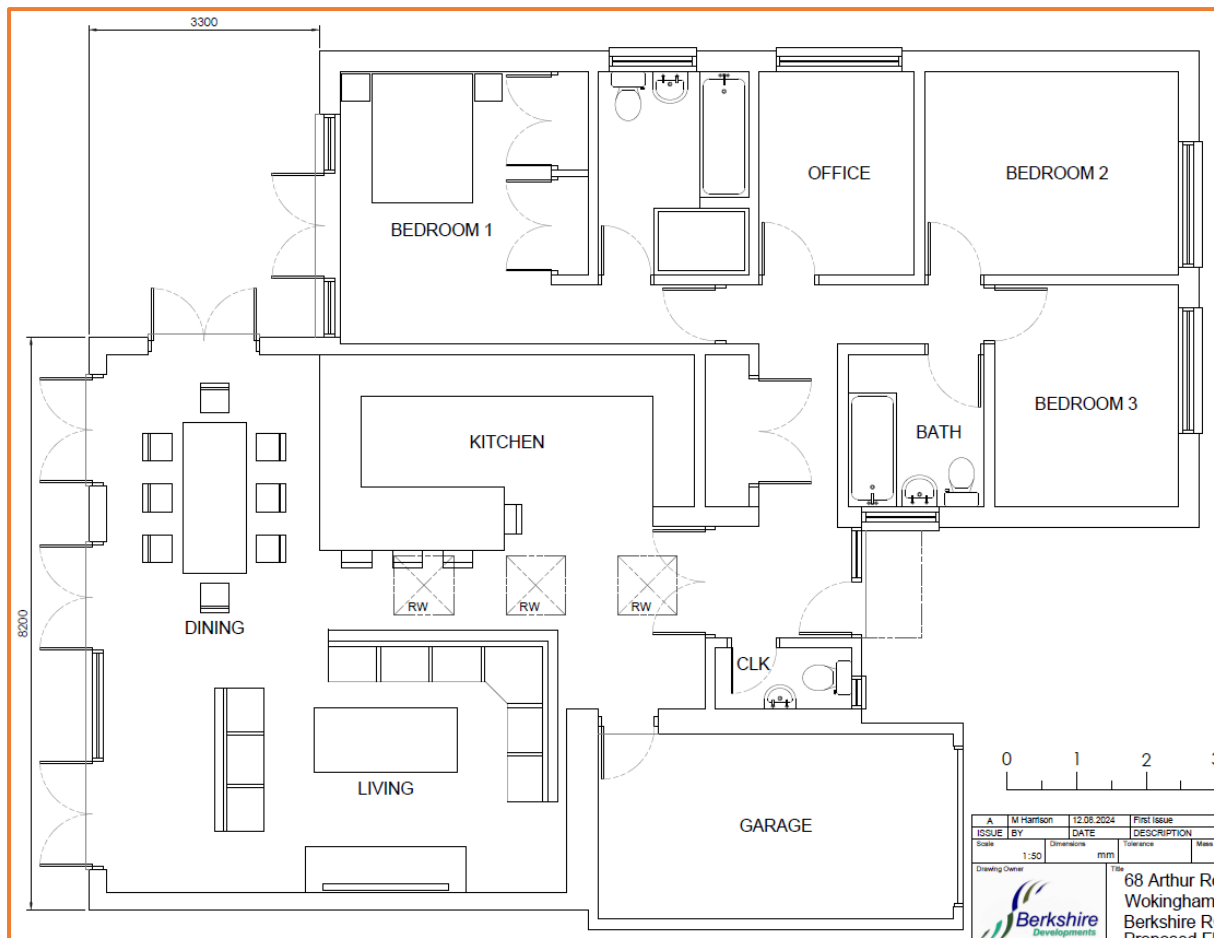


Figure 9: Proposed Ground Floor Plan (Source: Berkshire Developments)



Figure 10: Proposed South West Elevation (Source: Berkshire Developments)

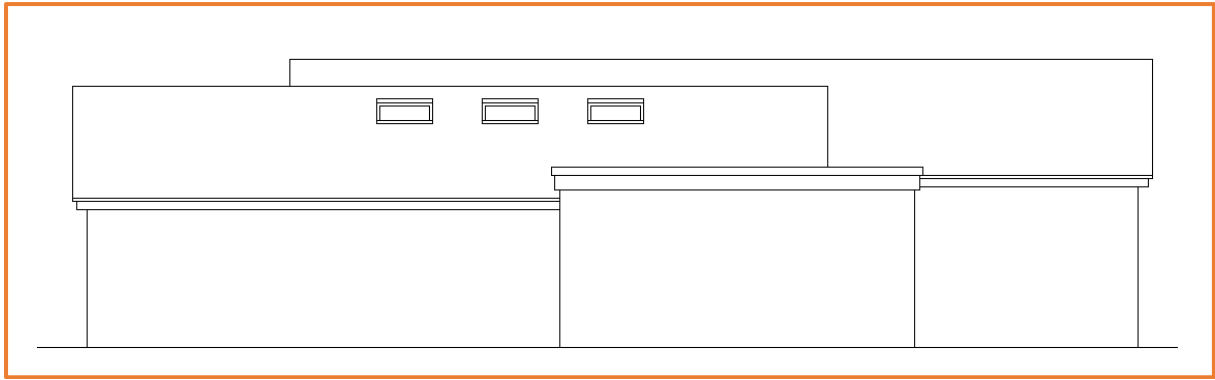


Figure 11: Proposed South East Elevation (Source: Berkshire Developments)

5. Assessment of Flood Risk

5.1 Flood Zones:

Within planning, Flood Zones refer to the probability of river and sea flooding, ignoring the presence of defences. They are shown on the Environment Agency's Flood Map for Planning (Rivers and Sea), available on the Environment Agency's website.

Flood Zone	Definition
Zone 1 Low Probability	Land having a less than 1 in 1,000 annual probability of river or sea flooding. (Shown as 'clear' on the Flood Map – 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. (Land shown in light blue on the Flood Map)
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. (Land shown in dark blue on the Flood Map)
Zone 3b The Functional Floodplain	This zone comprises land where water has to flow or be stored in times of flood. 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)

Table 1: Flood Zones

The Flood Zones shown on the Environment Agency's Flood Map for Planning (Rivers and Sea) do not take account of the possible impacts of climate change and consequent changes in the future probability of flooding.

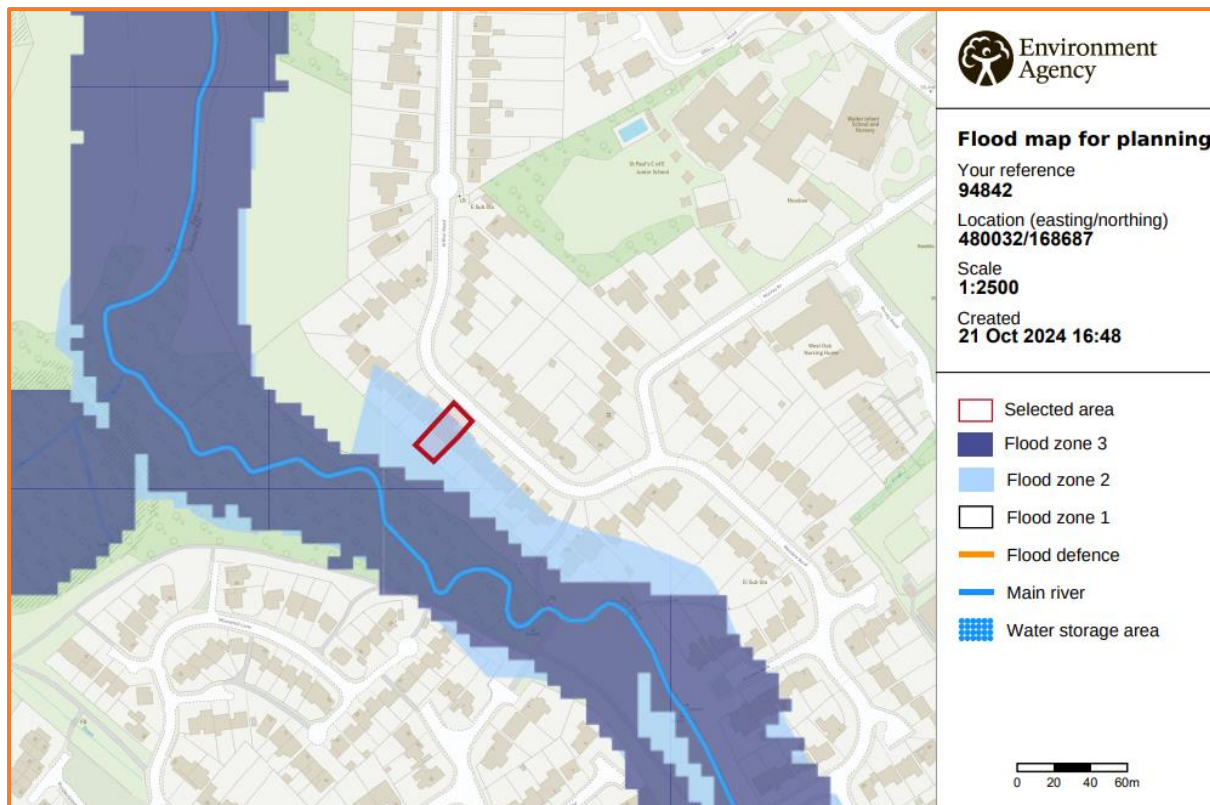


Figure 12: Environment Agency Flood Map for Planning (Rivers and Sea) (Source: EA)

The site is shown to be partially within Flood Zone 2 (Medium Probability), which means it is defined as land having between a 1 in 100 and 1 in 1,000 annual probability of river and sea flooding.

The risk would appear to be predominately from a fluvial source originating from the Emm Brook which is approximately 28m south west of the site.

5.2 Fluvial

5.2.1 Emm Brook

The Emm Brook is a small river within Berkshire. It is a tributary of River Loddon which it flows into at the village of Hurst. It is classified as a main river by the Environment Agency.

5.2.2 Detailed flood modelling:

Modelled flood levels and flood extents have been requested from the EA as part of the Product 4 data request. Modelled flood extents and levels have been provided for the River Loddon Lower (JBA, 2008) with Lower Loddon Flood map update (WSP, 2009) study.

The site is shown to be entirely outside of the modelled 1 in 5 year, 1 in 20 year, 1 in 100 year and 1 in 100 year + 20% climate change flood events.

The site is located with Flood Zone 2 and is classified as "more vulnerable". The Flood Risk Assessment: climate change allowance guidance – updated may 2022, states that the Central climate change allowance should be applied. The site falls within the Loddon and Tributaries

Management catchment, where the Central climate change allowance for the 2080's is 14% and the Higher Central allowance for the 2080's is 23%.

The 1D in-channel flood levels with 20% increase in flows have been provided and as such the 100 year + 20% climate change increase will be used for this assessment.

The closest upstream in-channel node to the site is node Emm2.39.1 where the following levels have been taken. Comparison of the modelled flood levels provided with topographic site levels (48.43mAOD to 51.04mAOD) shows that the site is at least 1.99m above the 100yr + 20% CC modelled flood level.

	5 yr	20 yr	100 yr	100 yr + 20% CC
Modelled Flood Level (mAOD)	46.23	46.32	46.40	46.44
Depth of Flooding on site (m)	Above	Above	Above	Above

Table 2. 1D in-channel flood levels

The Flood Zone 2 extent at the site is understood to be derived from the historic flood map (recorded flood outlines).

5.2.3 Flood Defences:

Flood defences are structures which affect flow in times of flooding in order to reduce the risk water entering property. They generally fall into one of two categories; 'formal' or 'informal'.

A 'formal' flood defence is a structure which has been specifically built to control floodwater. It is maintained by its owner or statutory undertaker so that it remains in the necessary condition to function. In accordance with the Flood and Water Management Act, the Environment Agency has powers to construct and maintain defences to help against flooding.

An 'informal' defence is a structure that has not necessarily been built to control floodwater and is not maintained for this purpose. This includes road and rail embankments and other linear infrastructure (buildings and boundary walls) which may act as water retaining structures or create enclosures to form flood storage areas in addition to their primary function.

According to the EA there are no Environment Agency maintained raised defences in this area.

5.2.3 Residual risk (breach or overtopping of flood defences):

Breaching of flood defences can cause rapid inundation of areas behind flood defences as flow in the river channel discharges through the breach. A breach can occur with little or no warning, although they are much more likely to concur with extreme river levels or tides when the stresses on flood defences are highest. Flood water flowing through a breach will normally discharge at a high velocity, rapidly filling up the areas behind the defences, resulting in significant damage to buildings and a high risk of loss of life. Breaches are most likely to occur in soft defences such as earth embankments although poorly maintained hard defences can also be a potential source of breach.

Overtopping of flood defences occurs when water levels exceed the protection level of raised flood defences. The worst case occurs when the fluvial or tidal levels exceed the defence level as this

can lead to prolonged flooding. Less severe overtopping can occur when flood levels are below defence levels, but wave action causes cyclic overtopping, with intermittent discharge over the crest level of the defence. Flood defences are commonly designed with a freeboard to provide protection against overtopping from waves. The risk from overtopping due to exceedance of the flood defence level is much more significant than the risk posed by wave overtopping. Exceedance of the flood defence level can lead to prolonged and rapid flooding with properties immediately behind the defences at highest risk.

No Flood defences act to defend the site from direct inundation.

5.2.4 Historical flood events:

The EA hold records of historic flood events from rivers and the sea. The EA map flooding to land, not individual properties. Their historic flood event record outlines are an indication of the geographical extent of an observed flood event. Their historic flood event outlines do not give any indication of flood levels for individual properties. They also do not imply that any property within the outline has flooded internally.

The EA and 2023 Wokingham Strategic Flood Risk Assessment (SFRA) have records of historical flooding during March 1947 at the site. This was caused by exceedance of channel capacity. The Flood Zone extent at the site matches this 1947 historic flood extent.

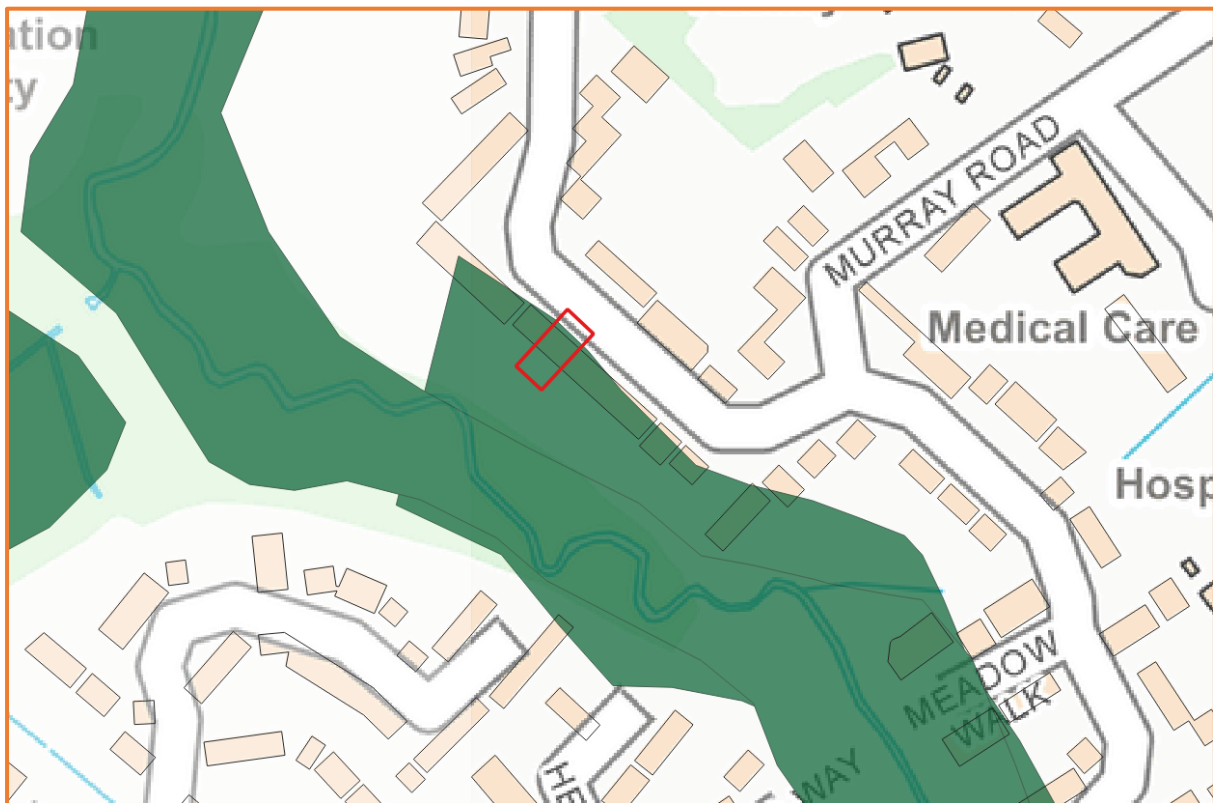


Figure 13: Environment Agency recorded flood outlines (Source: EA)

5.3 Pluvial (Surface Water):

Pluvial (surface water) flooding happens when rainwater does not drain away through the normal drainage systems or soak into the ground but lies on or flows over the ground instead.

In 2013 the EA, working with Lead Local Flood Authorities (LLFAs), produced an updated Flood Map for Surface Water. It is considered to represent a significant improvement on the previous surface water flood maps available, both in terms of method and representation of the risk of flooding. The modelling techniques and data used are considerably improved, and also incorporated locally produced mapping where this is available to represent features best modelled at a local scale.

The Flood Map for Surface Water assesses flooding scenarios as a result of rainfall with the following chance of occurring in any given year (annual probability of flooding is shown in brackets):

- High: Greater than or equal to 3.3% (1 in 30) chance in any given year (3.3%)
- Medium: Less than 3.3% (1 in 30) but greater than or equal to 1% (1 in 100) chance in any given year
- Low: Less than 1% (1 in 100) but greater than or equal to 0.1% (1 in 1,000) chance in any given year
- Very Low: Less than 0.1% (1 in 1,000) chance in any given year

The mapping below shows the Risk of Flooding from Surface Water centred on the site. Please note that the EA do not consider this information suitable to be used to identify the risk to individual properties or sites. It is useful to raise awareness in areas which may be at risk and may require additional investigation.

The EA Risk of Flooding from Surface Water Map suggests that the site lies within an area of "Very Low" risk of flooding from surface water. It should be noted that Arthur Road is within an area of "Low" risk of surface water flooding.

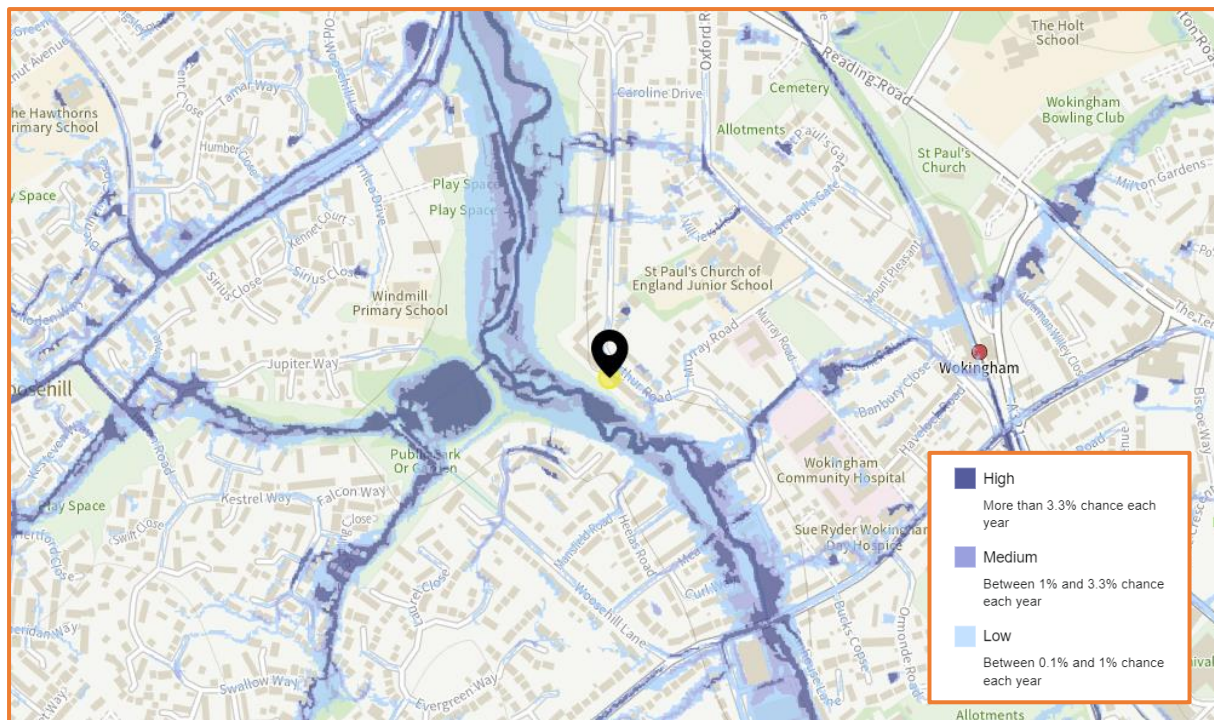


Figure 14: Extract from Environment Agency RoFSW map (Source: EA)

The EA has also produced surface water flood depth mapping for the 1 in 30 year (High Risk), 1 in 100 year (Medium Risk) and 1 in 1000 year (Low Risk) scenarios.

The detailed flood mapping below shows likely flood depths expected around the site during the 1:30, 1:100, and 1:1000 year pluvial flood events.

The site remains flood free throughout all modelled surface water events. It should be noted that during the 1 in 100 year surface water event, Arthur Road appears to have a maximum depth of 0.30m.

No further information has been provided to suggest the site or the surrounding area has been affected by surface water flooding.

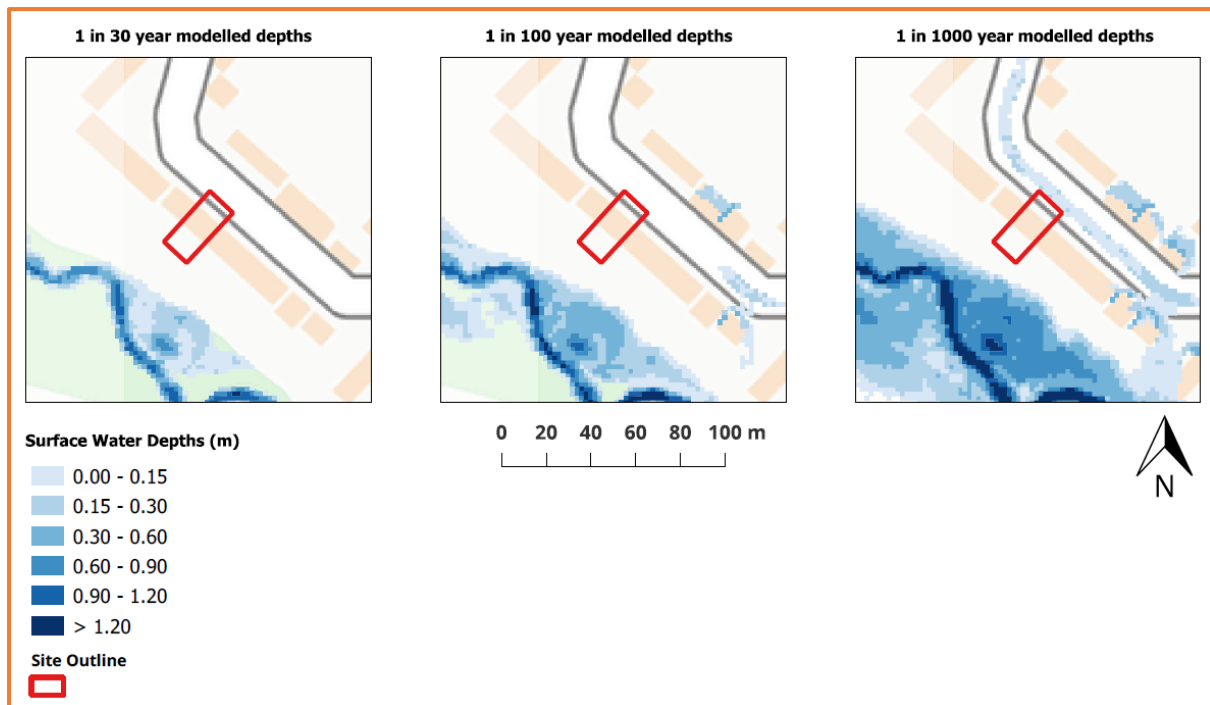


Figure 15: Environment Agency Risk of flooding from Surface Water Flood Depth Maps for High (1:30yr), Medium (1:100yr) and Low (1:1000yr) modelled events (Source: EA & OS)

5.3.1 Critical Drainage Areas

A Critical Drainage Area (CDA) is an area that has critical drainage problems and which has been notified to the local planning authority as such by the Environment Agency in line with the National Planning Policy Framework (NPPF). In these locations, there is a need for surface water to be managed to a higher standard than normal to ensure any new development will contribute to a reduction in flooding risks in line with NPPF. These higher standards are determined by the Environment Agency.

According to the 2023 Wokingham SFRA, there are currently no Critical Drainage Areas within Wokingham Borough.

5.4 Groundwater:

Groundwater flooding occurs as a result of water rising up from the underlying rocks or from water flowing from abnormal springs. This tends to occur after much longer periods of sustained high rainfall. Higher rainfall means more water will infiltrate into the ground and cause the water table to rise above normal levels. Groundwater tends to flow from areas where the ground level is high, to areas where the ground level is low. In low-lying areas the water table is usually at shallower depths anyway, but during very wet periods, with all the additional groundwater flowing towards these areas, the water table can rise up to the surface causing groundwater flooding.

Groundwater flooding is most likely to occur in low-lying areas underlain by permeable rocks (aquifers). These may be extensive, regional aquifers, such as chalk or sandstone, or may be localised sands or river gravels in valley bottoms underlain by less permeable rocks. Groundwater flooding takes longer to dissipate because groundwater moves much more slowly than surface water and will take time to flow away underground.

According to the 2023 Wokingham SFRA, the site lies within an area with ≥ 25 - 50% susceptibility to groundwater flooding.

In addition, according to the EA flooding from groundwater is unlikely in this area.

Lastly, no records of groundwater flooding in the vicinity of the site have been provided, and no basements are proposed as part of the development.

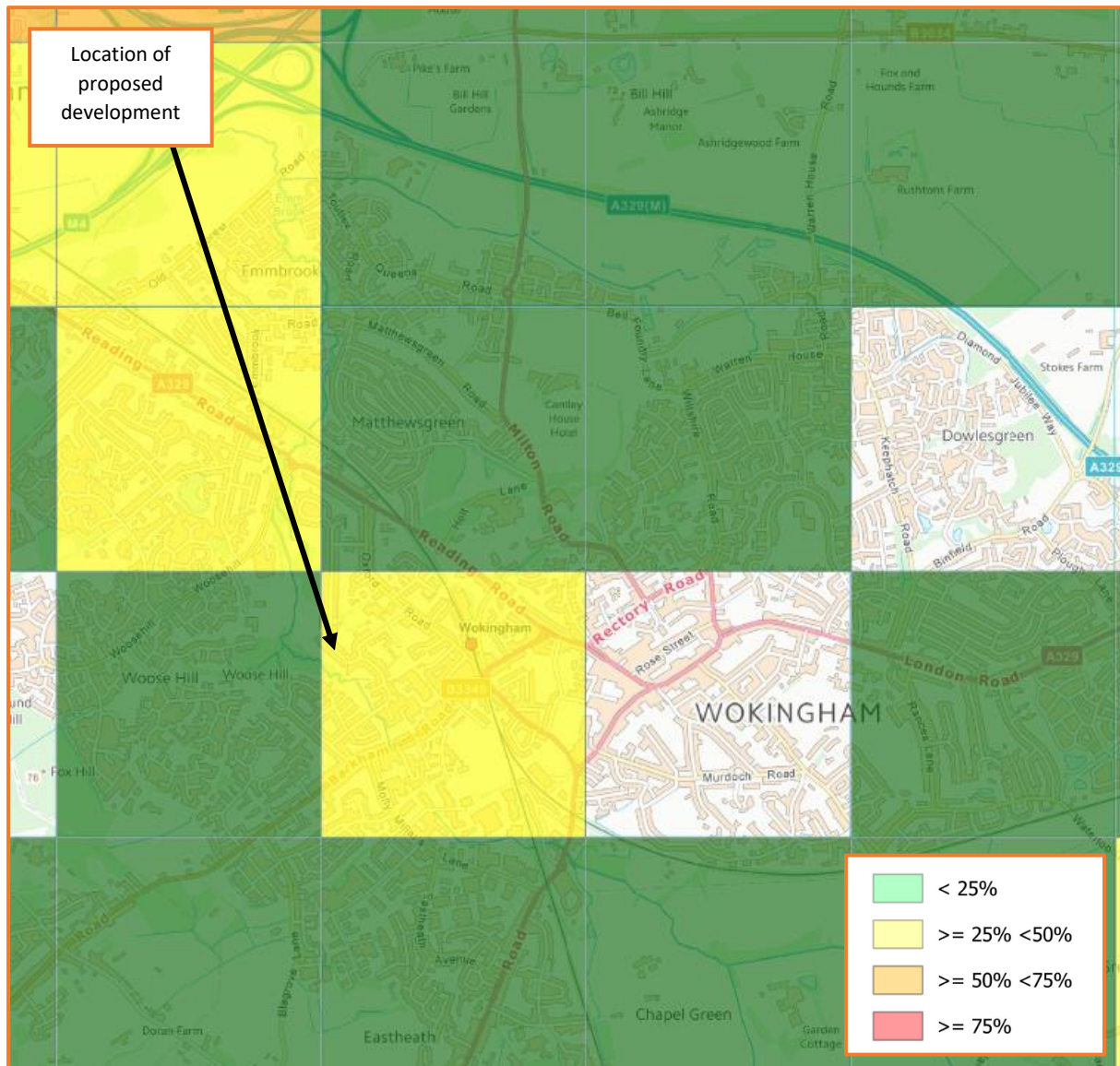


Figure 16: Areas at risk of groundwater flooding map (Source: 2023 Wokingham SFRA)

5.5 Sewer Surcharge:

Sewer flooding occurs when the sewer network cannot cope with the volume of water that is entering it. It is often experienced during times of heavy rainfall when large amounts of surface water overwhelm the sewer network causing flooding. Temporary problems such as blockages, siltation, collapses and equipment or operational failures can also result in sewer flooding.

All Water Companies have a statutory obligation to maintain a register of properties/areas which have reported records of flooding from the public sewerage system, and this is shown on the DG5 Flood Register. This includes records of flooding from foul sewers, combined sewers and surface water sewers which are deemed to be public and therefore maintained by the Water Company. The DG5 register records of flood incidents resulting in both internal property flooding and external flooding incidents. Once a property is identified on the DG5 register, water companies can typically put funding in place to address the issues and hence enable the property to be removed from the register. It should be noted that flooding from land drainage, highway drainage, rivers/watercourses and private sewers is not recorded within the register.

According to the 2023 Wokingham SFRA and Thames Water, between 2000 to 2022 there were a total of 4 sewer flooding incidents within the postcode area of "RG41 2".

No records of sewer flooding on the site or the surrounding area have been provided.

5.6 Other Sources:

Reservoirs with an impounded volume in excess of 25,000 cubic metres (measured above natural ground level) are governed by the Reservoirs Act and are listed on a register held by the Environment Agency. The site lies outside the maximum inundation extent on the EA Reservoir Inundation Map. The EA also advise on their website that reservoir flooding is extremely unlikely. There has been no loss of life in the UK from reservoir flooding since 1925. All major reservoirs have to be inspected by specialist dam and reservoir Engineers. In accordance with the Reservoirs Act 1975 in England, these inspections are monitored and enforced by the EA themselves. The risk to the site from reservoir flooding is therefore minimal and is far lower than that relating to the potential for fluvial / tidal flooding to occur. The Environment Agency Reservoir Flood Map illustrated below, illustrates the largest area that might be flooded if the storage area were to fail and release the water it is designed to hold during a flood event.

Records of flooding from reservoirs and canals are erratic as there is no requirement for the Environment Agency to provide information on historic flooding from canals and raised reservoirs on plans. In particular, the NPPF does not require flood risk from canals and raised reservoirs to be shown on the Environment Agency flood zones.

Overflows from canals can be common as they are often fed by land drainage, and often do not have controlled overflow spillways. Occasionally, major bank breaches also occur, leading to rapid and deep flooding of adjacent land.

No further information has been provided to suggest the site is susceptible to from the failure of canals or other artificial infrastructure from the risk of flooding.

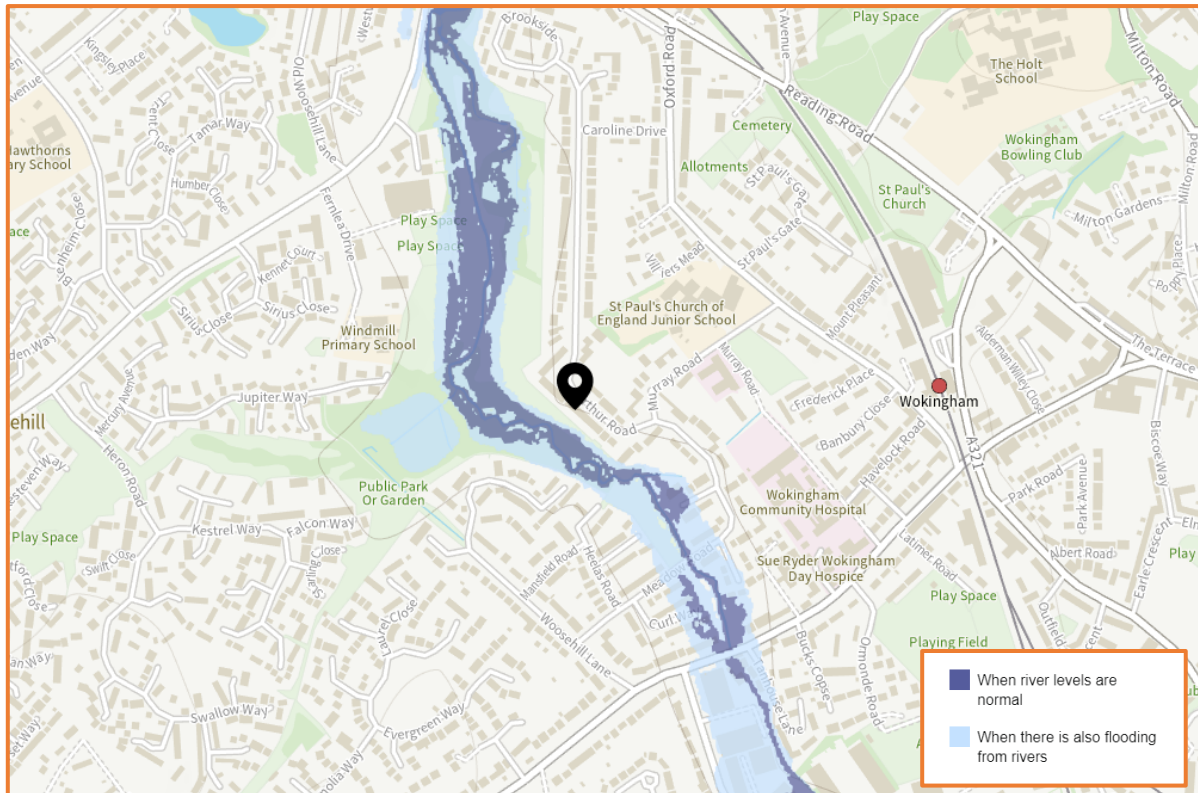


Figure 17: Extract from Environment Agency Reservoir Flood Map (Source: EA)

6. Flood Risk Management

6.1 Vulnerability to flooding:

The NPPF classifies property usage by vulnerability to flooding.

The existing site usage is classified as "more vulnerable" throughout, as it is a residential property.

Post development, the site will remain "more vulnerable", as the application is for a residential extension.

Accordingly, it is considered that the vulnerability of the site as a whole has not increased post development.

6.2 EA Standing Advice:

The EA Standing Advice guidance is for domestic extensions and non-domestic extensions where the additional footprint created by the development does not exceed 250m². It should not be applied if an additional dwelling is being created, e.g. a self-contained annexe or additional commercial unit.

The proposed application is for the construction of a residential extension which does not exceed 250m². Finished floor levels will be set no lower than existing adjacent floor levels.

In addition, there will be no introduction of additional or separate units, no sub-division, and no intensification of usage. The property will remain a single dwelling.

The site is not within 20m of an EA 'Main River'.

As such, the development as a whole is considered to fit within EA standing advice for domestic extensions.

6.3 Physical Design Measures:

The proposed application is for a residential extension to the existing property (and will not introduce any additional or separate residential units), finished floor levels will be set no lower than existing floor levels. Internal access will be maintained from the ground floor to the first floor of the property. No new basements or bedrooms on the ground floor are proposed as part of the development.

To help protect against flooding during extreme events, the applicant has agreed to implement flood resistant design measures, in consultation with the Local Authority building control department.

The EA Standing Advice states that the design should be appropriately flood resistant and resilient by:

- Using flood resistant materials that have low permeability to at least 600mm above the estimated flood level;
- Making sure any doors, windows or other openings are flood resistant to at least 600mm above the estimated flood level;
- Using flood resilient materials (for example lime plaster) to at least 600mm above the estimated flood level;
- By raising all sensitive electrical equipment, wiring and sockets to at least 600mm above the estimated flood level;
- Making it easy for water to drain away after flooding such as installing a sump and a pump
- Making sure there is access to all spaces to enable drying and cleaning;
- Ensuring that soil pipes are protected from back-flow such as by using non-return valves.

The site is however shown to be entirely outside of the modelled 1 in 5 year, 1 in 20 year, 1 in 100 year and 1 in 100 year + 20% climate change flood events.

Comparison of the in-channel modelled flood levels provided with topographic site levels (48.43mAOD to 51.04mAOD) shows that the site is at least 1.99m above the 100yr + 20% CC modelled flood level.

As such, the following measures are recommended where they can be practically and feasibly be implemented into the proposed extension:

- Solid concrete ground floor;
- Waterproof screed used on floors;
- Closed-cell foam used in wall cavities;
- Waterproof ground floor internal render;
- Exterior ventilation outlets, utility points and air bricks fitted with removable waterproof covers;
- Ground floor electrical main ring run from high level;
- Electrical incomer and meter situated at high level;
- Boilers, control and water storage / immersion installed at high level;
- Gas meter installed at high level;
- Plumbing insulation of closed-cell design;
- Non-return valves fitted to all drain and sewer outlets;
- Manhole covers secured;
- Kitchen units of solid, water resistant material;
- Use of MDF carpentry (i.e. skirting, architrave, built-in storage) avoided at ground floor level;

The applicant should also consider the use of demountable flood defence barriers to defend ground level doorways and low windows.

6.5 Safe Escape and Flood Action Plan:

The NPPF requires a route of safe escape for all residents and users to be provided from new residential properties in Flood Zone 3. Safe escape is usually defined as being through slow moving

flood water no deeper than 25cm during the 1:200 year plus allowance for climate change flood event.

However, it should be noted that the proposed application is for the extension of the existing residential property. No new units or additional dwellings will be created as part of the development.

Residents and users should follow the warning and evacuation procedure detailed in the following section.

6.6 Flood Warning:

The EA is responsible for issuing flood warnings. Flood warnings are issued to the emergency services and local authorities. Both private individuals and organisations can sign-up to receive warnings via phone, text or email. This system of receiving warnings is currently voluntary.

Advice regarding severe flood warnings will generally be given during weather forecasts on local radio and TV. In the case of extreme events, warnings can also be disseminated via door to door visits by the police or locally appointed flood wardens.

The site lies within an EA Flood Warning Area for Emm Brook at Wokingham (quickdial 315023).

The EA issue flood warnings/alerts to specific areas when flooding is expected. It is recommended that the applicant registers online with the free Environment Agency Floodline Warnings/Alert Direct service at www.gov.uk/sign-up-for-flood-warnings to receive flood warnings by phone, text or email.

The flood warning service has three types of warnings that will help you prepare for flooding and take action:

Flood Warning	Flood Alert	Flood Warning	Severe Flood Warning
			
What it means?	Flooding is possible. Be prepared.	Flooding is expected. Immediate action required.	Severe flooding. Danger to life.
When it's used?	Two hours to two days in advance of flooding.	Half an hour to one day in advance of flooding.	When flooding poses a significant threat to life.
What to do?	Be prepared to act on your flood plan. Prepare a flood kit of essential items. Monitor local water levels and the flood forecast on our website.	Move family, pets and valuables to a safe place. Turn off gas, electricity and water supplies if safe to do so. Put flood protection equipment in place.	Stay in a safe place with a means of escape. Be ready should you need to evacuate from your home. Co-operate with the emergency services. Call 999 if you are in immediate danger.

Table 3: EA Flood Warning Service

The applicant has prepared the following flood plan to protect life and property during a flood event:

Before a flood:

- Find out if you are at risk of flooding.
- Find out if you can receive flood warnings.
- Prepare and keep a list of all your important contacts to hand or save them on your mobile phone.
- Think about what items you can move now and what you would want to move to safety during a flood such as pets, cars, furniture, and electrical equipment.
- Know how to turn off gas, electricity and water supplies.
- Prepare a flood kit of essential items and keep it handy. It can include copies of important documents, a torch, a battery-powered or wind-up radio, blankets and warm clothing, waterproofs, rubber gloves and a first aid kit including all essential medication.
- Consider buying flood protection products such as flood boards and airbrick covers to help reduce flood water getting into your property.

During a flood:

- Tune into your local radio station on a battery or wind-up radio.
- Fill jugs and saucepans with water.
- Grab your flood kit - if you have prepared one.

- Collect blankets, torch, first aid kit, medication and food.
- Move important documents, personal items, valuables, and lightweight belongings upstairs or to high shelves.
- Raise large items of furniture, or put them in large bags if you have them.
- Move people, outdoor belongings, cars and pets to higher ground.
- Switch off water, gas and electricity at mains when water is about to enter your home. Do not touch sources of electricity when standing in water.
- Fit flood protection products, if you have them, for example flood boards, airbrick covers, sandbags.
- Put plugs in sinks and baths. Weigh them down with a pillowcase or plastic bag filled with soil.
- If you do not have non-return valves fitted, plug water inlet pipes with towels or cloths.
- Move your family and pets upstairs or to a high place with a means of escape.
- Listen to the advice of the emergency service and evacuate if told to do so.
- Avoid walking or driving through flood water. Six inches of fast-flowing water can knock over an adult and two feet of water can move a car.

After a flood:

- If you have flooded, contact your insurance company as soon as possible.
- Take photographs and videos of your damaged property as a record for your insurance company.
- If you don't have insurance, contact your local authority for information on grants and charities that may help you.
- Flood water can contain sewage, chemicals and animal waste. Always wear waterproof outerwear, including gloves, wellington boots and a face mask.
- Have your electrics, central heating and water checked by qualified engineers before switching them back on.

6.7 Off-Site Impacts:

6.7.1 Fluvial floodplain storage:

The NPPF requires that where development is proposed in undefended areas of floodplain, which lie outside of the functional floodplain, the implications of ground raising operations for flood risk elsewhere needs to be considered. Raising existing ground levels may reduce the capacity of the floodplain to accommodate floodwater and increase the risk of flooding by either increasing the depth of flooding to existing properties at risk or by extending the floodplain to cover properties normally outside of the floodplain. Flood storage capacity can be maintained by lowering ground levels either within the curtilage of the development or elsewhere in the floodplain, in order to maintain at least the same volume of flood storage capacity within the floodplain.

In undefended tidal areas, raising ground levels is unlikely to impact on maximum tidal levels so the provision of compensatory storage should not be necessary.

For development in a defended flood risk area, the impact on residual flood risk to other properties needs to be considered. New development behind flood defences can increase the

residual risk of flooding if the flood defences are breached or overtopped by changing the conveyance of the flow paths or by displacing flood water elsewhere. If the potential impact on residual risk is unacceptable then mitigation should be provided.

The site is situated in Flood Zone 2 and within an area of fluvial flood risk when using the Environment Agency Flood Map for Planning (Rivers and Sea). The site is entirely outside of the modelled 1:100 year plus climate change flood extent. Therefore, there will be no unacceptable loss of fluvial floodplain storage.

6.7.2 Surface Water Drainage:

The development will utilise Sustainable Urban Drainage (SuDs) design in accordance with the NPPF for Planning Applications hierarchy as follows:

1. Store rainwater for later use;
2. Infiltration techniques;
3. Attenuate rainwater by storing in tanks for gradual release;
4. Discharge rainwater direct into watercourse;
5. Discharge rainwater into surface water sewer;
6. Discharge rainwater into a combined sewer;

Due to the scale of the development, a full Surface Water Drainage Strategy is not required at this stage of planning. However, SuDS features will be incorporated into the development where practically possible or will utilise the existing arrangement on site.

7. Sequential and Exception Test

The Sequential Test is applied to developments in areas identified as being at risk of any source of flooding now or in the future. The Sequential Test ensures that a sequential, risk-based approach is followed to steer new development to areas with the lowest risk of flooding, taking all sources of flood risk and climate change into account.

The sequential approach is designed to ensure that areas at little or no risk of flooding from any source are developed in preference to areas at higher risk. This means avoiding, so far as possible, development in current and future medium and high flood risk areas considering all sources of flooding including areas at risk of surface water flooding. Other forms of flooding need to be treated consistently with river and tidal flooding in mapping probability and assessing vulnerability, so that the sequential approach can be applied across all areas of flood risk.

The site is situated within Flood Zone 2 when using the Environment Agency Flood Map for Planning (Rivers and Sea) and within an area at “very low” risk of flooding from surface water.

Post development, the site will remain “more vulnerable”, as the application is for an extension to the existing residential property.

Accordingly, it is considered that the vulnerability of the site as a whole has not increased post development. There will be no introduction of additional or separate units, no sub-division, and no intensification of usage.

Flood Zones	Flood Risk Vulnerability Classification				
	Essential infrastructure	Highly vulnerable	More vulnerable	Less vulnerable	Water compatible
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	Exception Test required	✓	✓	✓
Zone 3a	Exception Test required	✗	Exception Test required	✓	✓
Zone 3b	Exception Test required	✗	✗	✗	✓

Table 4: Flood risk vulnerability and flood zone ‘compatibility’

Using the table above, the proposed application is considered to be suitable within Flood Zone 2.

The Sequential and Exception Tests do not need to be applied to minor developments and changes of use (this application is for ‘minor development’ – a residential extension).

8. Discussion and Conclusions

Unda Consulting Limited have been appointed by Neil Shand to undertake a Flood Risk Assessment for the proposed development at 68 Arthur Road, Wokingham, RG41 2SY. The FRA has been undertaken in accordance with the National Planning Policy Framework (NPPF) and the associated technical guidance.

The existing site usage is classified as "more vulnerable" throughout, as it is a residential property. Post development, the site will remain "more vulnerable", as the application is for the extension of the existing residential property. Accordingly, it is considered that the vulnerability of the site as a whole is not increased post development.

The site is shown to be partially within Flood Zone 2 (Medium Probability), which means it is defined as land having between a 1 in 100 and 1 in 1,000 annual probability of river and sea flooding.

The risk would appear to be predominately from a fluvial source originating from the Emm Brook which is approximately 28m south west of the site.

Modelled flood levels and flood extents have been requested from the EA as part of the Product 4 data request.

Modelled flood extents and levels have been provided for the River Loddon Lower (JBA, 2008) with Lower Loddon Flood map update (WSP, 2009) study.

The site is shown to be entirely outside of the modelled 1 in 5 year, 1 in 20 year, 1 in 100 year and 1 in 100 year + 20% climate change flood events.

Comparison of the in-channel modelled flood levels provided with topographic site levels (48.43mAOD to 51.04mAOD) shows that the site is at least 1.99m above the 100yr + 20% CC modelled flood level.

The Flood Zone 2 extent at the site is understood to be derived from the historic flood map (recorded flood outlines).

According to the EA there are no Environment Agency maintained raised defences in this area.

The EA and 2023 Wokingham Strategic Flood Risk Assessment (SFRA) have records of historical flooding during March 1947 at the site. This was caused by exceedance of channel capacity. The Flood Zone extent at the site matches this 1947 historic flood extent.

The EA Risk of Flooding from Surface Water Map suggests that the site lies within an area of "Very Low" risk of flooding from surface water. It should be noted that Arthur Road is within an area of "Low" risk of surface water flooding.

The site remains flood free throughout all modelled surface water events. It should be noted that during the 1 in 100 year surface water event, Arthur Road appears to have a maximum depth of 0.30m.

No further information has been provided to suggest the site or the surrounding area has been affected by surface water flooding.

According to the 2023 Wokingham SFRA, there are currently no Critical Drainage Areas within Wokingham Borough.

According to the 2023 Wokingham SFRA, the site lies within an area with $\geq 25 - 50\%$ susceptibility to groundwater flooding. In addition, according to the EA flooding from groundwater is unlikely in this area.

No evidence has been presented, suggesting that risk of sewer surcharge flooding, reservoir inundation and groundwater would appear to be low.

The proposed application is for a residential extension which does not exceed 250m^2 to the existing property (and will not introduce any additional or separate residential units), finished floor levels will be set no lower than existing adjacent floor levels. No new basements are proposed.

As such, the development as a whole is considered to fit within EA standing advice for domestic extensions.

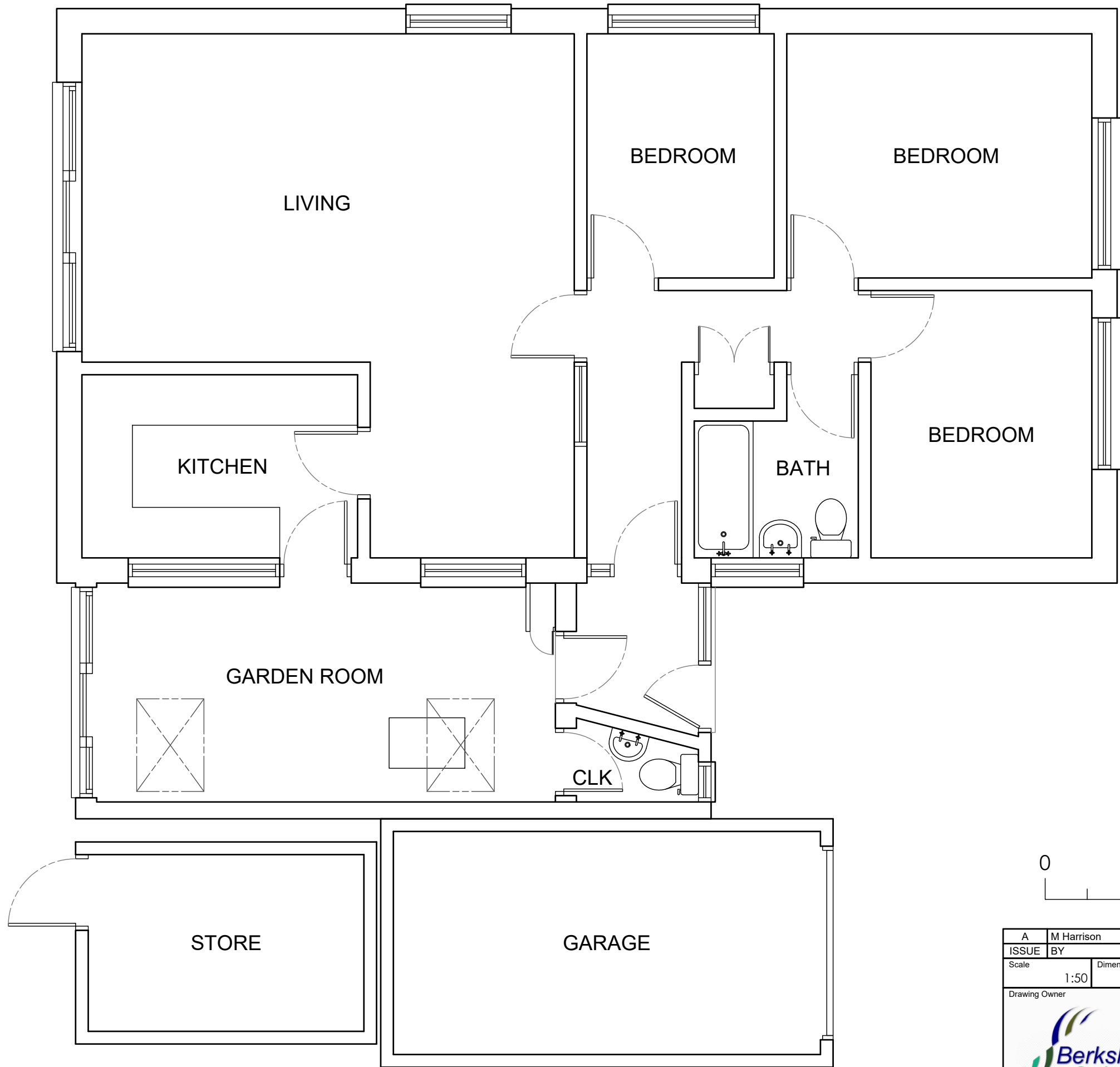
The applicant has confirmed that:

- The proposed planning application is for a 'minor development' – a residential extension.
- The additional footprint created by the development will not exceed 250m^2 .
- There will be no introduction of additional or separate units, no sub-division, and no intensification of usage.
- No new basements or ground floor bedrooms are proposed.
- The proposed development fits within EA standing advice for domestic extensions.
- Finished floor levels will be set no lower than existing adjacent floor levels.
- Flood proofing of the house will be incorporated as appropriate.
- The applicant will register with the free Environment Agency Floodline Alert Direct service.
- Due to the small scale of development, a full Surface Water Drainage Strategy is not required at this stage of planning.

Assuming accordance with these flood risk management measures, Unda Consulting Limited consider the proposed application to be suitable in flood risk terms.

Appendix

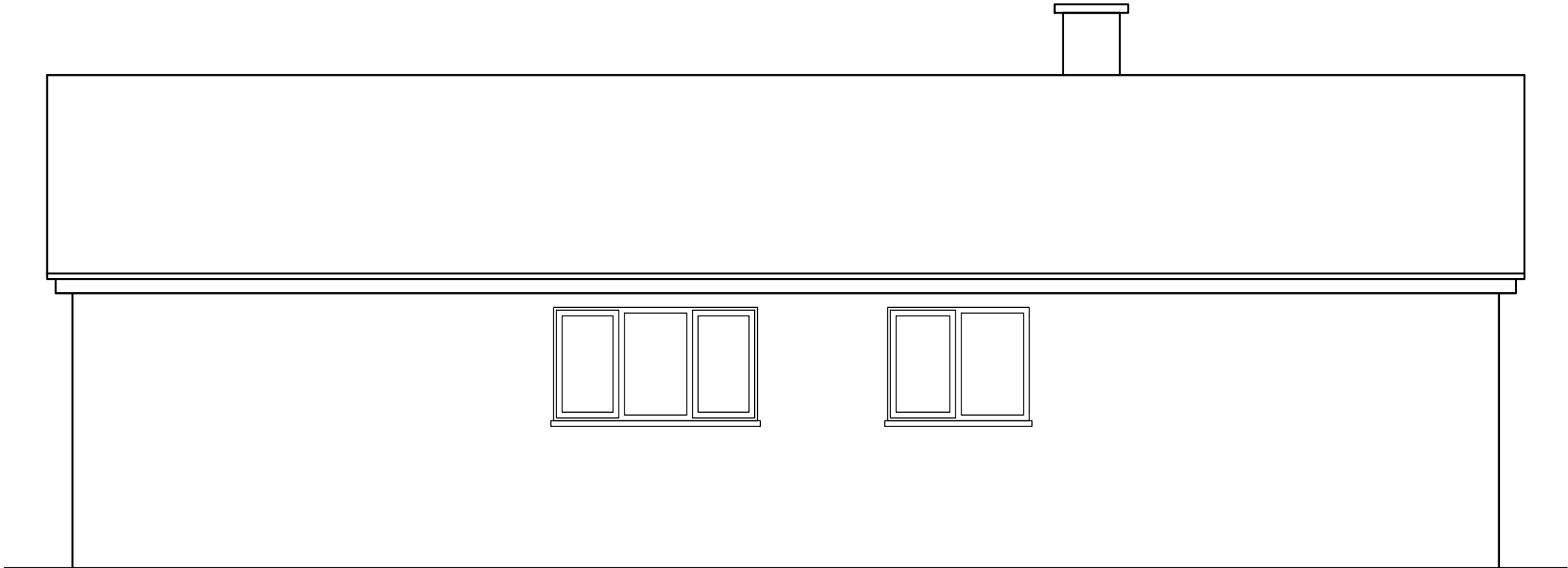
- Site location, existing and proposed plans.
- EA Flood Map for Planning.



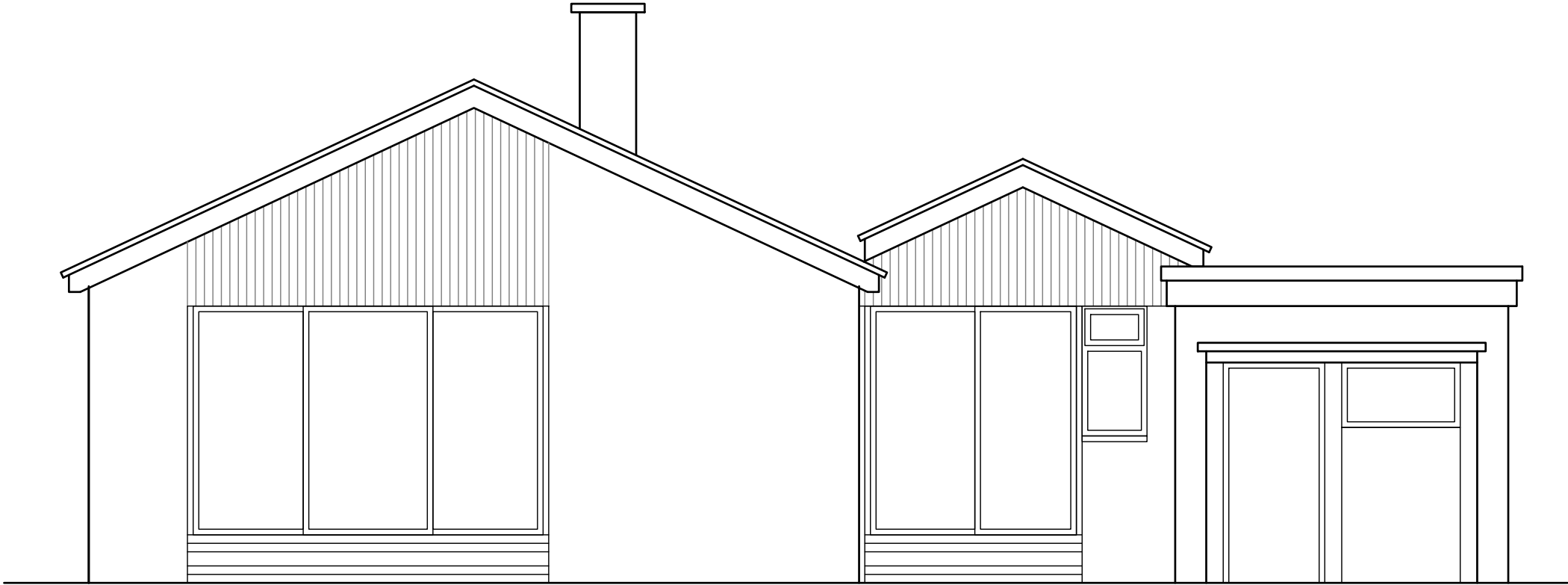
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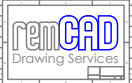


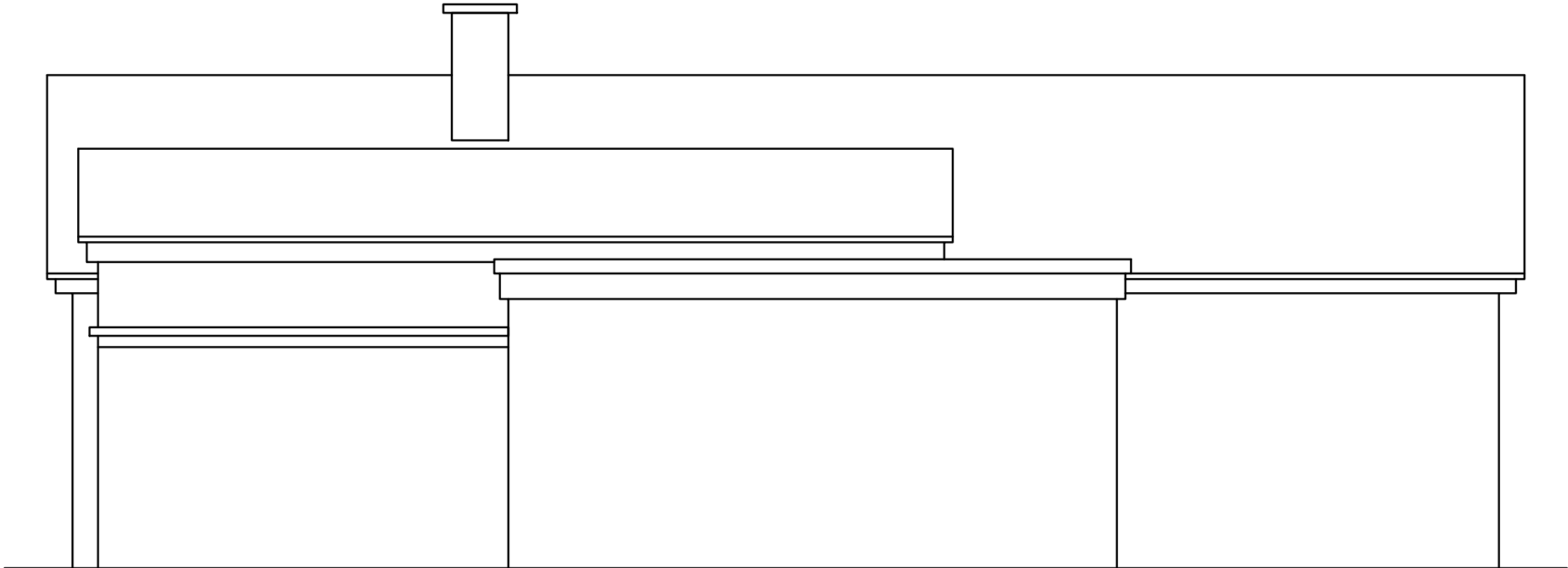
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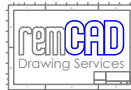


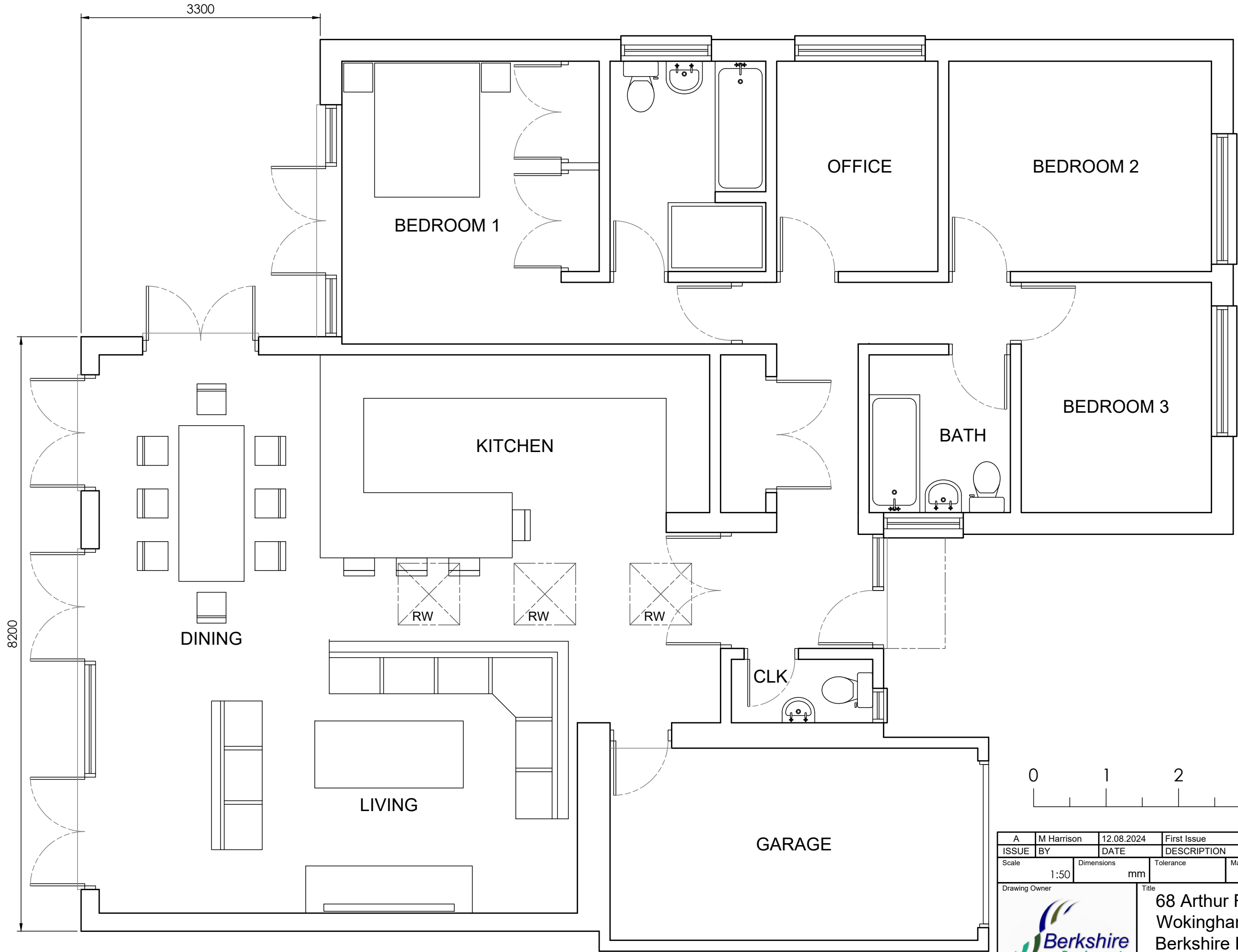
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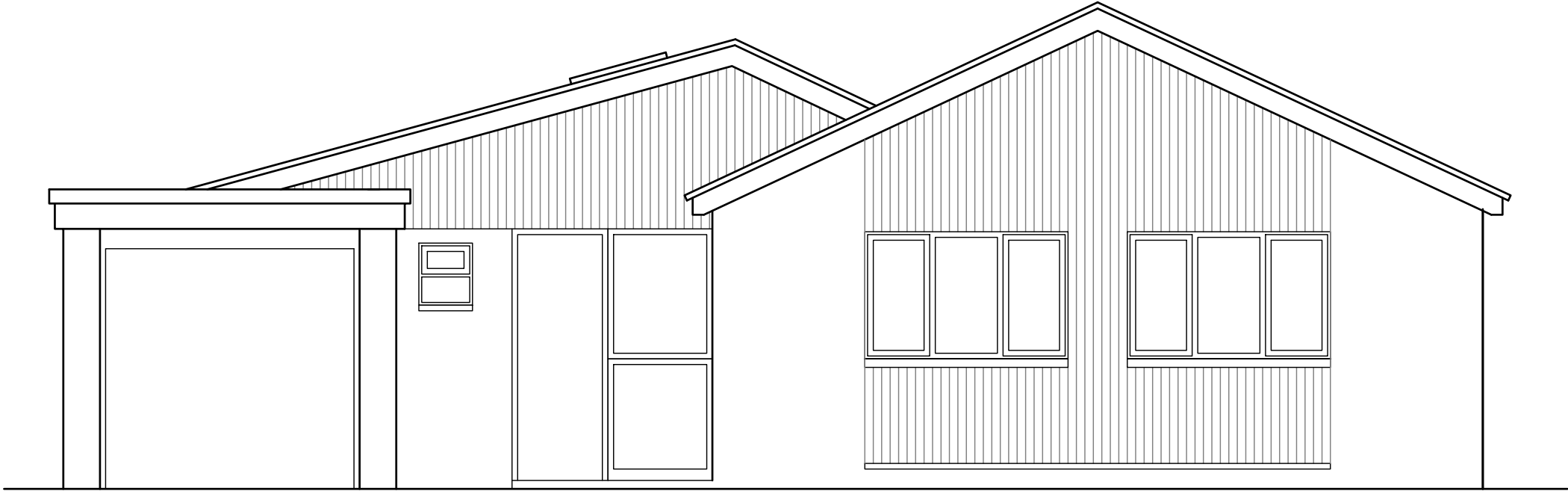
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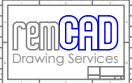


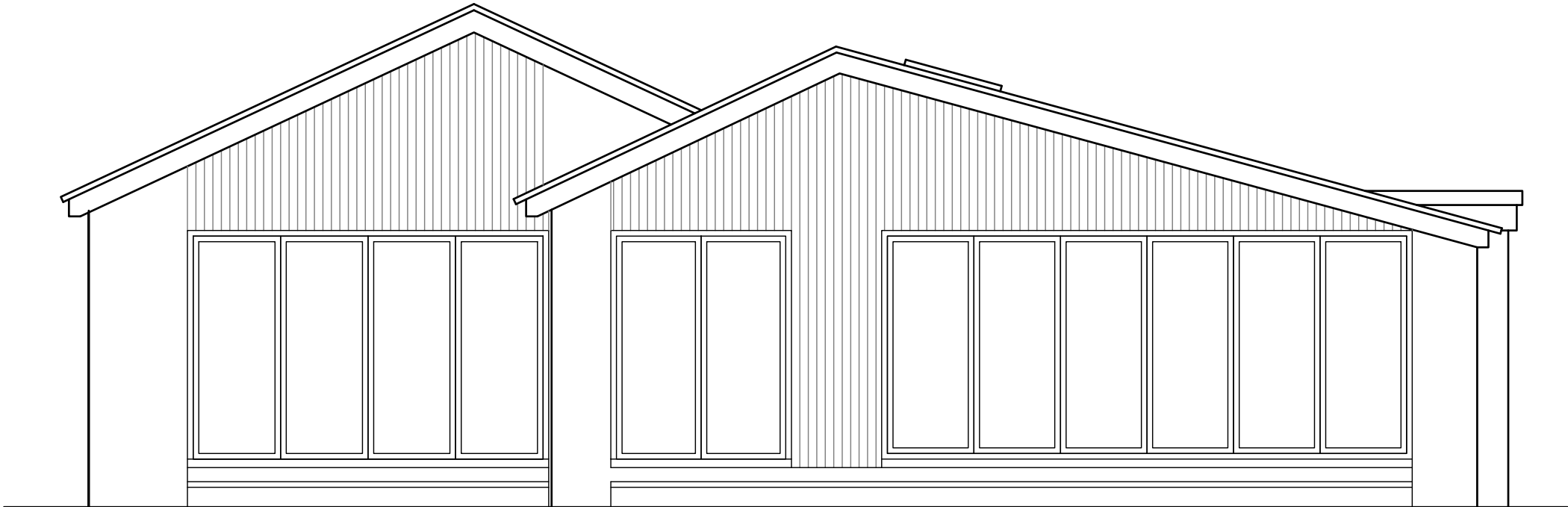
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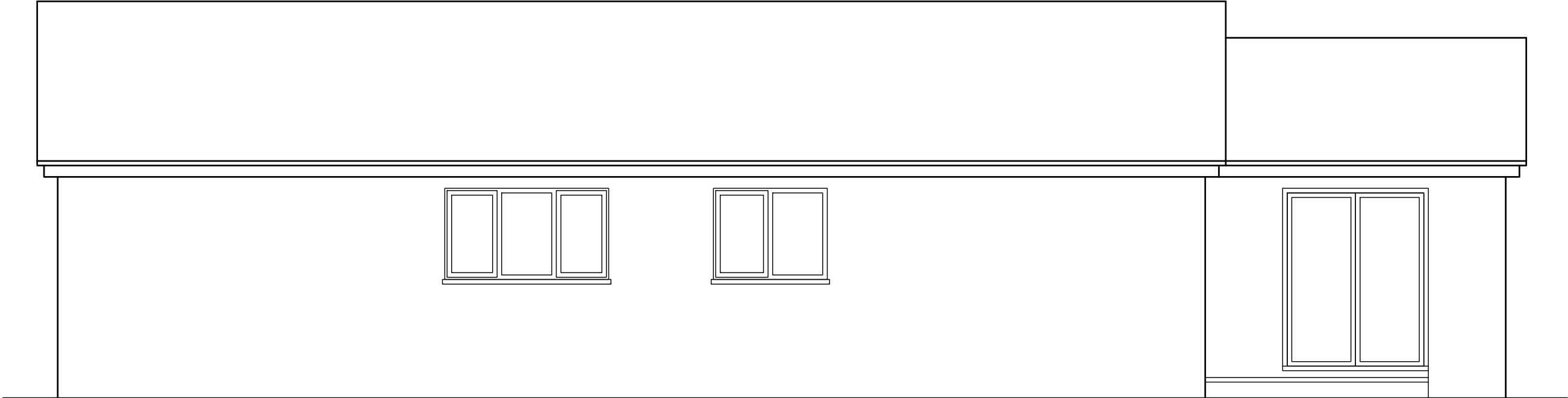
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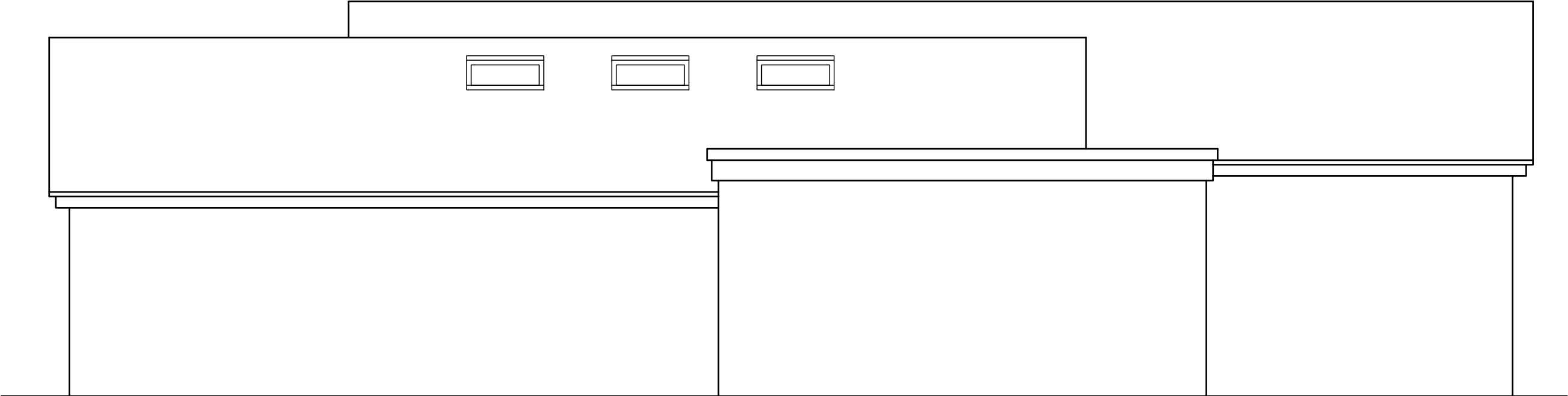
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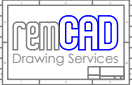


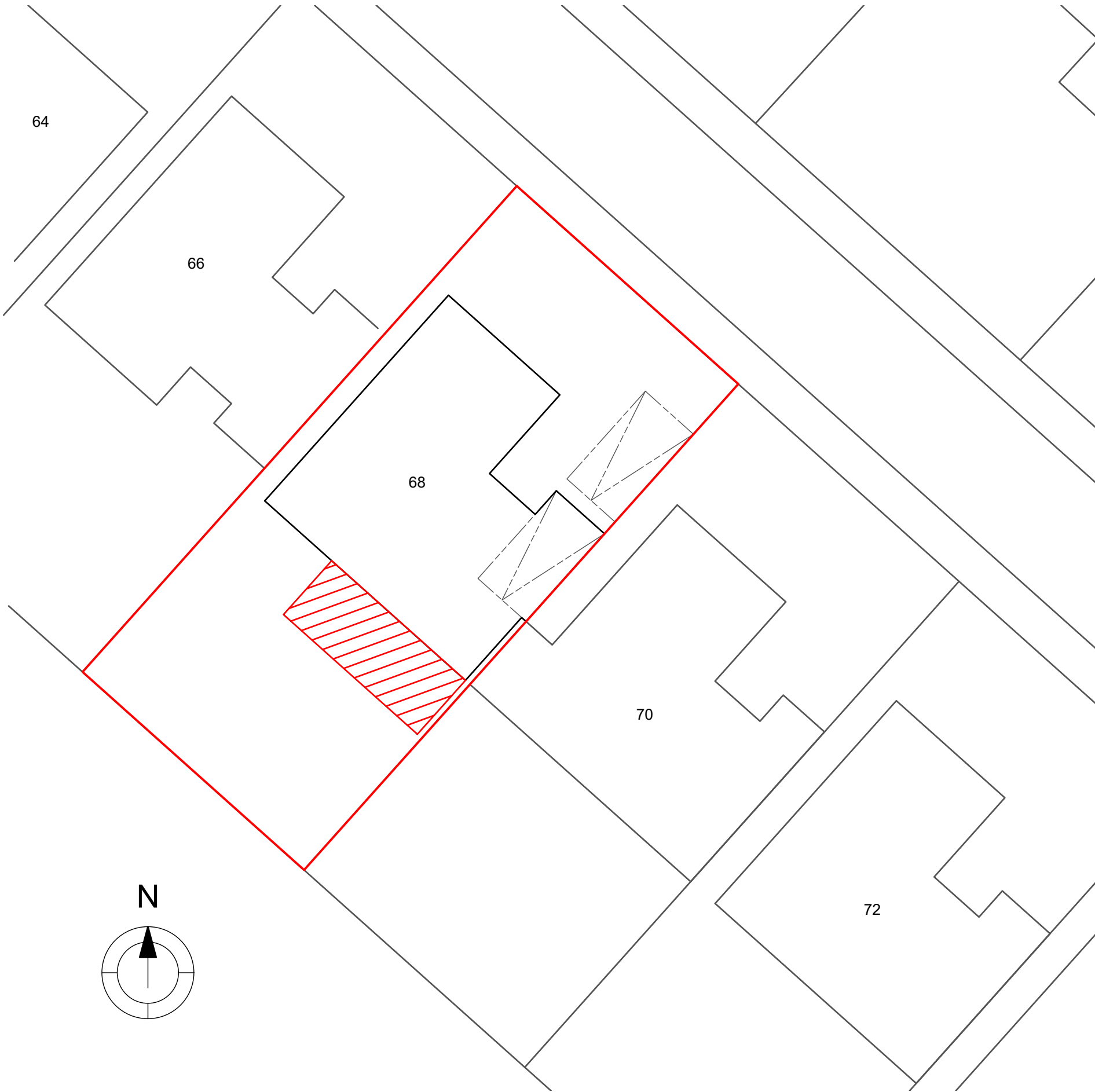
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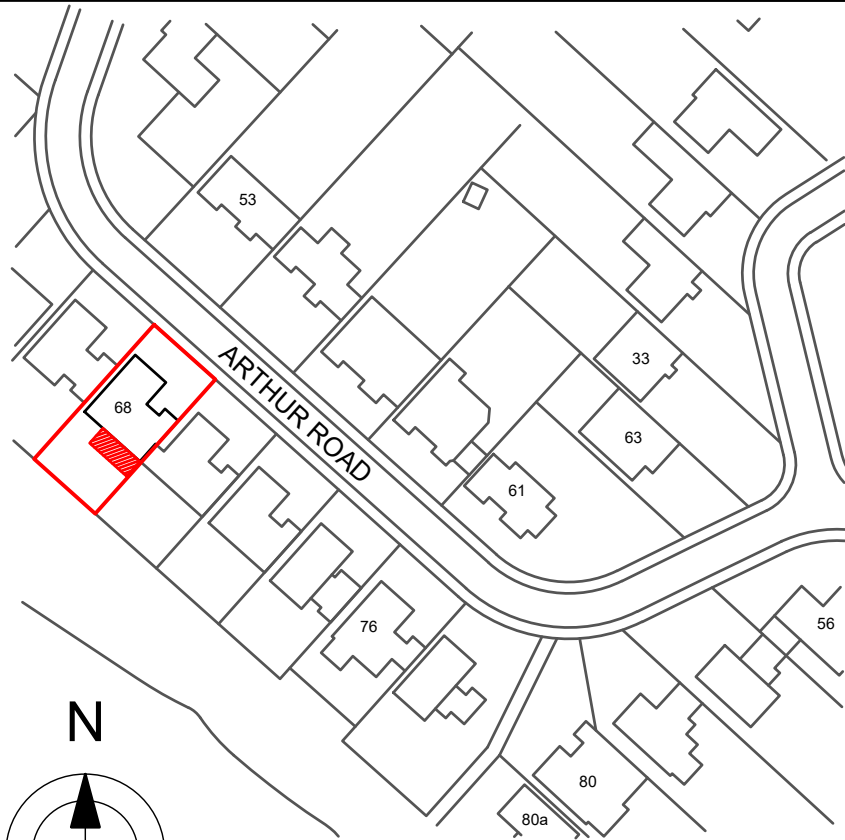
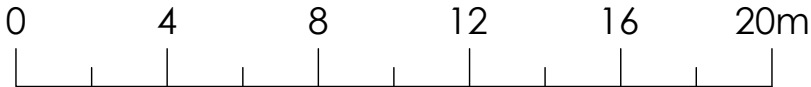
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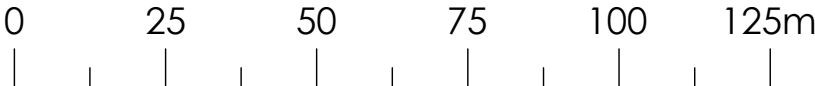
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SITE PLAN
SCALE 1:200



LOCATION PLAN
SCALE 1:1250



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Flood map for planning

Your reference
94842

Location (easting/northing)
480032/168687

Created
21 Oct 2024 16:48

Your selected location is in flood zone 2, an area with a medium probability of flooding.

This means:

- you must complete a flood risk assessment for development in this area
- you should follow the Environment Agency's standing advice for carrying out a flood risk assessment (see www.gov.uk/guidance/flood-risk-assessment-standing-advice)

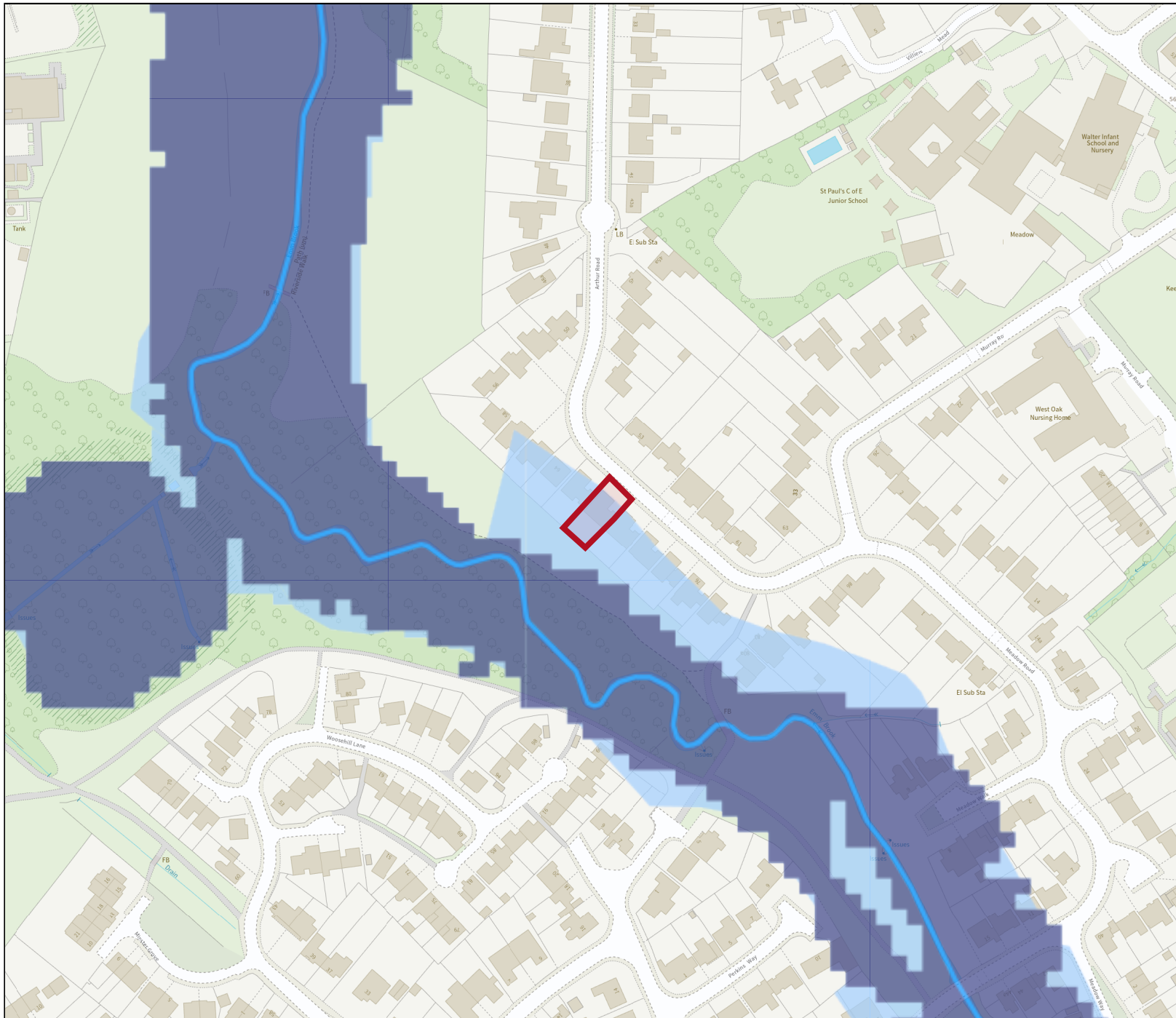
Notes

The flood map for planning shows river and sea flooding data only. It doesn't include other sources of flooding. It is for use in development planning and flood risk assessments.

This information relates to the selected location and is not specific to any property within it. The map is updated regularly and is correct at the time of printing.

Flood risk data is covered by the Open Government Licence which sets out the terms and conditions for using government data. <https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/>

Use of the address and mapping data is subject to Ordnance Survey public viewing terms under Crown copyright and database rights 2024 OS AC0000807064. <https://flood-map-for-planning.service.gov.uk/os-terms>



Flood map for planning

Your reference
94842

Location (easting/northing)
480032/168687

Scale
1:2500

Created
21 Oct 2024 16:48

-  Selected area
-  Flood zone 3
-  Flood zone 2
-  Flood zone 1
-  Flood defence
-  Main river
-  Water storage area

0 20 40 60m