



Flood Risk Assessment for Planning

Prepared for:

Mr and Mrs B Cooper

April 2021

Our reference:

90539-Cooper-SilverlockeRd

Location:

9 Silverlocke Road

Grays

Essex

RM17 6EU



Document Issue Record

Project: Flood Risk Assessment for Planning
Client: Mr and Mrs B Cooper
Application: Single storey side extension
Location: 9 Silverlocke Road, Grays, Essex RM17 6EU
Our reference: 90539-Cooper-SilverlockeRd
Version: v1.0 070421

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1. Key Facts

1.1 Flood Risk Posed:

- EA Flood Zones 2 and 3 (Medium and High Risk).
- Potential tidal flood risk from the River Thames (Estuary) which is located 1km to the south of the site.
- There no Flood Storage Areas located in close proximity to the site.
- The site is not located within a functional floodplain.
- Site within an area protected by existing EA tidal flood defences to the 1:1000 year design standard.
- EA records show that the site was not affected by flooding in 1953.
- Risk of pluvial flooding would appear to be "Very Low".
- Risk of groundwater, sewer flooding and reservoir flooding would appear to be very low.

1.2 Flood Risk Mitigation:

- The proposed development fits within EA standing advice for domestic extensions.
- No additional residential units will be created as part of the development.
- The additional footprint created by the development will not exceed 250m².
- No new bedrooms will be created on the ground floor.
- Floor levels within the extension will be set no lower than existing floor levels;
- Internal access will be maintained from ground floor to the first floor level.
- Flood proofing of the development will be incorporated as appropriate.
- The applicant will register with the Environment Agency Floodline Alert/Warnings Direct service.

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 Mr and Mrs B Cooper (hereinafter referred to as “the applicant”) to undertake a Flood Risk Assessment for the proposed development at 9 Silverlocke Road, Grays, Essex RM17 6EU. (hereinafter referred to as “the site”). The FRA has been undertaken in accordance with the National Planning Policy Framework (NPPF) and the associated technical guidance.

The site appears to be located within Flood Zones 2 and 3 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 consists of an existing residential dwelling. The site is understood to have lawful planning permission for residential use.

A site location plan is provided in the report Appendix.



Figure 1: Aerial photograph of site and surrounding area (Source: Google Earth)

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 +0.15m every 1m. This dataset is derived from a combination of our 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. 2.0m 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 the site ranges between approximately 3.3m AOD at the front of the site to 4.0m AOD at the rear of the site.

3.3 Geology and Soil:

The British Geological Survey (BGS) Map indicates that the bedrock underlying the site is Lewes Nodular Chalk Formation, Seaford Chalk Formation And Newhaven Chalk Formation (undifferentiated) - Chalk. Sedimentary Bedrock formed approximately 72 to 94 million years ago in the Cretaceous Period.

The British Geological Survey (BGS) Map indicates that the superficial deposits underlying the site is Taplow Gravel Member - Sand and Gravel. Superficial Deposits formed up to 2 million years ago in the Quaternary Period.

The soil type taken from the UK Soil Observatory website is relatively deep soils from River Terrace Sand / Gravel soil parent material. It has a sand to sandy loam soil texture.

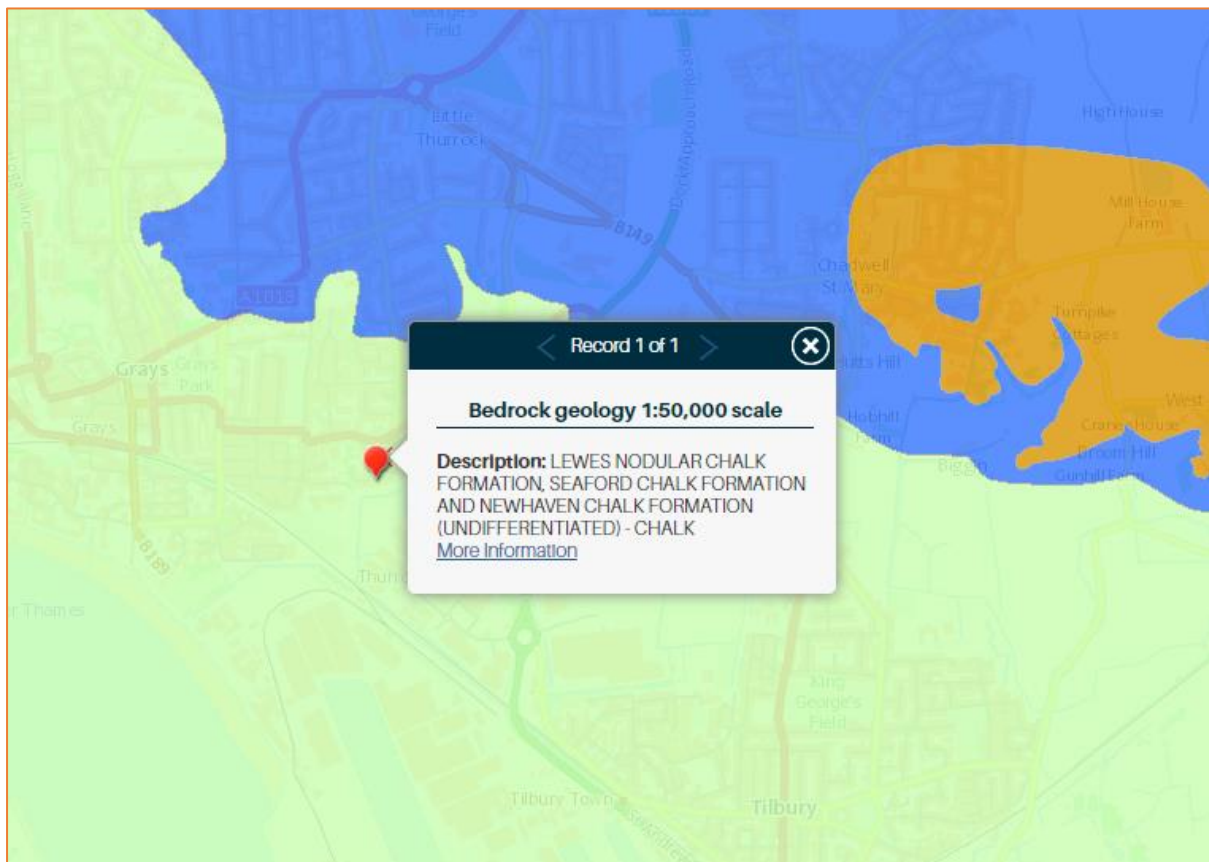


Figure 2: Local bedrock geology (Source: BGS)

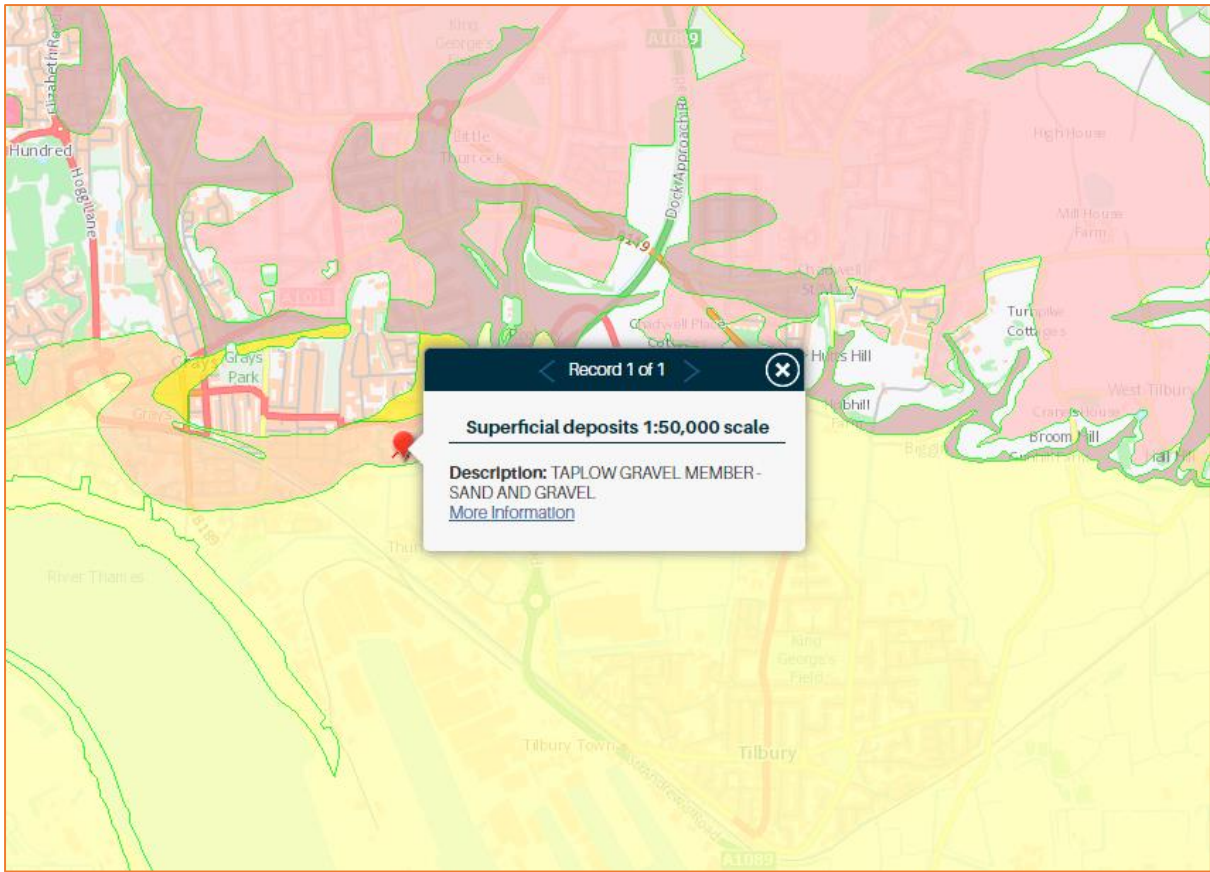


Figure 3: Local superficial deposits (Source: BGS)



Figure 4: Local soil types (Source: UKSO)

4. Development Proposal

The proposed application is for the demolition of the store and the construction of a two storey side extension.

Proposed plans are provided in the report Appendix.

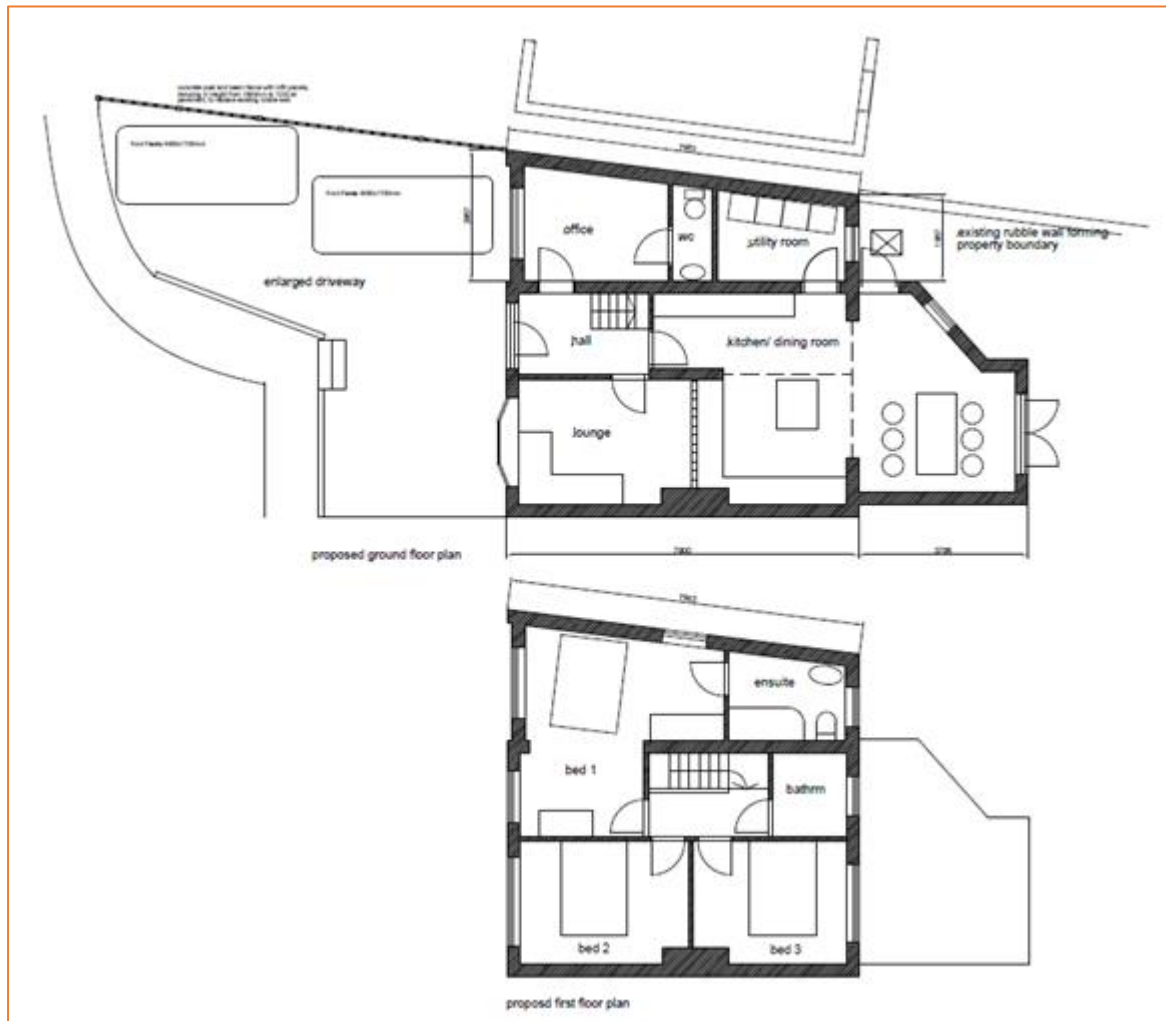


Figure 5: Proposed development plans (Source: the applicant)

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

The site is located partially within Flood Zone 2 (Medium Probability), which means it is defined as land having between a 1 in 200 and 1 in 1,000 annual probability of river and sea flooding and Flood Zone 3 (Medium Probability), which means it is defined as land having between a 1:100 and 1 in 1000 annual probability of fluvial flooding.

The site is shown to be within an area that benefits from the presence of flood defences.

The risk would appear to be predominantly tidal and originate from the River Thames (Estuary) which is located 1km to the south of the site. The nearest watercourse is the Chadwell New Cross Sewer which is located 74m south of the site.

5.2 Tidal (River Thames Estuary):

The River Thames is a river that flows through southern England. It is the longest river entirely in England and the second longest in the United Kingdom, after the River Severn. While it is best known for flowing through London, the river also flows alongside other towns and cities, including Oxford, Reading, Henley-on-Thames, and Windsor.

The usually quoted source of the Thames is at Thames Head. This is about 1.2km north of Kemble parish church in southern Gloucestershire, near the town of Cirencester, in the Cotswolds. Seven Springs near Cheltenham, where the river Churn rises, is also sometimes quoted as the Thames' source, as this location is furthest from the mouth, and adds 23km to the length.

Brooks, canals and rivers, within an area of 9,950km², combine to form 38 main tributaries feeding the Thames between its source and Teddington Lock. This is the usual tidal limit; however, high spring tides can raise the head water level in the reach above Teddington and can occasionally reverse the river flow for a short time. In these circumstances, tidal effects can be observed upstream to the next lock beside Molesey weir. Before Teddington Lock was built in 1810–12, the river was tidal at peak spring tides as far as Staines upon Thames.

Below Teddington Lock (89km upstream of the Thames Estuary), the river is subject to tidal activity from the North Sea. Before the lock was installed, the river was tidal as far as Staines, 26km upstream

The principal tributaries of the River Thames on the Tideway include the rivers Brent, Wandle, Effra, Westbourne, Fleet, Ravensbourne (the final part of which is called Deptford Creek), Lea, Roding, Darent and Ingrebourne. At London, the water is slightly brackish with sea salt, being a mix of sea and fresh water. This part of the river is managed by the Port of London Authority.

5.2.1 Modelled flood levels and extents:

Product 4 modelled flood levels and extents have been requested from the Environment Agency for use within this report. At the time of writing no logged enquiry number was available.

5.2.2 Flood Storage Areas:

Flood Storage Areas are areas that act as a balancing reservoir, storage basin or balancing pond. Their purpose is to attenuate an incoming flood peak to a flow level that can be accepted by the downstream channel. It may also delay the timing of a flood peak so that its volume is discharged over a longer time interval. Flood storage areas do not completely remove the chance of flooding and can be overtopped or fail in extreme weather conditions.

According to Environment Agency data, there no Flood Storage Areas located in close proximity to the site.

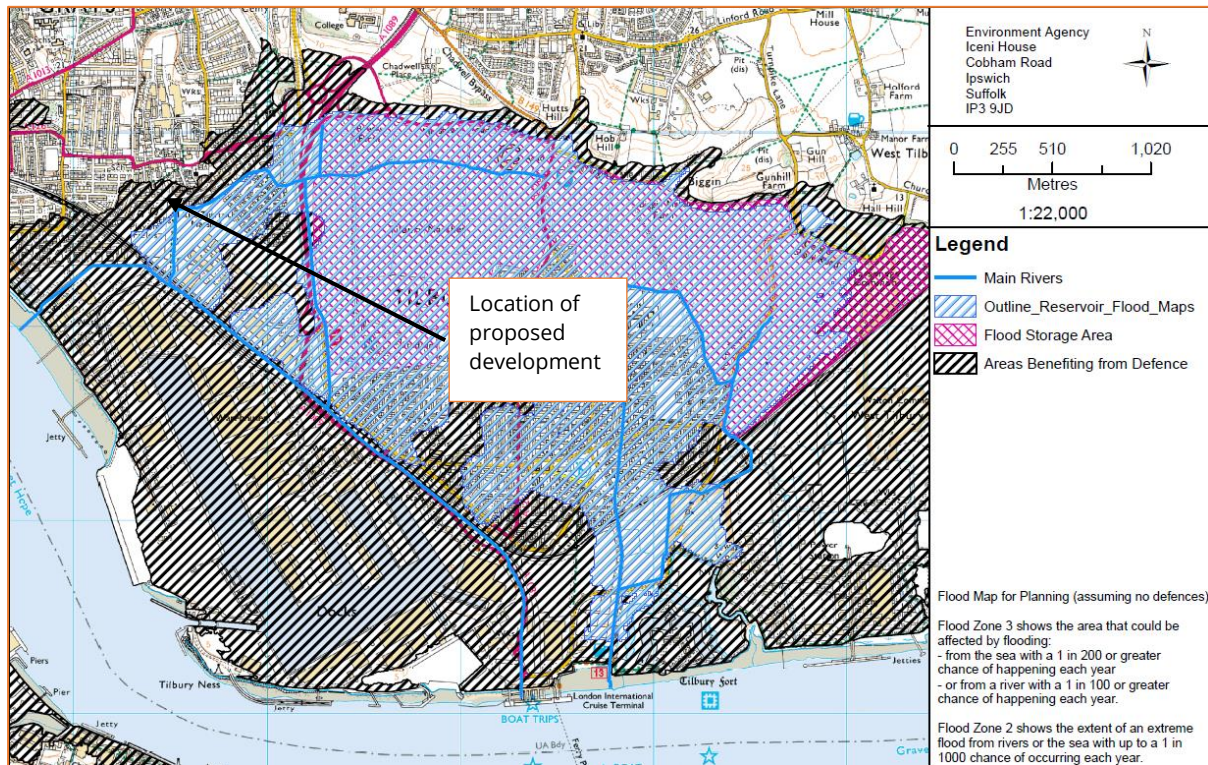


Figure 7: Outline Reservoir flood map, Flood Storage Area, Areas benefiting from Defences (Source: EA)

5.2.3 Functional Floodplain:

This zone comprises land where water is required to flow or be stored in times of flood. The functional floodplain designation encompasses land which would flood with an annual probability of 1 in 20 (5%) or greater in any year; and includes areas of land required for water conveyance routes.

The site is not located within a functional floodplain.

5.2.4 Flood Defences:

A flood defence or EA Asset is any man-made or natural feature – such as a raised defence, retaining structure, channel, pumping station or culvert – that performs a flood defence or land drainage function.

According to the EA, the site is within an area protected by existing tidal flood defences to the 1:1000 year design standard.

5.2.5 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.

5.2.4 Historical flood events:

According to EA records, the site is located on the edge of the historical flood extent from 1953 – tidal flooding Essex, caused by overtopping of defences.

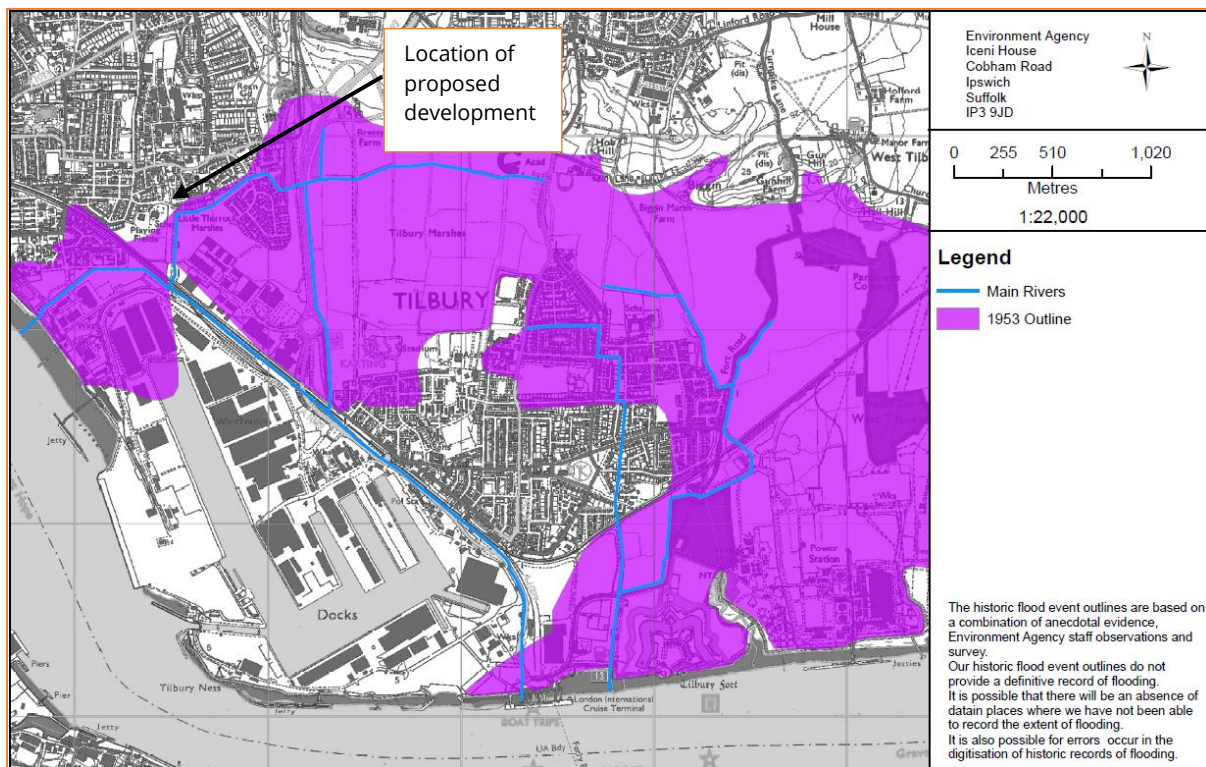


Figure 8: Historical Flood Map (Source: EA)

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):

- 1:30 (3.3%)
- 1:100 (1%)
- 1:1000 (0.1%)

The mapping below shows the Risk of Flooding from Surface Water centred on the postcode. 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 in an area of "Very Low" risk from surface water, while Silverlocke Road lies in an area of "High" risk from surface water flooding



Figure 9: Extract from Environment Agency Surface Water Flood Map (Source: EA)

The Lead Local Flood Authority (LLFA) responsible for managing the flood risk from surface water in the area is Thurrock council.

According to the Thurrock Local Flood Risk Management Strategy Final report December 2015 the site is not located within a Critical Drainage Area.

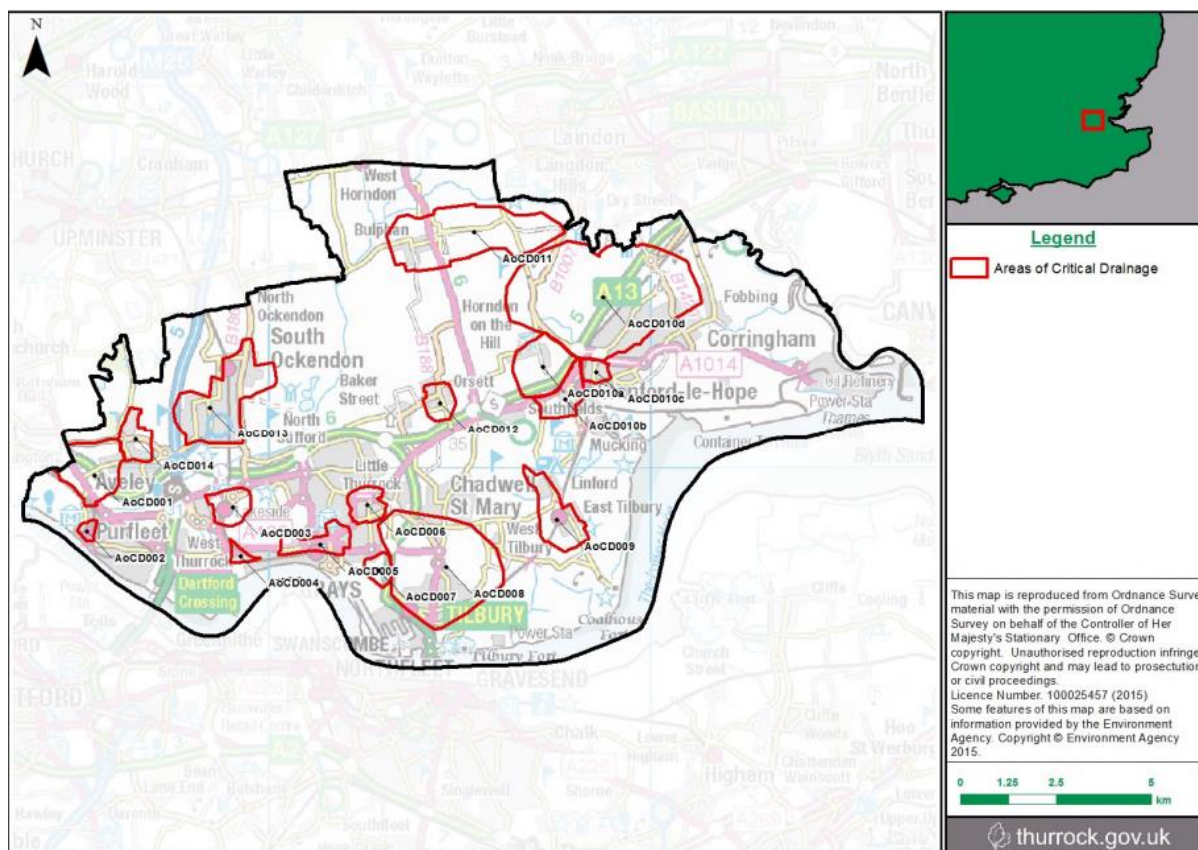


Figure 9: Areas of Critical Drainage (AoCD) in Thurrock (Source: Thurrock Local Flood Risk Management Strategy December 2015)

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 Thurrock Local Flood Risk Management Strategy Final report December 2015 the site is located within an Areas Susceptible to Groundwater <25%.

No further records have been provided to suggest that the site has been affected by groundwater flooding previously.

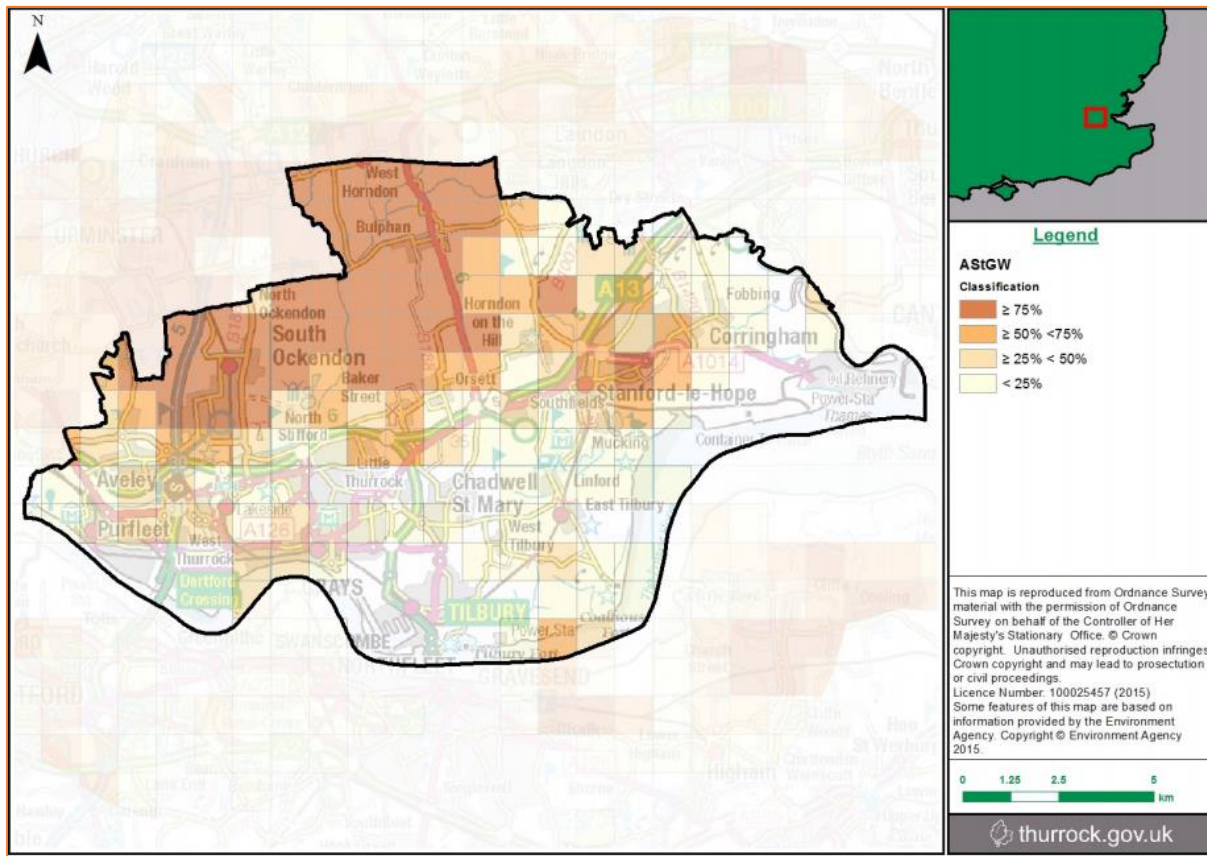


Figure 10: Areas Susceptible to Groundwater (AStGW) in Thurrock (Source: Thurrock Local Flood Risk Management Strategy December 2015)

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.

No information has been provided to suggest that the site is susceptible to sewer surcharge flooding.

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 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.

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.

There will be no introduction of additional units or dwellings.

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 planning application is for the construction of a single storey side extension which does not exceed 250m².

As per the EA Standing Advice, floor levels in the extension will be set no lower than existing adjacent floor levels, and flood proofing of the development will be incorporated as appropriate.

No additional residential units will be created as part of the development.

The proposed development is considered to fit within the EA's standing advice for domestic extensions.

6.3 Physical Design Measures:

The NPPF requires new residential floor levels be set at least 300mm above suitable modelled 1:100 year plus allowance for climate change flood levels. Given that the proposed application is for an 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, and internal access will be maintained from the ground floor to the first floor of the property. In addition, no addition bedrooms are to be located on the ground floor.

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

- Electrical main ring run from ceiling level;

- Electrical incomer and meter situated at a high level;
- Boilers, control and water storage / immersion installed at a high level;
- Plumbing insulation of closed-cell design;
- Non-return valves fitted to all drain and sewer outlets;
- Manhole covers secured;
- Anti-syphon fitted to all toilets.
- Ground floor electrical main ring run from first floor level; and on separately switched circuit from first floor;
- Electrical incomer and meter situated at first floor level or above;
- Boilers, control and water storage / immersion installed at first floor level or above;
- Gas meter installed at first floor level or above;
- Plumbing insulation of closed-cell design;
- Non-return valves fitted to all drain and sewer outlets;
- Manhole covers secured;
- Anti-syphon fitted to all toilets;
- Kitchen units of solid, water resistant material;
- Use of MDF carpentry (i.e. skirting, architrave, built-in storage) avoided at ground floor level;
- Stairs of solid hardwood construction with wood faces treated to resist water penetration.
- The external ground floor doors and windows will be flood proof.

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

6.4 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.

However, it should be noted that the proposed application is for the construction of a residential extension. No additional or new units or dwellings will be created as part of the development. Safe escape is not a requirement under the EA Standing Advice guidance is for domestic extensions.

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

6.5 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 Environment Agency Flood Warning Area. 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 2: EA Flood Warning Service

6.6 Flood Plan:

It is recommended that the applicant and future owners, occupiers and Landlords of the property prepare a flood plan to protect life and property during a flood event:

Before a flood:

- 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.
- Know how to turn off electricity and water supplies to the site.
- 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.

During a flood:

- Activate the evacuation plan and evacuate the site.
- Remove cars from the site if there is sufficient warning and the water levels are not rising rapidly.
- Switch off water and electricity for the site.
- Tune into your local radio station on a battery or wind-up radio.
- 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 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 Zones 2 and 3 when using the Environment Agency Flood Map for Planning (Rivers and Sea) but is within an area of predominantly tidal flood risk, therefore there will be no unacceptable loss of floodplain storage.

6.7.2 Surface Water Drainage:

The development will utilise Sustainable drainage systems (SuDS) design in accordance with the NPPF for Planning Applications and the drainage 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 small 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.

As such, any change in surface water runoff from the site will likely be negligible.

7. Sequential and Exception Test

The Sequential Test aims to ensure that development does not take place in areas at high risk of flooding when appropriate areas of lower risk are reasonably available.

The site is situated within Flood Zones 2 and 3 when using the Environment Agency Flood Map for Planning (Rivers and Sea). Post development, the site will remain “more vulnerable”, as the application is for the construction of a residential extension.

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	X	Exception Test required	✓	✓
Zone 3b	Exception Test required	X	X	X	✓

Table 3: Flood risk vulnerability and flood zone ‘compatibility’

Using the table above, the proposed application is considered to be suitable within Flood Zone 2 and 3. 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 Mr and Mrs B Cooper to undertake a Flood Risk Assessment for the proposed development at 9 Silverlocke Road, Grays, Essex RM17 6EU. The FRA has been undertaken in accordance with the National Planning Policy Framework (NPPF) and the associated technical guidance.

The proposed application is for the construction of a residential extension. Post development, the site will be “more vulnerable”, as the application is for the construction of a residential extension. Accordingly, it is considered that the vulnerability of the site as a whole will not increase post development. There will be no introduction of additional units or dwellings.

The site is located partially within Flood Zone 2 (Medium Probability), which means it is defined as land having between a 1 in 200 and 1 in 1,000 annual probability of river and sea flooding and Flood Zone 3 (Medium Probability), which means it is defined as land having between a 1:100 and 1 in 1000 annual probability of fluvial flooding.

The site is shown to be within an area that benefits from the presence of flood defences.

The risk would appear to be predominantly tidal and originate from the River Thames (Estuary) which is located 1km to the south of the site.

Product 4 modelled flood levels and extents have been requested from the Environment Agency for use within this report.

There no Flood Storage Areas located in close proximity to the site.

The site is not located within a functional floodplain.

According to the EA, the site is within an area protected by existing tidal flood defences to the 1:1000 year design standard.

EA records show that the site was not affected by flooding in 1953.

The EA Surface Water Flood Map suggests that the site lies within an area of “Very Low” risk of flooding from surface water.

Additionally, the risk of flooding posed to the site by sewer surcharge and reservoir flooding would appear to be low.

Given that the proposed application is for an 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, and internal access will be maintained from the ground floor to the first floor of the property. In addition, no additional bedrooms are to be located on the ground floor.

Safe escape is not a requirement under the EA Standing Advice guidance is for domestic extensions.

The applicant has confirmed that:

- The proposed development fits within EA standing advice for domestic extensions.
- No additional residential units will be created as part of the development;
- The additional footprint created by the development will not exceed 250m².

- No bedrooms are proposed on the ground floor;
- Floor levels within the extension will be set no lower than existing floor levels;
- Internal access will be maintained from ground floor to the first floor level.
- Flood proofing of the development will be incorporated as appropriate.
- The applicant will register with the Environment Agency Floodline Alert/Warnings Direct service.

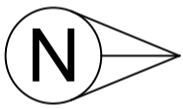
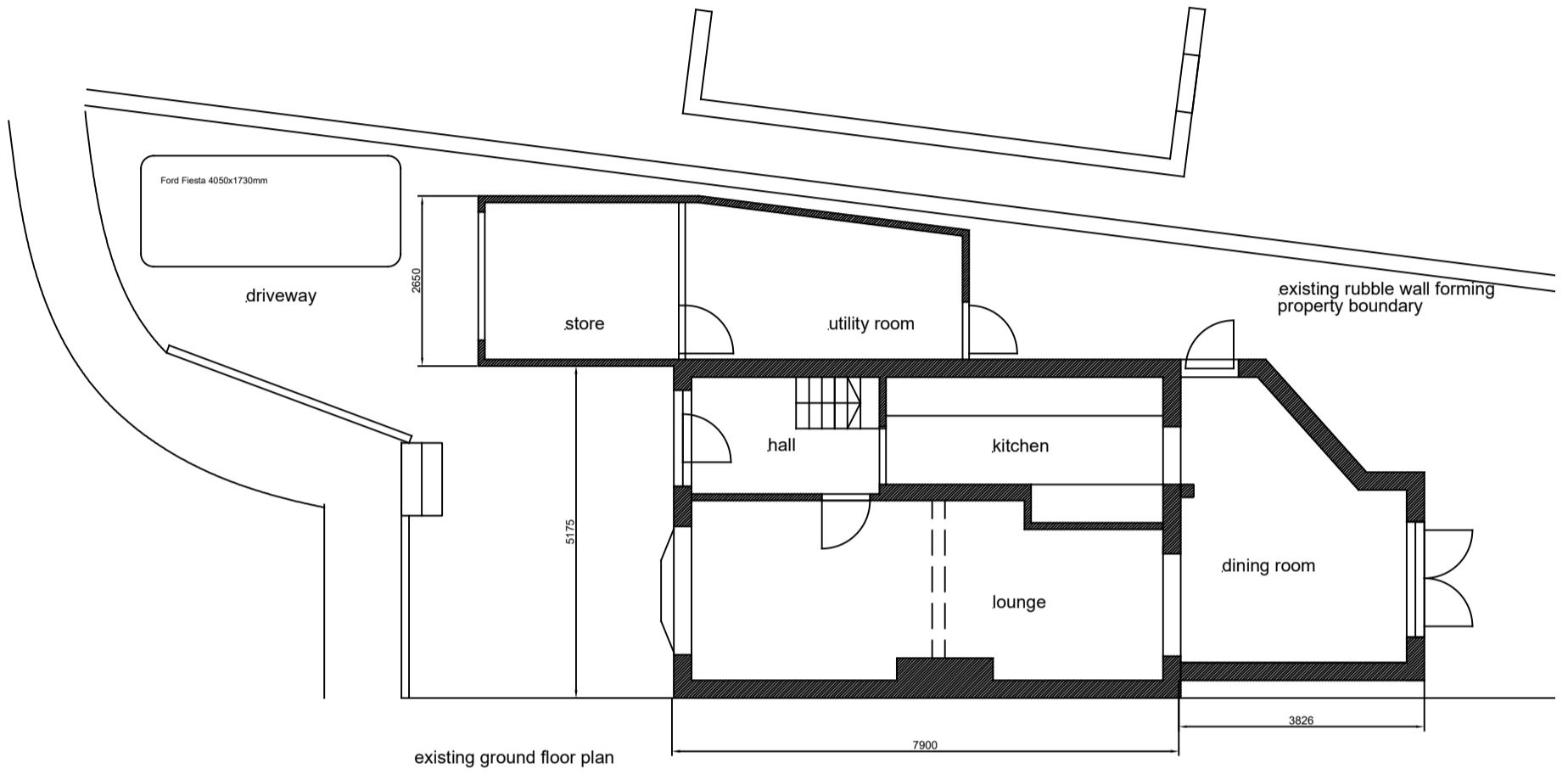
Assuming accordance with these flood risk management measures, Unda Consulting Limited consider the proposed application to be suitable in flood risk terms.

Appendix

- Existing and proposed Plans;
- EA Flood Map for Planning.

9 Silverlocke Road, Grays, RM17 6EU

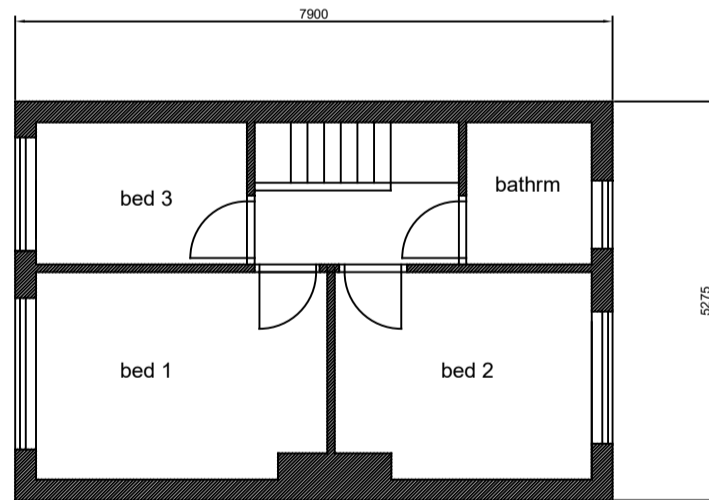


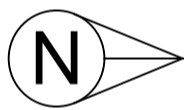
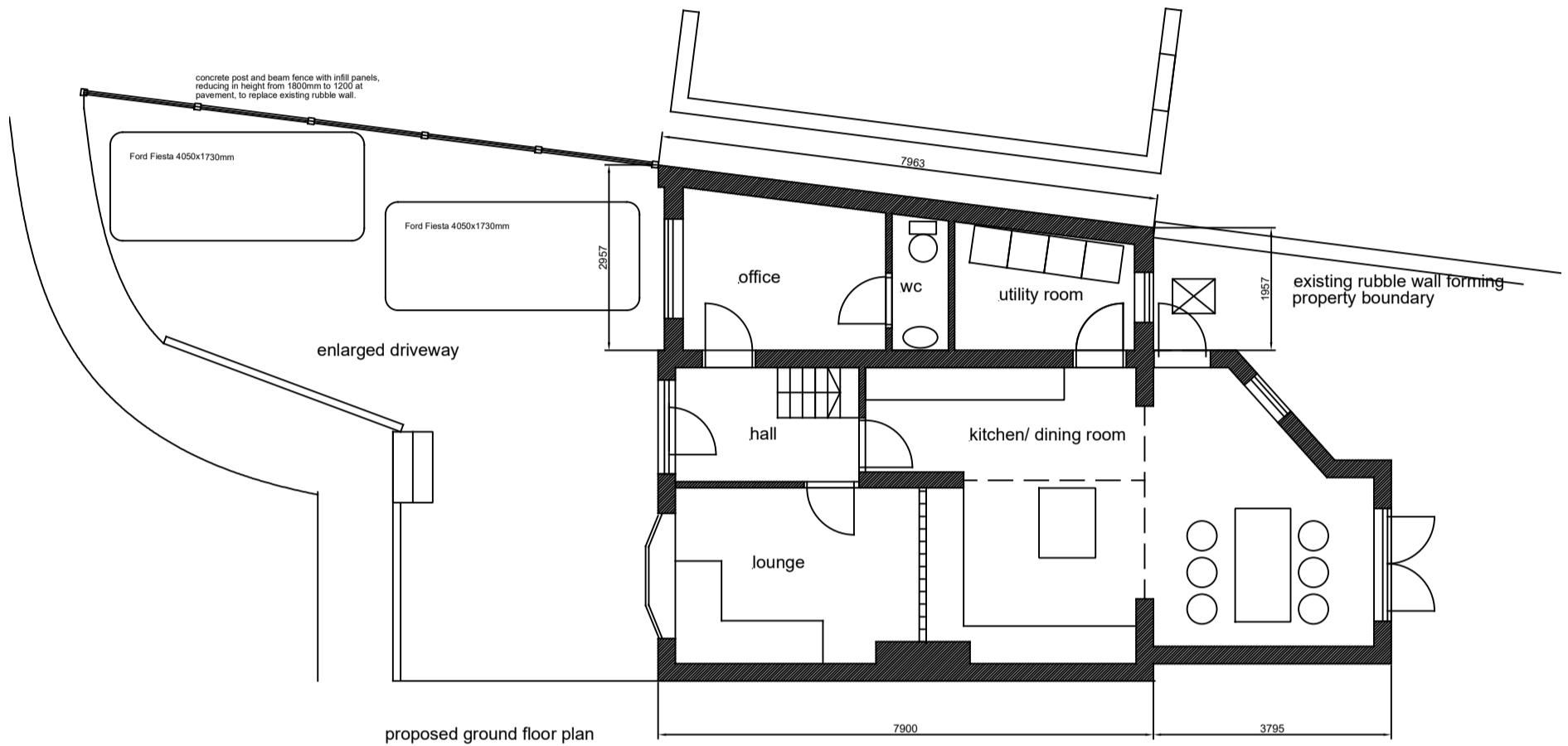


9 Silverlocke Road, as existing
1:100 when printed full size A3

Drawing no BERAH 1
Revisions

- a
- b
- c
- d

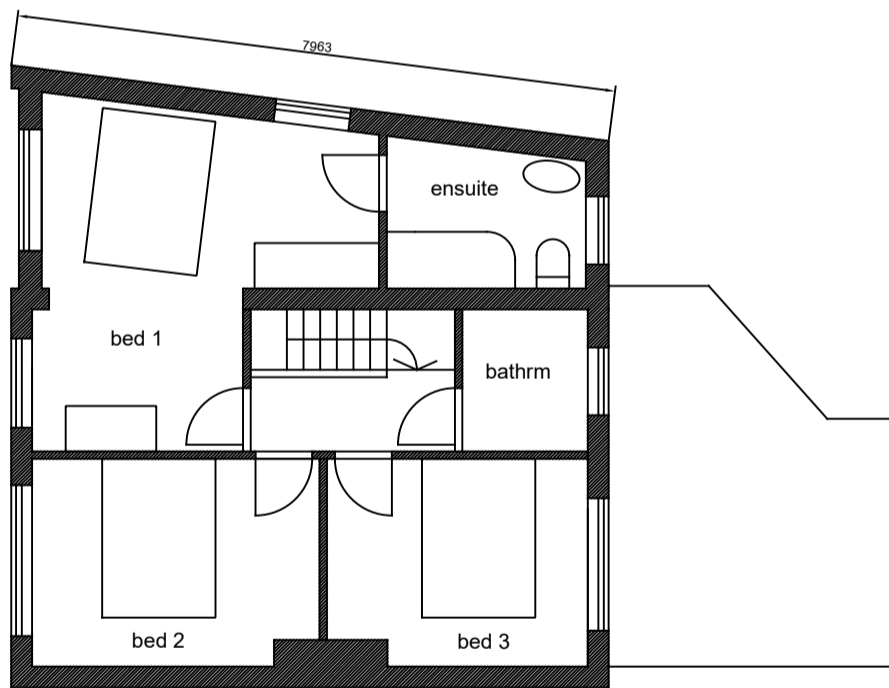


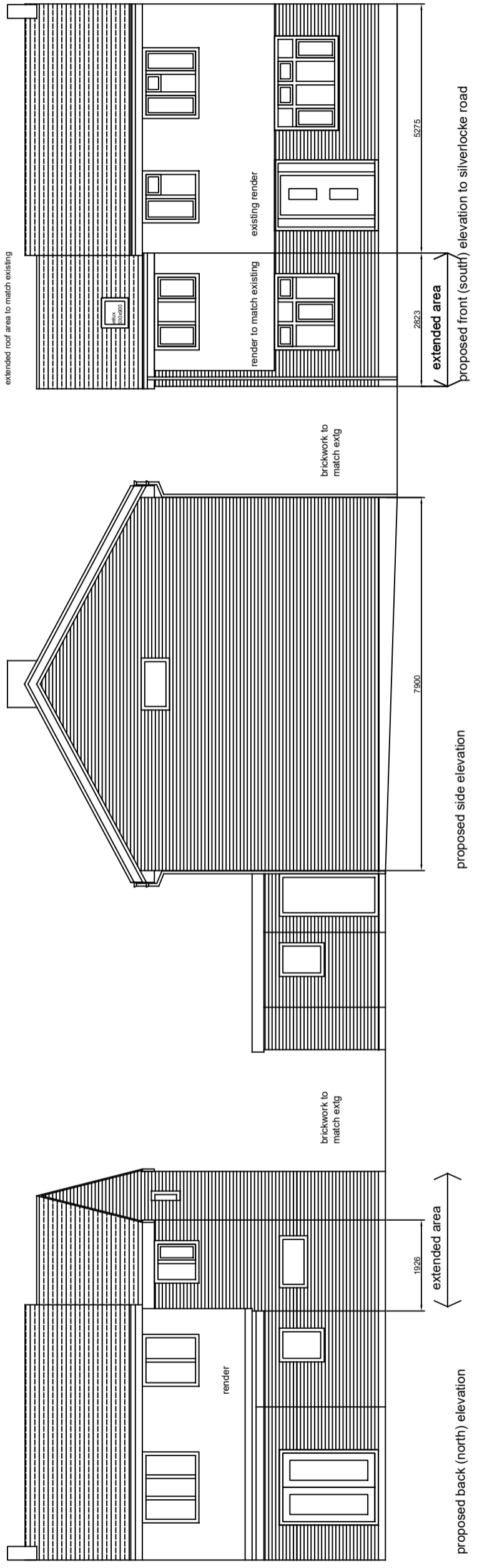


9 Silverlocke Road, proposed plans
1:100 when printed full size A3

Drawing no BERAH 2
Revisions

- a
- b
- c
- d



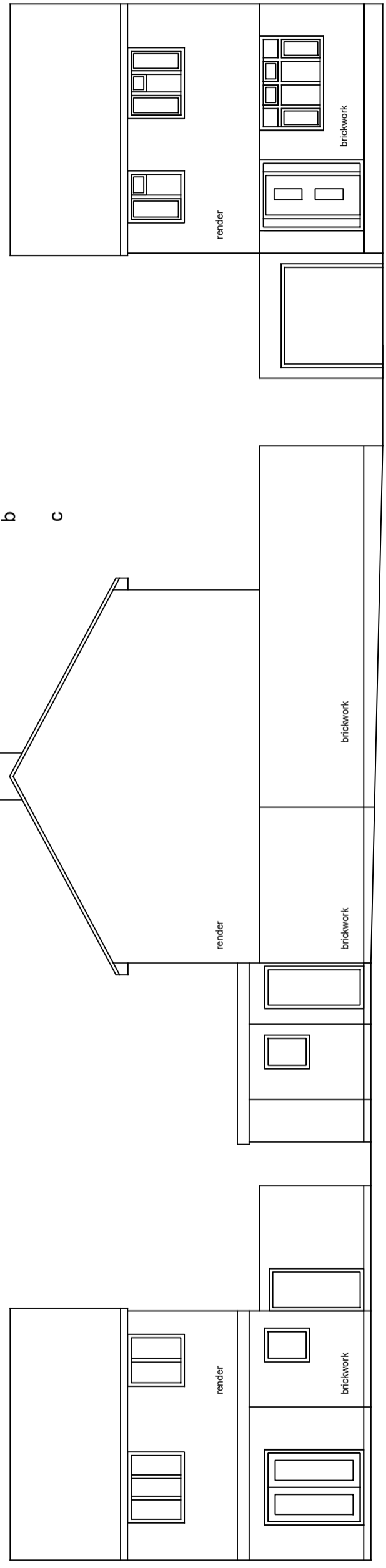


Drawing no BERAH 3
Revisions

a

b

c



9 Silverlocke Road, existing and proposed elevations
1:100 when printed full size A3

Flood map for planning

Your reference
<Unspecified>

Location (easting/northing)
562609/177692

Created
30 Mar 2021 16:34

Your selected location is in flood zone 3 – an area with a high probability of flooding that benefits from flood defences.

This means:

- you may need to complete a flood risk assessment for development in this area
- you should ask the Environment Agency about the level of flood protection at your location and request a Flood Defence Breach Hazard Map (You can email the Environment Agency at: enquiries@environment-agency.gov.uk)
- you should follow the Environment Agency's standing advice for carrying out a flood risk assessment (find out more at 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.

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



Flood map for planning

Your reference

<Unspecified>

Location (easting/northing)

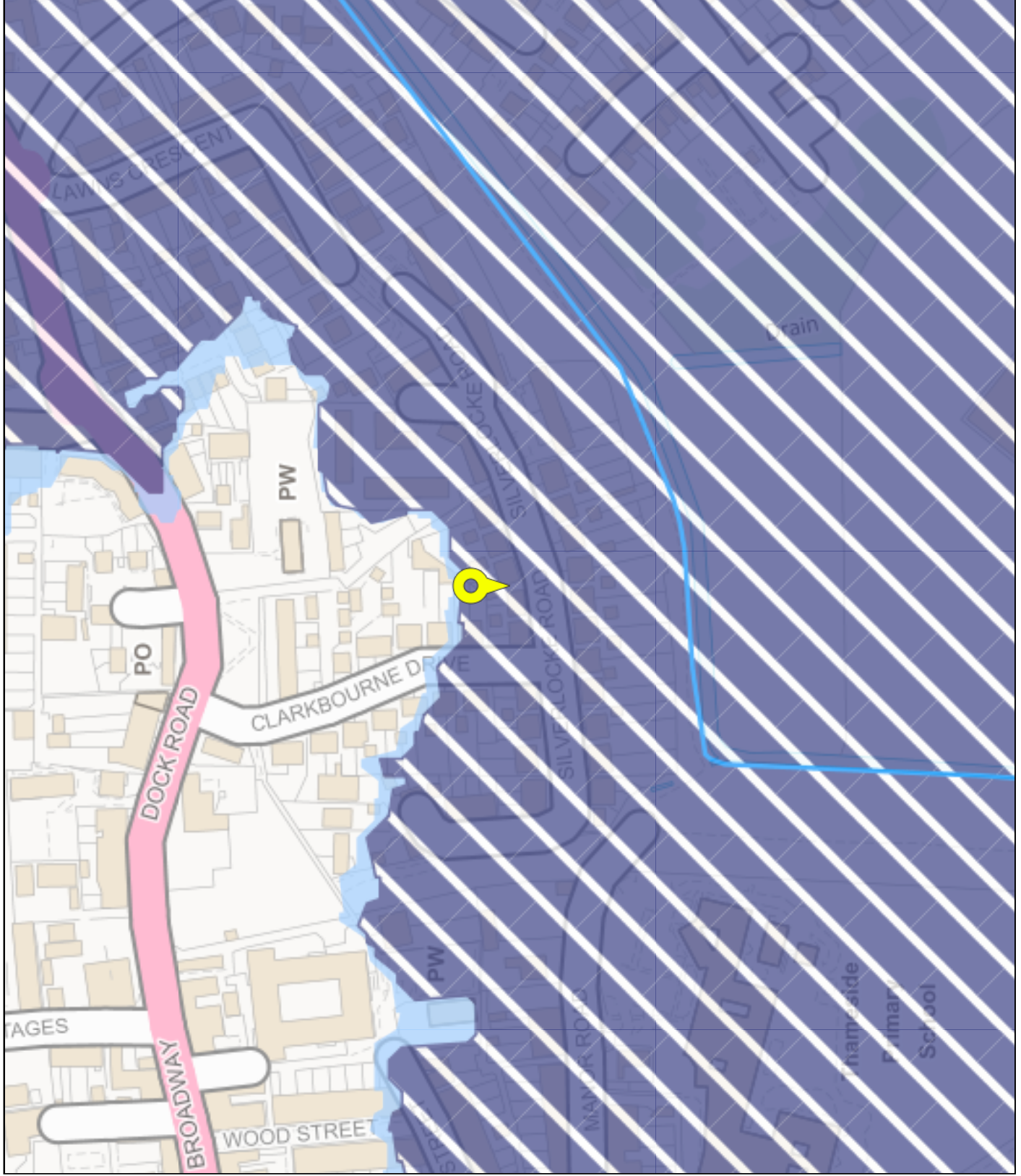
562609/177692

Scale

1:2500

Created

30 Mar 2021 16:34



Selected point

Flood zone 3



Flood zone 3: areas benefiting from flood defences



Flood zone 2



Flood zone 1



Flood defence



Main river



Flood storage area

