Flood Risk Assessment for Planning

Prepared for:
PWX construction LTD

Location:
291 Tarring Road
Worthing
West Sussex
BN11 5JG

September 2024

Our reference:
94743-SticklandWright-TarringRd



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Document Issue Record

Project:	Flood Risk Assessment for Planning
Client:	PWX construction LTD
Application:	Change of use from Commercial, Business and Service (Use Class E) to form 4no. 1 bedroom residential units (Use Class C3).
Location:	291 Tarring Road, Worthing, West Sussex, BN11 5JG
Our reference:	94743-SticklandWright-TarringRd
Version:	v1.0 260824

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1. Key Facts

1.1 Flood Risk Posed:

- The site is situated partially within Flood Zone 1 (Low Risk).
- There are no Flood Storage Areas located in close proximity to the site.
- The site is not located within the functional floodplain (Flood Zone 3b).
- There are no flood defences in the vicinity of the site.
- The EA have no records of historical flooding having affected the site or surrounding area.
- The EA Risk of Flooding from Surface Water Map suggests that the site lies in an area of "Medium" risk of flooding from surface water.
- The EA risk of flooding from surface water depth maps show:
    - For the 1:30 year event (High), the site is flood free.
    - For the 1:100 year event (Medium), the site is flood free.
    - For the 1:1000 year event (Low), on the site and in the area of the proposed development there is a maximum flood depth of between 0.30-0.60m.
- The site is located in an area where groundwater levels are between 0.025m and 0.5m below the ground surface.
- The site's postcode area (BN11 5) has 11 recorded incidents of sewer flooding, which occurred between January 2013 and May 2023.
- 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.

1.2 Flood Risk Mitigation:

- The proposed application is for the change of use from Commercial, Business and Service (Use Class E) to form 4no. 1 bedroom residential units (Use Class C3).
- Floor levels post development will be set no lower than existing floor levels.
- Flood proofing of the development will be incorporated as appropriate.
- Safe escape will be provided by a flood warning and evacuation plan.
- Post development, there will be no unacceptable loss of fluvial floodplain storage.
- Due to the 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 PWX construction LTD (hereinafter referred to as “the applicant”) to undertake a Flood Risk Assessment for the proposed development at 291 Tarring Road, Worthing, West Sussex, BN11 5JG (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 purpose of the study is to support a planning application for the proposed development.

The site appears to be located within Flood Zone 1 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 problems;
- 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.

Given the proposed development is located in Flood Zone 1 (Low Risk of flooding from rivers or the sea) and the site is under 1ha in area, a FRA would not normally be required under NPPF. However, it is understood the site falls within an area at risk of surface water flooding. 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 existing site is a commercial Class E office.

Existing site plans are provided in the report Appendix.



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

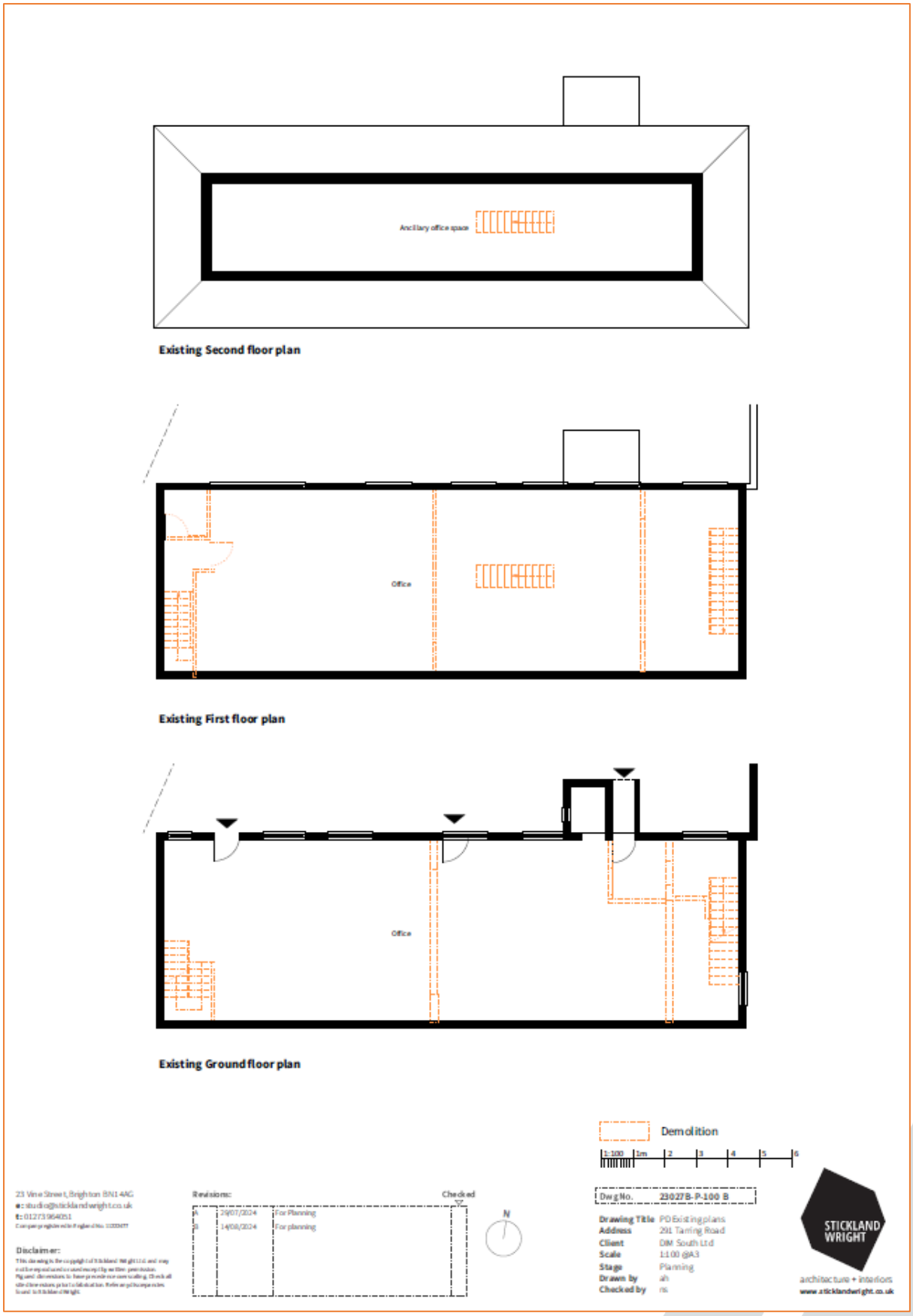


Figure 2: Existing Floor Plans (Source: Strickland Wright)

3.3 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 ranges between approximately 7.65mAOD to 8.36mAOD.

The ground topography in the area of the proposed development ranges between approximately 7.09mAOD to 8.12mAOD.

3.4 Geology and Soil:

The British Geological Survey (BGS) Map indicates that the bedrock underlying the site is Seaford Chalk Formation – Chalk.

Superficial deposits underlying the site are of River Terrace Deposits (undifferentiated) - Sand, Silt and Clay.

The soil type taken from the UK Soil Observatory is relatively deep soils from Sand Loess soil parent material with a Silt to Sand soil texture.

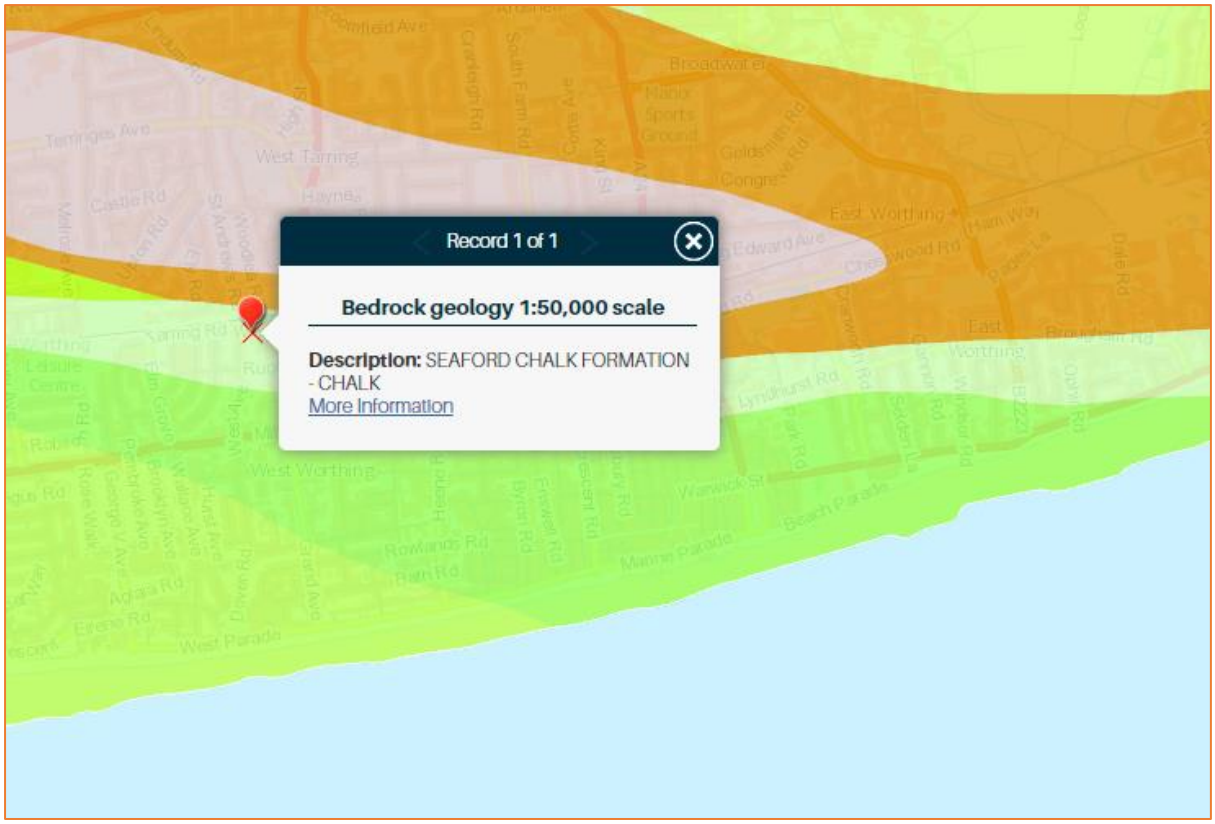


Figure 3: Local bedrock geology (Source: BGS)

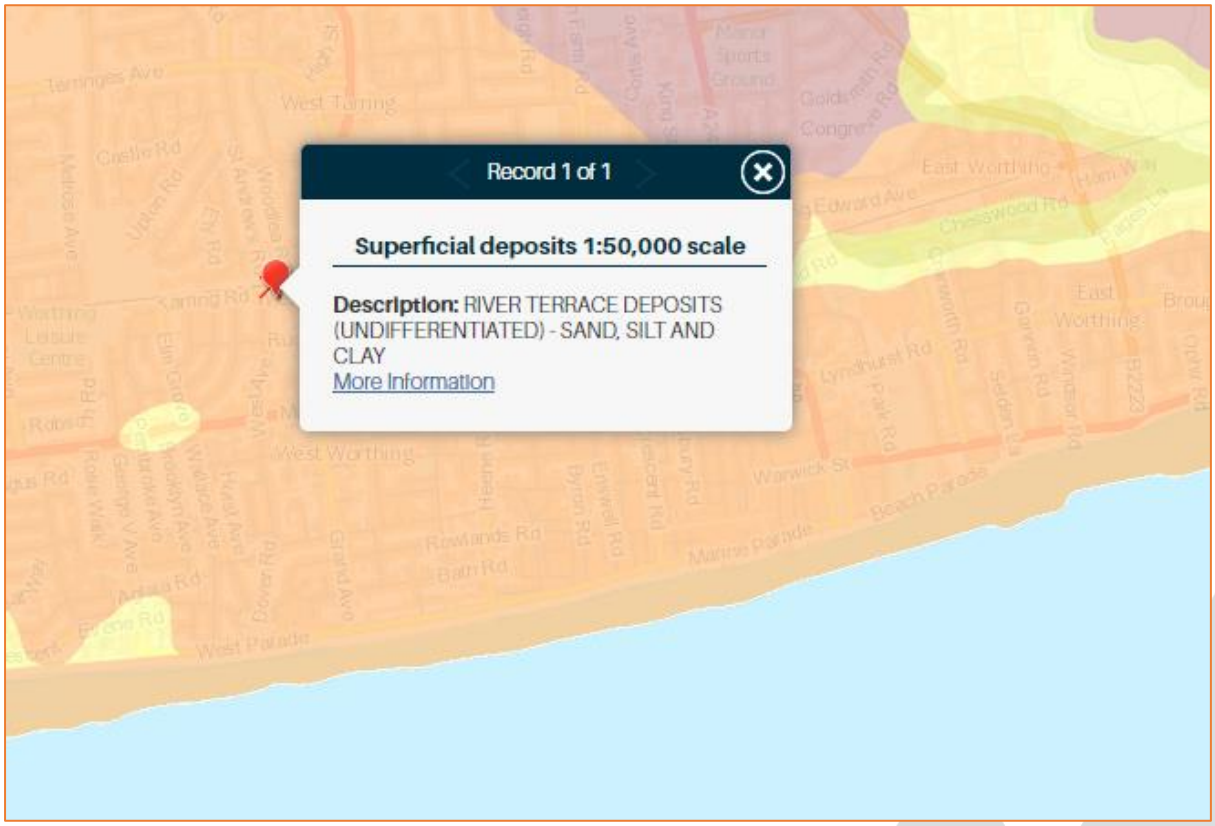


Figure 4: Superficial deposits geology (Source: BGS)

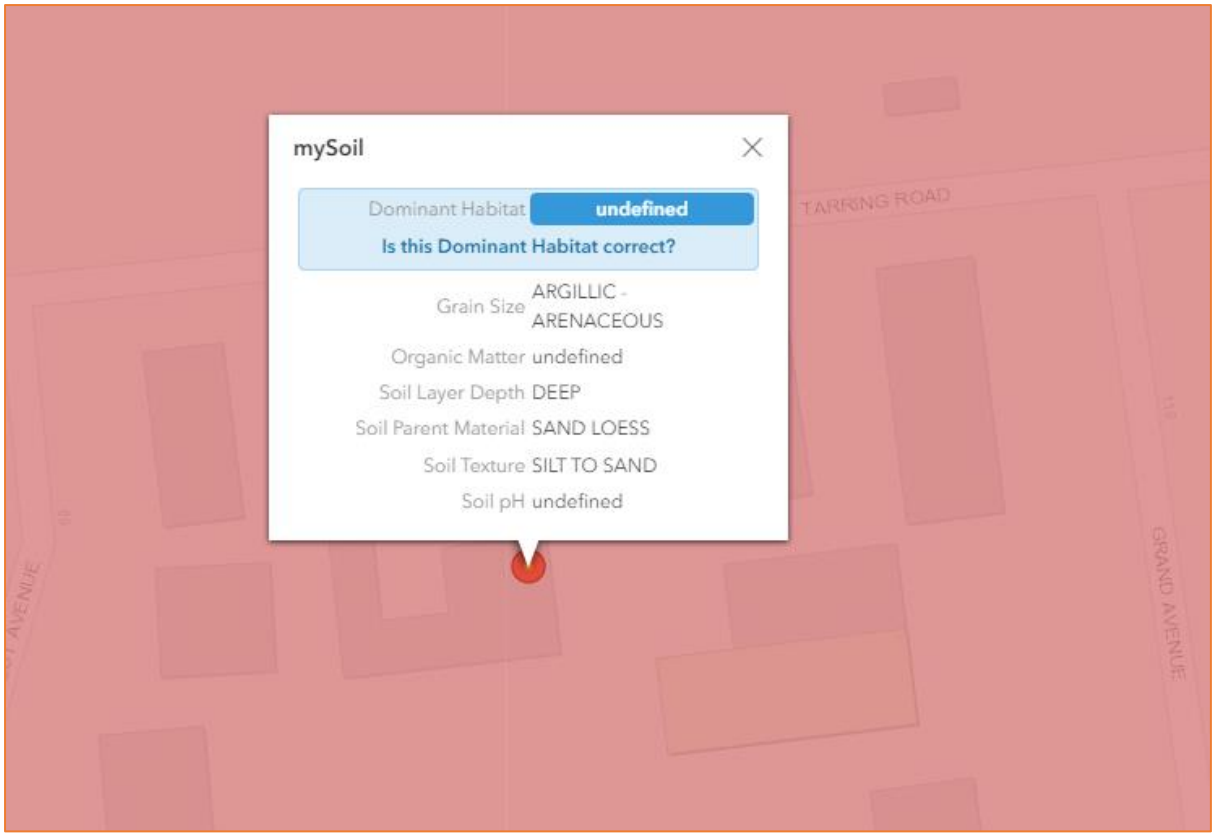


Figure 5: Local soil types (Source: UKSO)

4. Development Proposal

The proposed planning application is for the change of use from Commercial, Business and Service (Use Class E) to form 4no. 1 bedroom residential units (Use Class C3).

Proposed plans can be found in the report Appendix.

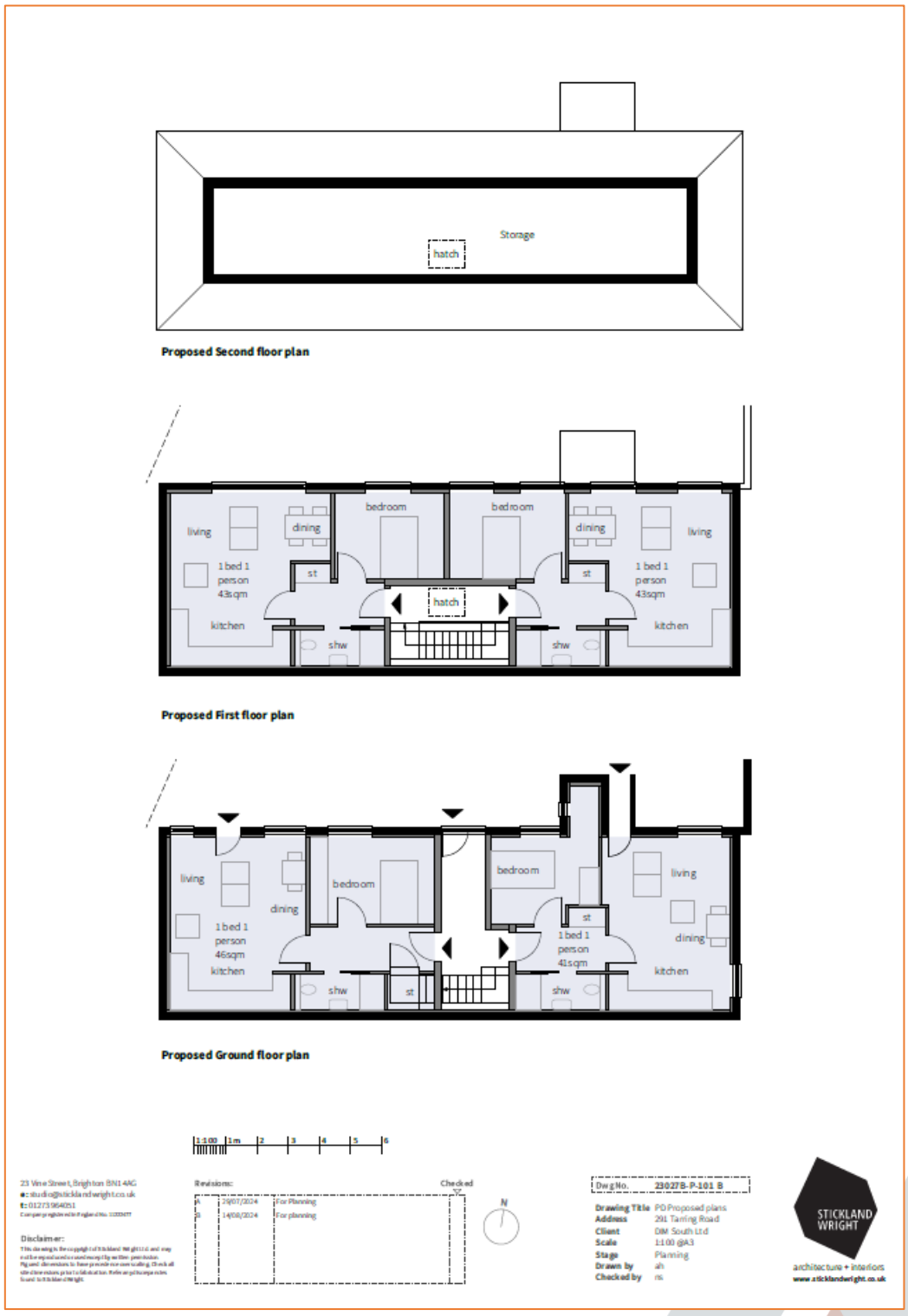


Figure 6: Proposed Floor Plans (Source: Stickland Wright)

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.

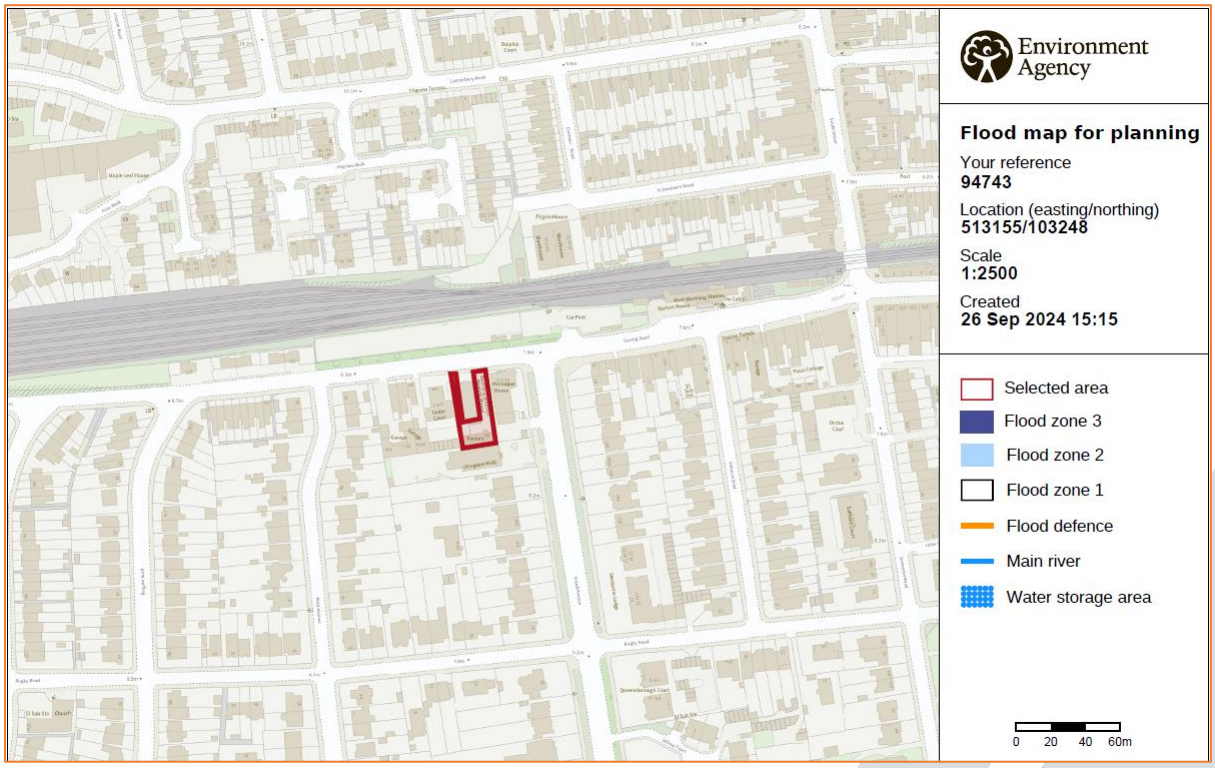


Figure 7: Environment Agency Flood Map for Planning (Rivers and Sea) (Source: EA)

The site is located entirely within Flood Zone 1 (Low Probability) which means it is defined as land having a less than 1 in 1,000 annual probability of river and sea flooding.

In addition, the site is not located within a “Dry Island”.

5.2 Fluvial / Tidal:

The site is located entirely within Flood Zone 1 (Low Probability) which means it is defined as land having a less than 1 in 1,000 annual probability of river and sea flooding.

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

5.2.2 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 the functional floodplain (Flood Zone 3b).

5.2.3 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 there are no Environment Agency owned or maintained defences in the vicinity of the site or surrounding area.

The 2024 Adur and Worthing Strategic Flood Risk Assessment (SFRA) also confirms there are no defences that defend the site.

5.2.4 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, meaning there is a negligible residual risk from breach and overtopping of flood defences.

5.2.5 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 have no records of historical flooding having affected the site or surrounding area.

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 to 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 "Medium" risk of flooding from surface water.

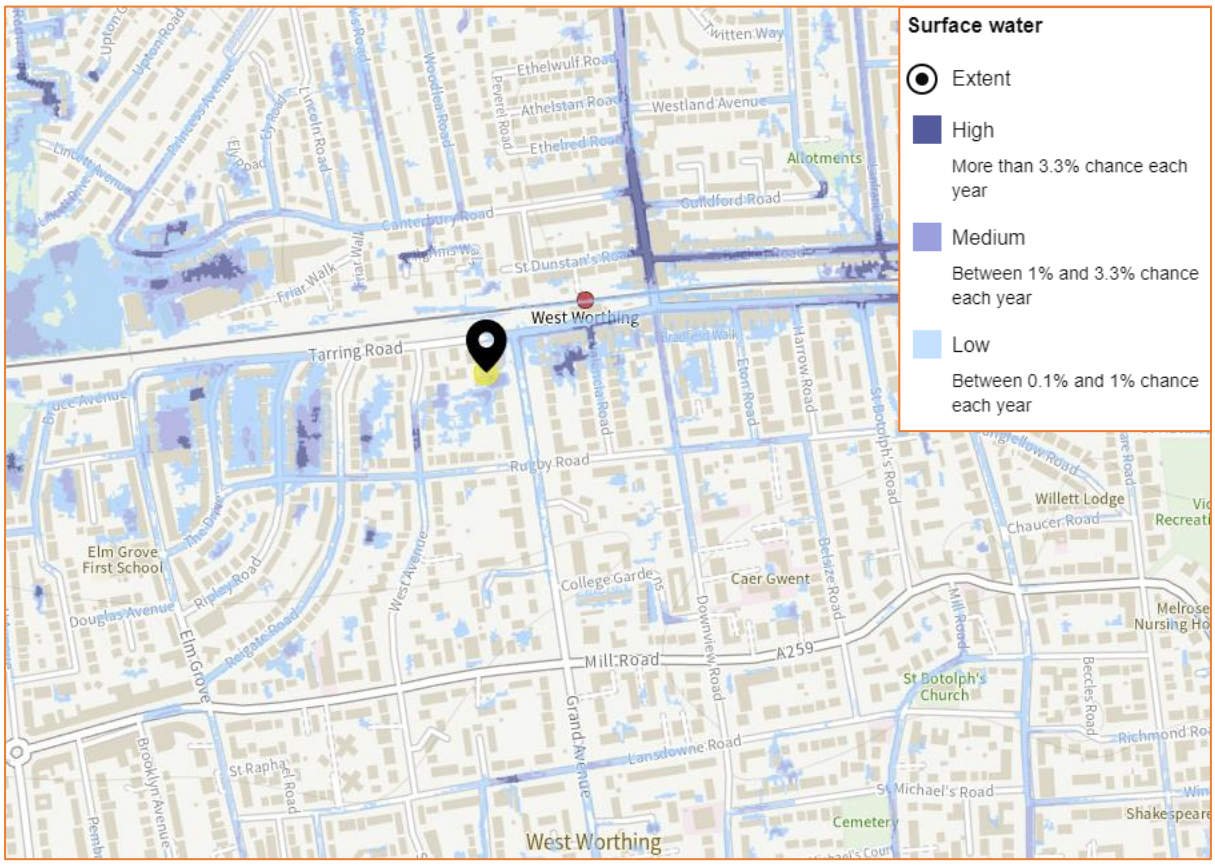


Figure 10: Extract from Environment Agency Surface Water Flood Map (Source: EA)

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 (high risk, medium risk and low risk respectively).

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

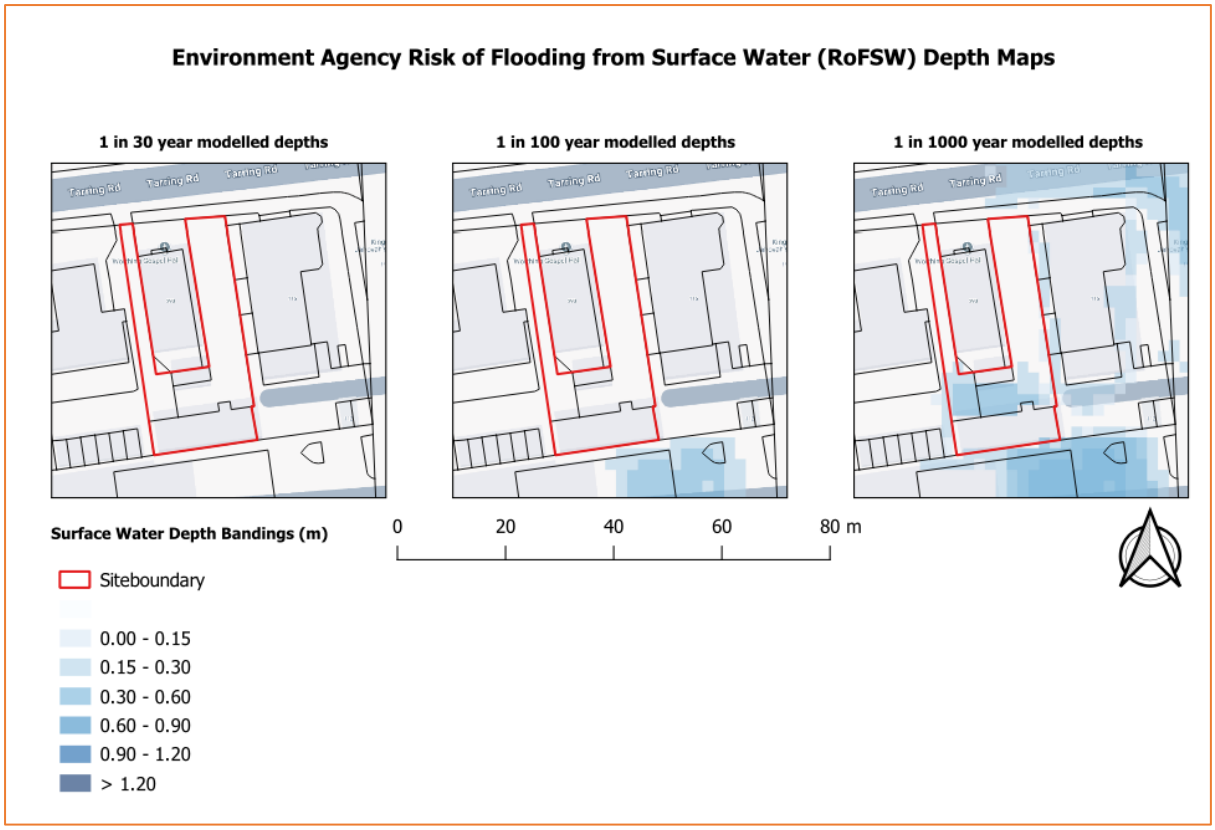


Figure 10: Environment Agency Risk of Flooding from Surface Water Flood Depth Maps for High (1:30yr), Medium (1:100yr) and Low (1:1000yr) modelled events (EA)

The EA risk of flooding from surface water depth maps show:

- For the 1:30 year event (High), the site is flood free.
- For the 1:100 year event (Medium), the site is flood free.
- For the 1:1000 year event (Low), on the site and in the area of the proposed development there is a maximum flood depth of between 0.30-0.60m.

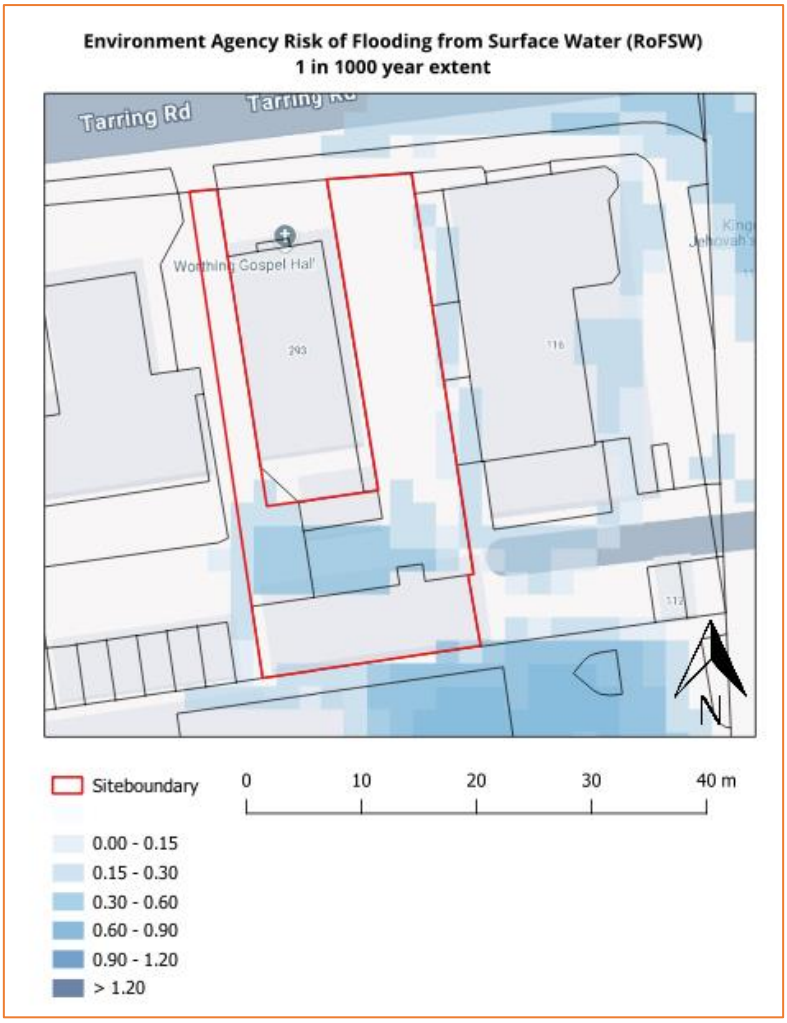


Figure 11: Environment Agency Risk of Flooding from Surface Water Flood Depth Map for Low (1:1000yr) modelled event (Source: EA)

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.

The 2024 Adur and Worthing SFRA shows the site is located in an area where groundwater levels are between 0.025m and 0.5m below the ground surface.

No information has been provided to suggest that the site has flooded from groundwater flooding previously.

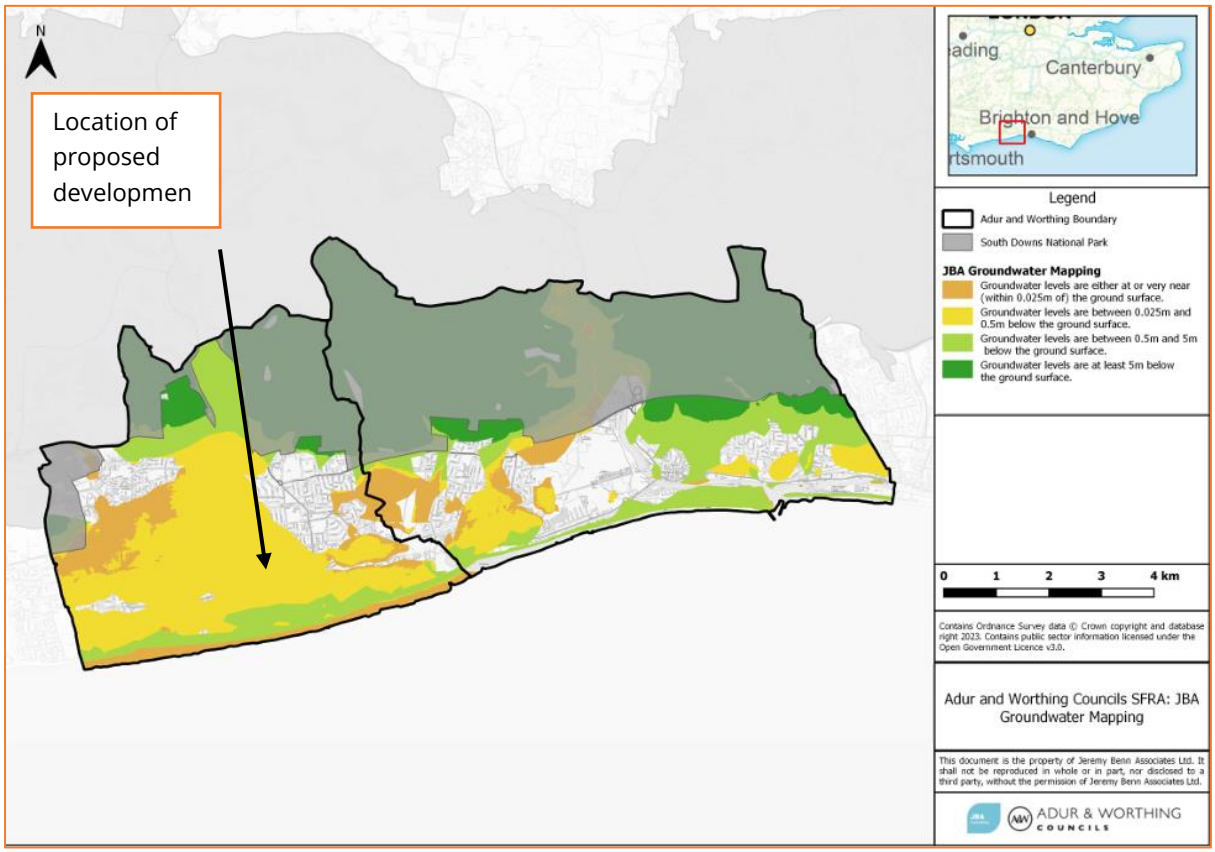


Figure 10: JBA Groundwater Mapping (Source: Adur and Worthing Councils SFRA)

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 2024 Adur and Worthing SFRA, the site's postcode area (BN11 5) has 11 recorded incidents of sewer flooding, which occurred between January 2013 and May 2023.

No information has been provided to suggest that the site has flooded from sewer surcharge flooding previously.

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.

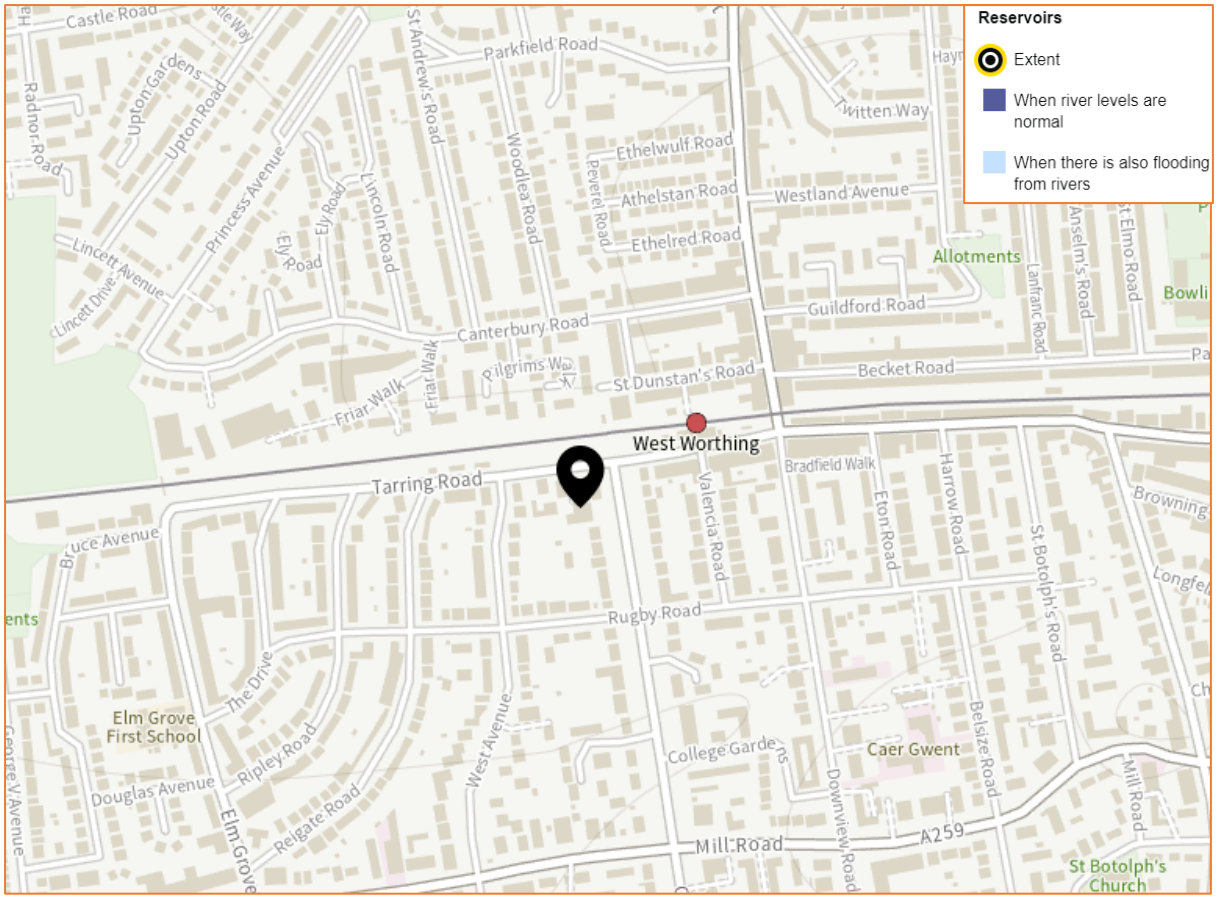


Figure 11: Extract from Environment Agency Reservoir Flood Map (Source: EA)

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 “less vulnerable” throughout, as it is a commercial Class E office.

Post development, the site will become “more vulnerable”, as the application is for the change of use from Commercial, Business and Service (Use Class E) to form 4no. 1 bedroom residential units (Use Class C3).

Accordingly, it is considered that the vulnerability of the site as a whole will increase 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 250m^2. 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 change of use from Commercial, Business and Service (Use Class E) to form 4no. 1 bedroom residential units (Use Class C3).

6.3 Physical Design Measures:

The site is shown to be entirely within Flood Zone 1 on the EA Flood Map for Planning (Rivers and Sea). The EA Surface Flood Map suggests that the site is at a “Medium risk of flooding from surface water.

The Environment Agency risk of flooding from surface water maps show that for the key 1:1000 year (0.1% chance) surface water event, on the site there is a maximum flood depth of between 0.30-0.60m.

The application is for the change of use from Commercial, Business and Service (Use Class E) to form 4no. 1 bedroom residential units (Use Class C3). There will be no increase in built footprint, new basements or lowering of floor levels. Given the application is for the change of use of the existing building, it is not possible to raise floor levels.

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:

- Making sure any doors, windows or other openings are flood resistant to at least 600mm above ground level;

- By raising all sensitive electrical equipment, wiring and sockets to at least 600mm above ground 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

A flood proof door should be installed for external ground floor level doors, or 600mm demountable flood defence barriers to defend lower ground level doorways and low windows if a flood door is not practical or other planning constraints prevent it.

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.

The site is shown to be entirely within Flood Zone 1 on the EA Flood Map for Planning (Rivers and Sea). The EA Surface Flood Map suggests that the site is at a “Medium” risk of flooding from surface water.

The Environment Agency risk of flooding from surface water maps show that for the key 1:1000 year (0.1% chance) surface water event, on the site there is a maximum flood depth of between 0.30-0.60m.

Based on the EA Risk of flooding surface water 1 in 1000 year flood hazard mapping, site users should exit the site onto Tarring Road.

Internal access will be maintained from ground floor level to the upper floors of the development for all residential site users.

Owners, occupants and tenants should follow the warning and evacuation procedure detailed in the following section.



Figure 15: Environment Agency Risk of Flooding from Surface Water Flood Hazard Map for Low (1:1000yr) modelled event. Escape route shown by pink dotted line. (Source: EA)

6.5 Flood Warning:

As the UK's official weather service, the Met Office is responsible for issuing weather warnings, which warn of impacts caused by severe weather. The Met Office provide warnings up to seven days ahead for rain, thunderstorms, wind, snow, lightning, ice and fog.

Met Office weather warnings are available in a number of ways, which make it easy to get the very latest information wherever you are. These include the Met Office app and website, social media, email alerts, TV, radio and RSS.

It is recommended that the site owner sign up to the National Severe Weather Warning Service. More information can be found here: https://www.metoffice.gov.uk/weather/guides/warnings.

The Met Office issues weather warnings, through the National Severe Weather Warning Service, when severe weather has the potential to bring impacts to the UK. These warnings are given a colour (yellow, amber or red) depending on a combination of both the impact the weather may have and the likelihood of those impacts occurring.

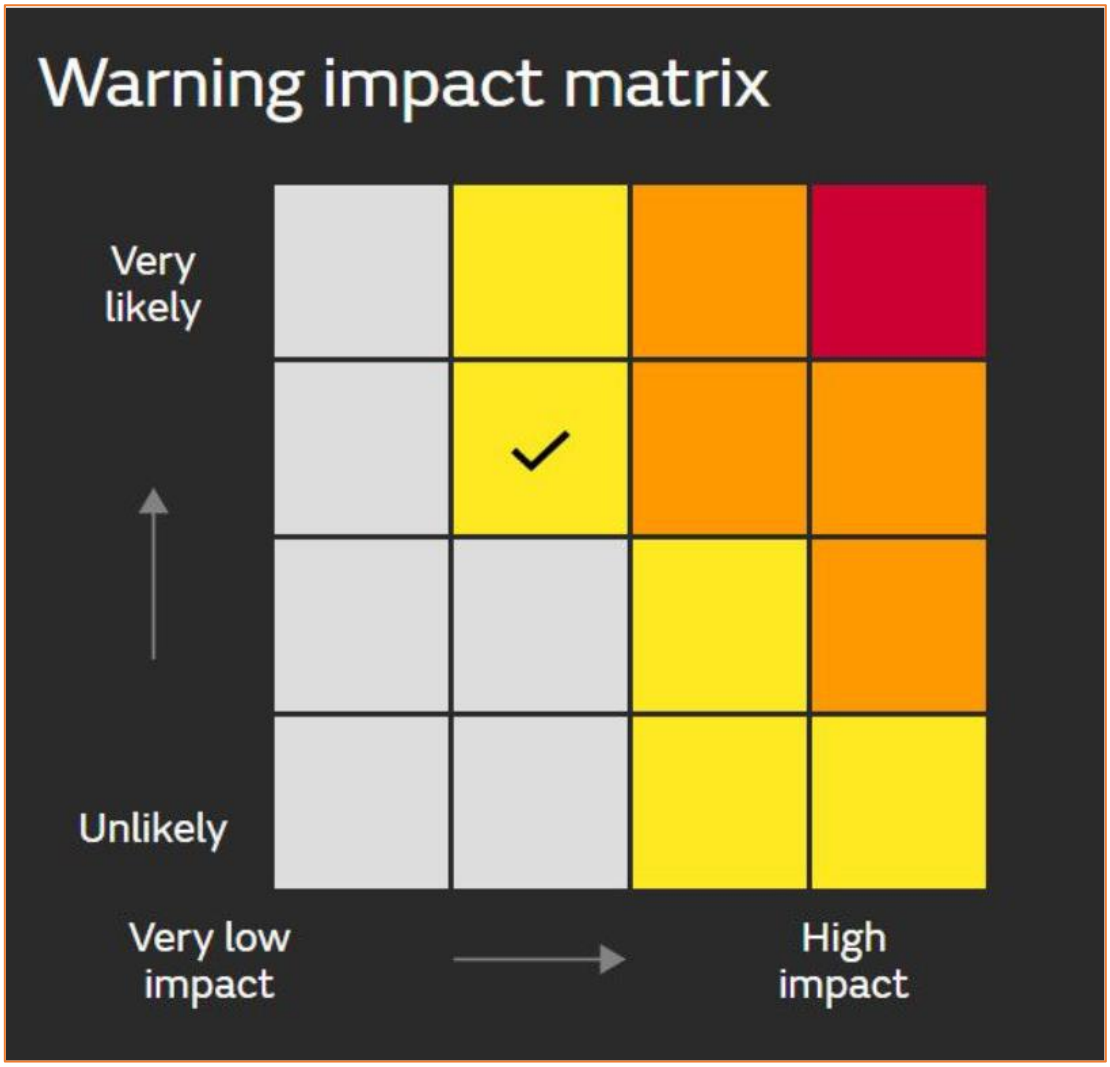


Table 2: Met Office Weather Warning Impact Matrix (Source: Met Office)

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.

6.6 Flood Plan:

It is recommended that the applicant and future owners 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 proposed development is located entirely within Flood Zone 1. The proposed application is for the change of use from Commercial, Business and Service (Use Class E) to form 4no. 1 bedroom residential units (Use Class C3). Post development, there will be no loss of fluvial 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 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 arrangements on site.

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 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 located entirely within Flood Zone 1 when using the Environment Agency Flood Map for Planning (Rivers and Sea). The EA Surface Water Flood Map suggests that the site is at a “Medium” risk of flooding from surface water.

Pose development, the site will become “more vulnerable” throughout as the application is for the change of use from Commercial, Business and Service (Use Class E) to form 4no. 1 bedroom residential units (Use Class C3).

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 1. The Sequential and Exception Tests do not need to be applied to minor developments and changes of use.

8. Discussion and Conclusions

Unda Consulting Limited have been appointed by PWX construction LTD to undertake a Flood Risk Assessment for the proposed development at 291 Tarring Road, Worthing, West Sussex, BN11 5JG. 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 change of use from Commercial, Business and Service (Use Class E) to form 4no. 1 bedroom residential units (Use Class C3).

Post development, the site will become "more vulnerable", as the application is for the change of use from Commercial, Business and Service (Use Class E) to form 4no. 1 bedroom residential units (Use Class C3). Accordingly, it is considered that the vulnerability of the site as a whole will increase post development.

The site is located entirely within Flood Zone 1 (Low Probability) which means it is defined as land having a less than 1 in 1,000 annual probability of river and sea flooding. In addition, the site is not located within a "Dry Island".

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

The site is not located within the functional floodplain (Flood Zone 3b).

According to the EA there are no Environment Agency owned or maintained defences in the vicinity of the site or surrounding area. The 2024 Adur and Worthing Strategic Flood Risk Assessment (SFRA) also confirms there are no defences that defend the site.

The EA have no records of historical flooding having affected the site or surrounding area.

The EA Risk of Flooding from Surface Water Map suggests that the site lies in an area of "Medium" risk of flooding from surface water.

The EA risk of flooding from surface water depth maps show:

- For the 1:30 year event (High), the site is flood free.
- For the 1:100 year event (Medium), the site is flood free.
- For the 1:1000 year event (Low), on the site and in the area of the proposed development there is a maximum flood depth of between 0.30-0.60m.

The 2024 Adur and Worthing SFRA shows the site is located in an area where groundwater levels are between 0.025m and 0.5m below the ground surface. No information has been provided to suggest that the site has flooded from groundwater flooding previously.

According to the 2024 Adur and Worthing SFRA, the site's postcode area (BN11 5) has 11 recorded incidents of sewer flooding, which occurred between January 2013 and May 2023.

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.

Given the application is for the change of use of the existing building, it is not possible to raise floor levels.

The Environment Agency risk of flooding from surface water maps show that for the key 1:1000 year (0.1% chance) surface water event, on the site there is a maximum flood depth of between 0.30-0.60m. Based on the EA Risk of flooding surface water 1 in 1000 year flood hazard mapping, site users should exit the site onto Tarring Road. Internal access will be maintained from ground floor level to the upper floors of the development for all residential site users.

The applicant has confirmed that:

- The proposed application is for the change of use from Commercial, Business and Service (Use Class E) to form 4no. 1 bedroom residential units (Use Class C3).
- Floor levels post development will be set no lower than existing floor levels.
- Flood proofing of the development will be incorporated as appropriate.
- Safe escape will be provided by a flood warning and evacuation plan.
- Post development, there will be no unacceptable loss of fluvial floodplain storage.
- Due to the scale of development, a full Surface Water Drainage Strategy is not required at this stage of planning.

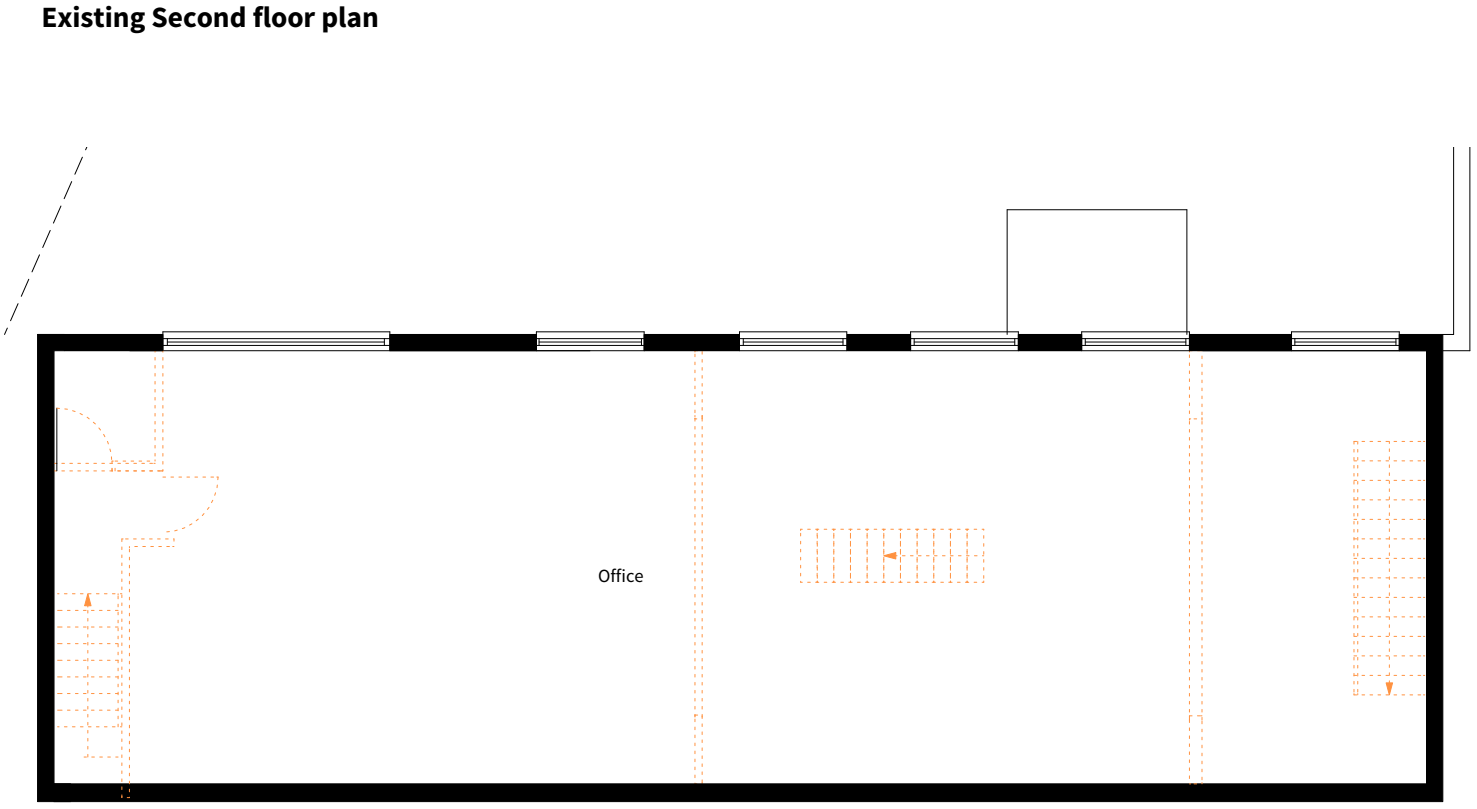
Assuming accordance with these flood risk management measures, Unda Consulting Limited consider the proposed application to be suitable in flood risk terms.

Appendix

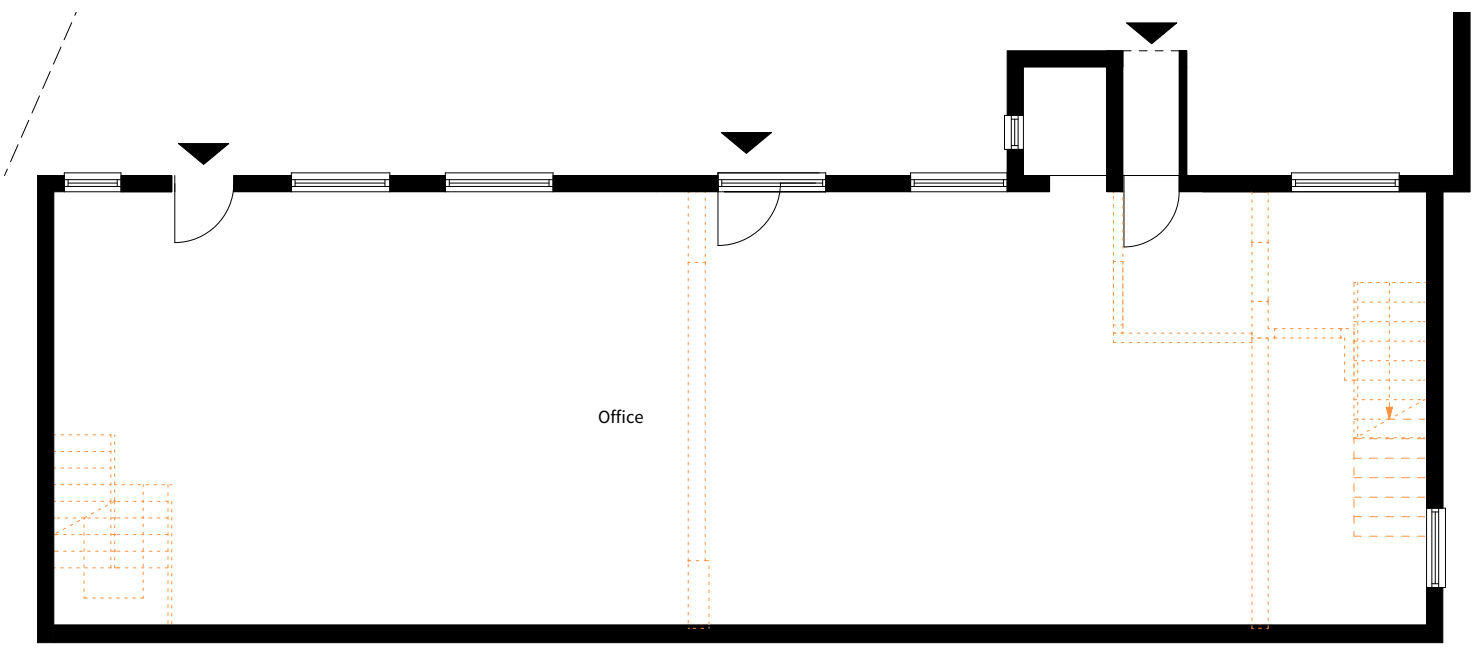
- Existing and Proposed Plans;
- EA Flood Map for Planning.



Existing Second floor plan



Existing First floor plan



Existing Ground floor plan

Demolition

1:100 | 1m | 2 | 3 | 4 | 5 | 6

23 Vine Street, Brighton BN1 4AG
e: studio@sticklandwright.co.uk
t: 01273 964051
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Revisions:

			Checked
A	29/07/2024	For Planning	
B	14/08/2024	For planning	

N

Dwg No.	**23027B-P-100 B**
Drawing Title	PD Existing plans
Address	291 Tarring Road
Client	DIM South Ltd
Scale	1:100 @A3
Stage	Planning
Drawn by	ah
Checked by	ns

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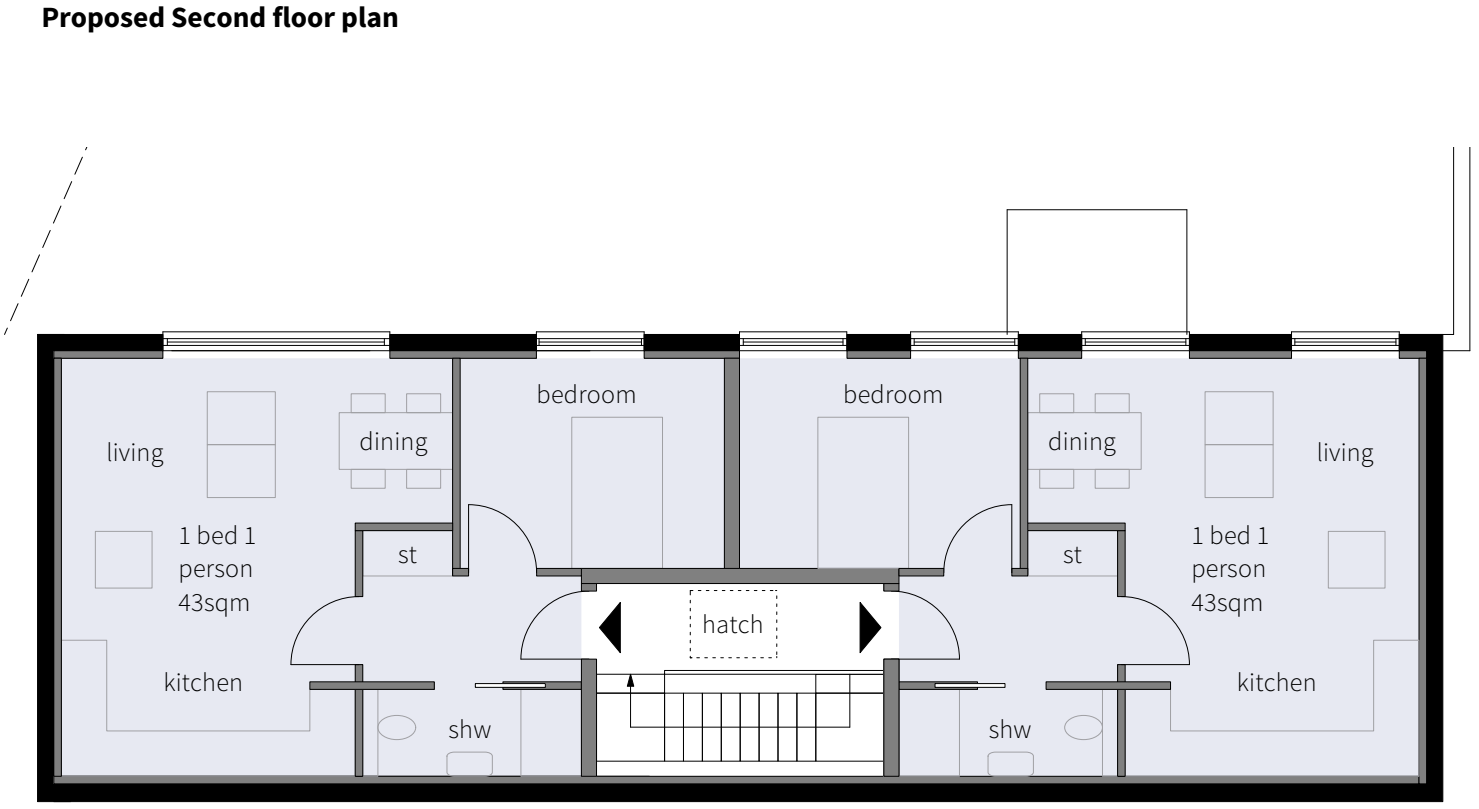
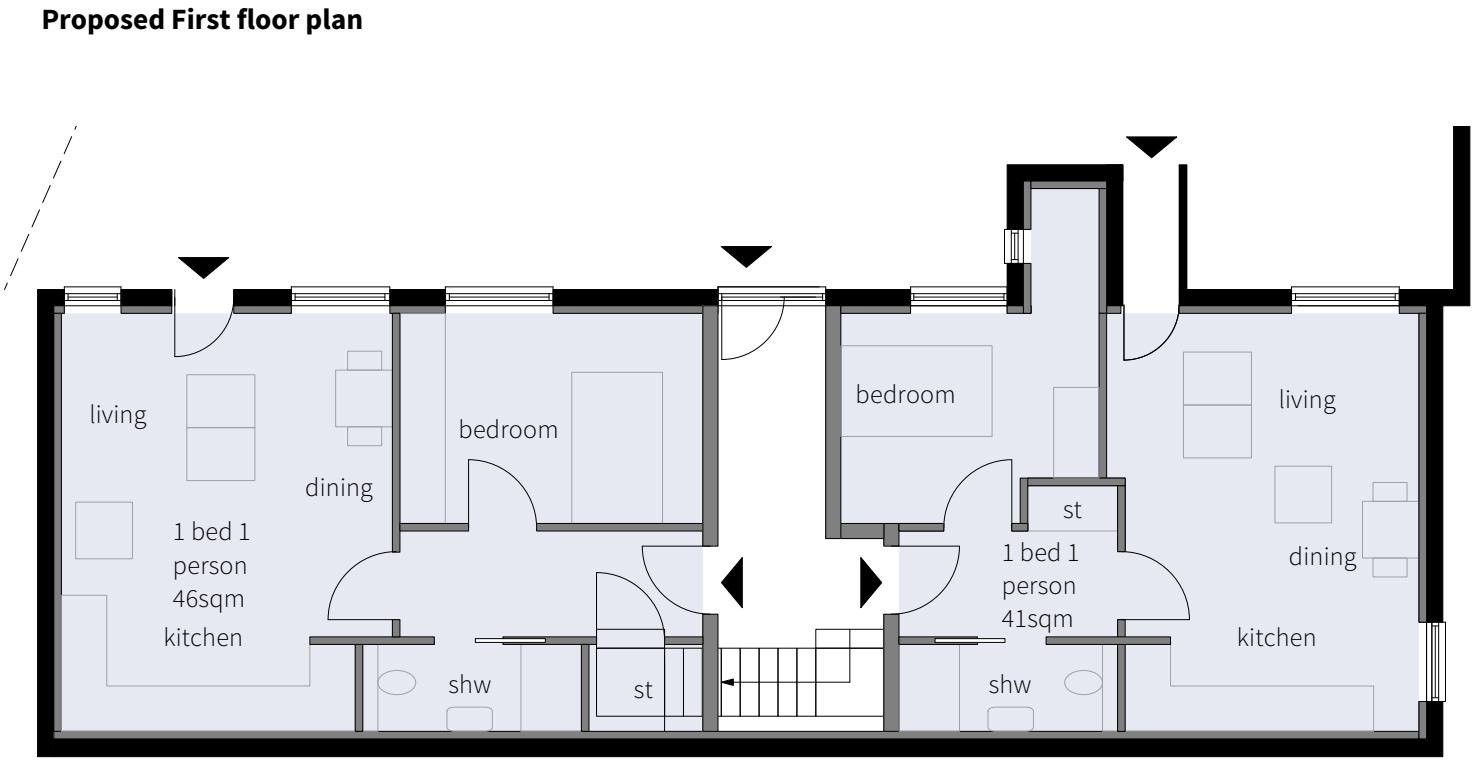
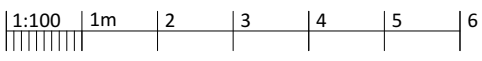
Proposed Second floor plan



Proposed First floor plan



Proposed Ground floor plan



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Revisions:

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A	29/07/2024	For Planning	
B	14/08/2024	For planning	

N

Dwg No.	**23027B-P-101 B**
Drawing Title	PD Proposed plans
Address	291 Tarring Road
Client	DIM South Ltd
Scale	1:100 @A3
Stage	Planning
Drawn by	ah
Checked by	ns

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Flood map for planning

Your reference	Location (easting/northing)	Created
94743	**513155/103248**	**26 Sep 2024 15:15**

Your selected location is in flood zone 1, an area with a low probability of flooding.

You will need to do a flood risk assessment if your site is **any of the following:**

- bigger that 1 hectare (ha)
- In an area with critical drainage problems as notified by the Environment Agency
- identified as being at increased flood risk in future by the local authority's strategic flood risk assessment
- at risk from other sources of flooding (such as surface water or reservoirs) and its development would increase the vulnerability of its use (such as constructing an office on an undeveloped site or converting a shop to a dwelling)

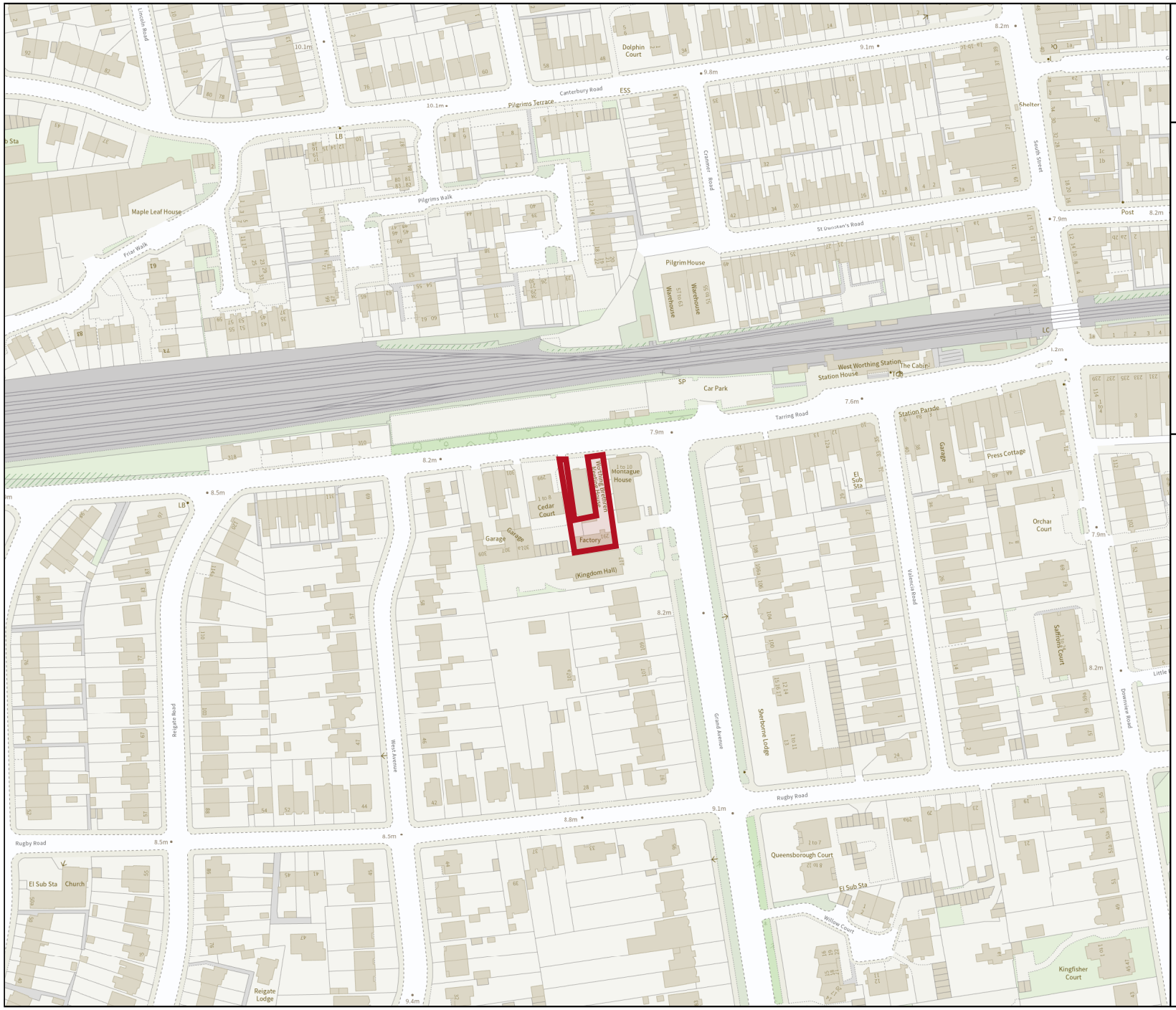
Notes

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 2022 OS 100024198. https://flood-map-for-planning.service.gov.uk/os-terms



Environment Agency

Flood map for planning

Your reference
94743

Location (easting/northing)
513155/103248

Scale
1:2500

Created
26 Sep 2024 15:15

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

0 20 40 60m

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