



Flood Risk Assessment

Prepared for:
Eddystone SIPP

Location:
Eddystone House
Eddystone Road
Wadebridge
PL27 7AL

September 2023

Our reference:
93098-Way-EddystoneRd



Document Issue Record

Project: Flood Risk Assessment

Client: Eddystone SIPP

Location: Eddystone House, Eddystone Road, Wadebridge, PL27 7AL

Application: Change of use from commercial to residential on the first and second floors.

Our reference: 93098-Way-EddystoneRd

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Key Facts

Flood Risk Posed:

- The site is situated within Flood Zone 3a when using the Environment Agency Flood Map for Planning (Rivers and Sea).
- Cornwall Council have also produced Flood Zone mapping as part of their SFRA. The site is shown to be within Flood Zone 3a, and entirely outside of Flood Zone 3b.
- The risk would appear to be predominantly tidal, and originate from the River Camel which is tidally influenced in this reach, with potential fluvial risk from the Polmorla Brook.
- No detailed flood modelling has been provided by the EA for the Polmorla Brook.
- Site entirely outside JFLOW 1:100 year, 1:1000 year and derived 1:100 year plus climate change flood extents for the Polmorla Brook.
- Comparison of extreme tidal flood levels with topographic site levels shows that the site is below the coastal flood levels, with a potential maximum flood depth of 1.63m for the 1:200yr plus Higher Central and 1.75m for the 1:200yr plus Upper End climate change allowances.
- EA records indicate that flooding occurred in Wadebridge in 1979, 1980, 1984, 1986, 1992, 1993, 1998, 1999, 2000, 2002, 2012, 2014 and 2019. The site is shown to be entirely outside of all these historic flood extents.
- The EA Risk of Flooding from Surface Water Map suggests that the site lies in an area of “Very Low” risk of flooding from surface water, with Eddystone Road adjacent to the site to be within an area of “Low” to “High” risk of flooding from surface water.
- Low risk of flooding from groundwater and sewer flooding.

Flood Risk Management:

- The application is for the Change of use from commercial to residential on the first and second floors.
- The proposal is for the change of use of the existing first and second floors of the existing building. No residential uses will therefore be located at ground floor level, and as such all residential uses will be above the potential maximum coastal 1:200 year flood levels with allowance for climate change.
- Flood proofing of the development will be incorporated as appropriate.
- Safe escape will be provided by a formal flood warning and evacuation plan which will be prepared in liaison with the Council’s Emergency Planners and tied in with the existing emergency plans for the area.
- The applicant will register with the free Environment Agency Floodline 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.

Introduction

Unda Consulting Limited have been appointed by Eddystone SIPP (hereinafter referred to as “the applicant”) to undertake a Flood Risk Assessment for the proposed development at Eddystone House, Eddystone Road, Wadebridge, PL27 7AL (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 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.

Current Situation

Existing Site:

The existing site is an existing building which is understood to be commercial uses at first and second floor level.

A map showing site location is presented below in Figure 1, and a detailed site plan for the current situation is provided in the report Appendix.



Figure 1: Location Plan (Source: Ordnance Survey)

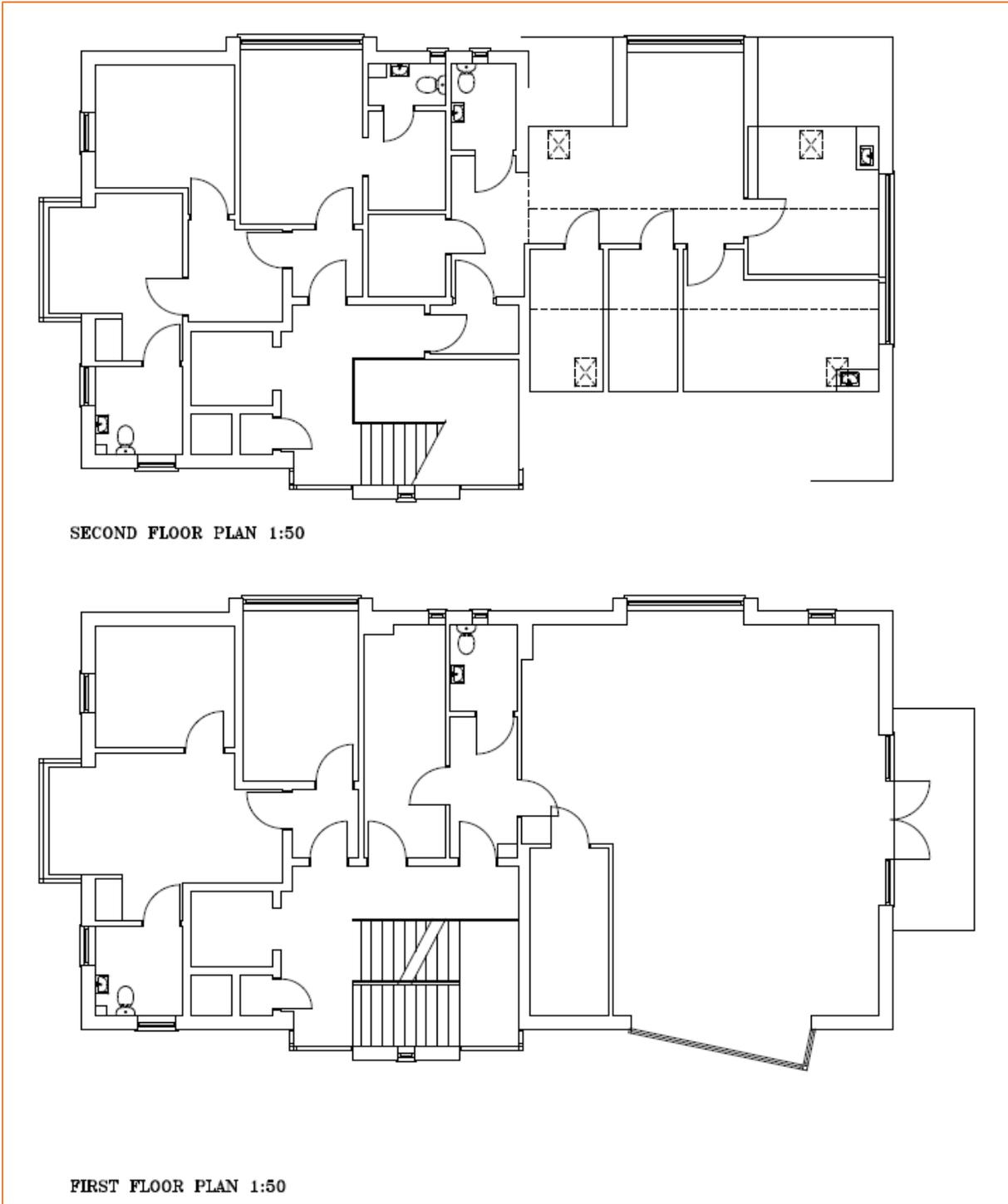


Figure 2: Existing Flood Plans (Source: Eddystone SIPP.)

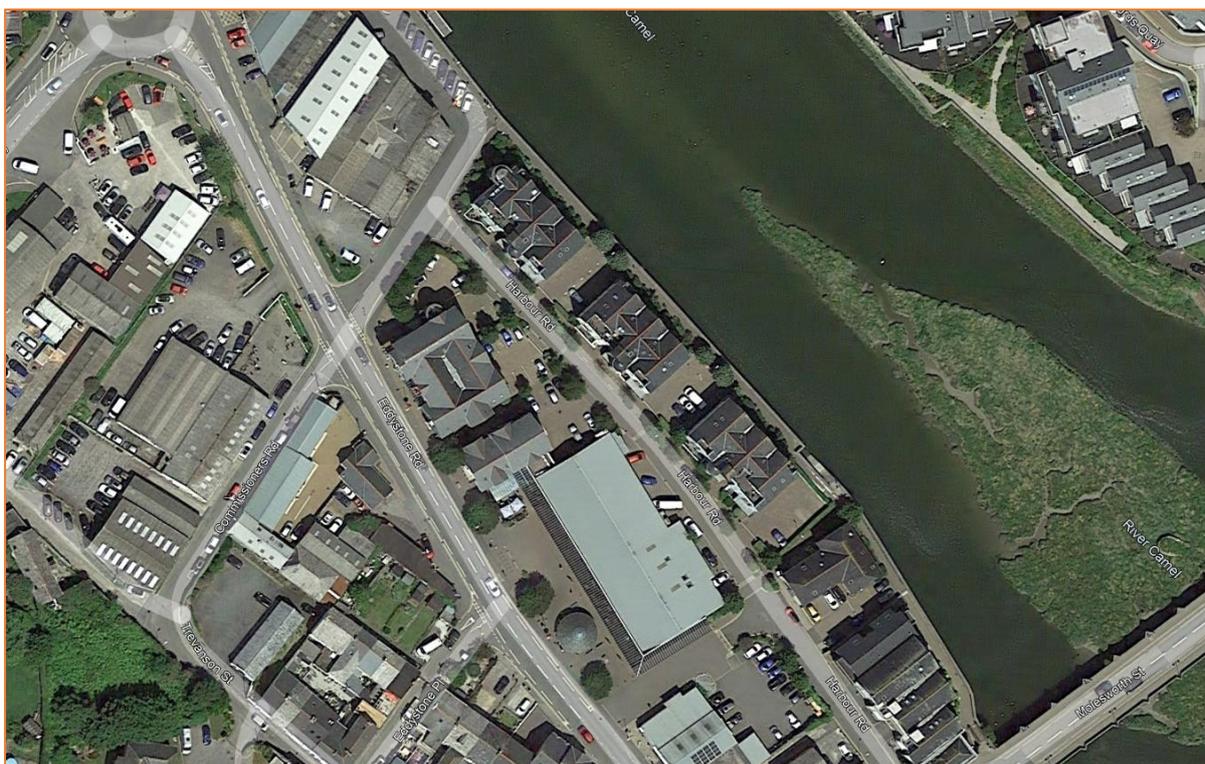


Figure 3: Aerial view of site (Source: Google Earth)

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 +/-5cm to 15cm with spatial resolutions ranging from 25cm to 2 metres. This dataset is derived from a combination of the EA's 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 shows topographic levels across the site varies between approximately 4.68mAOD and 4.75mAOD.

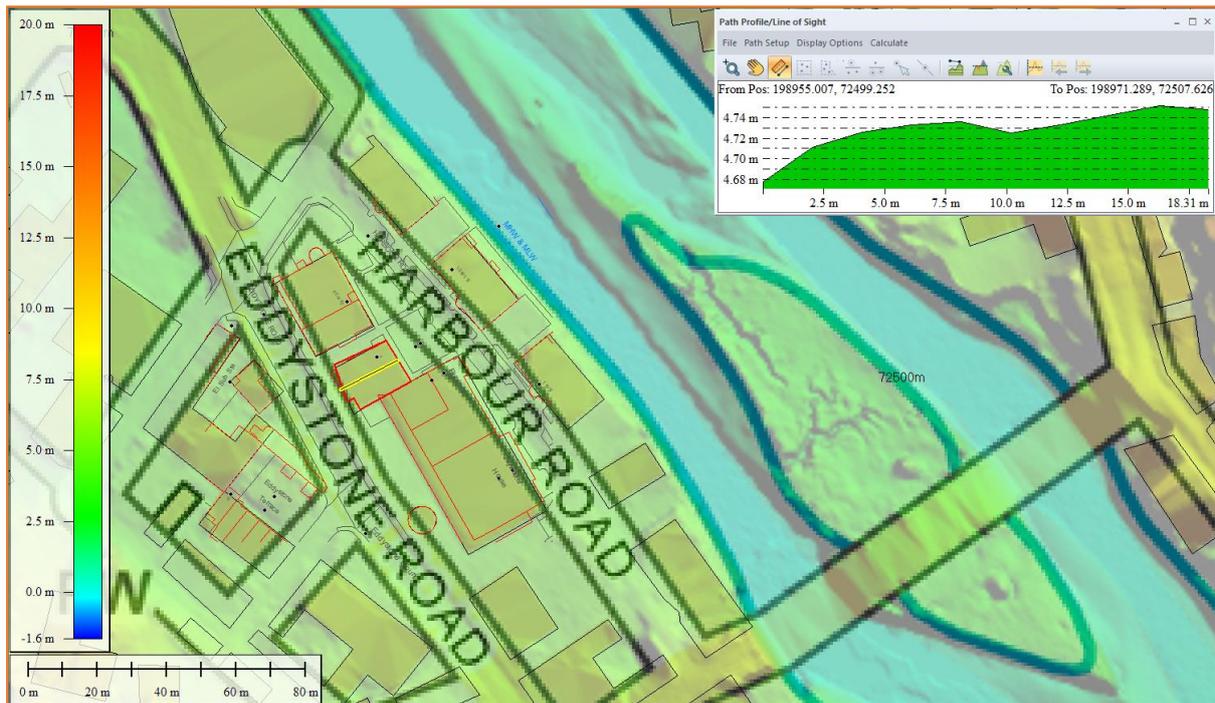


Figure 4: 1m LiDAR DTM showing topographic levels across the site (Source: EA LiDAR, OS Mapping)

Geology and Soils:

The bedrock geology taken from the BGS website is Trevoze Slate Formation and Rosenum Formation (undifferentiated) – Slate and Siltstone, with superficial deposits of Tidal flat deposits – Clay and Silt.

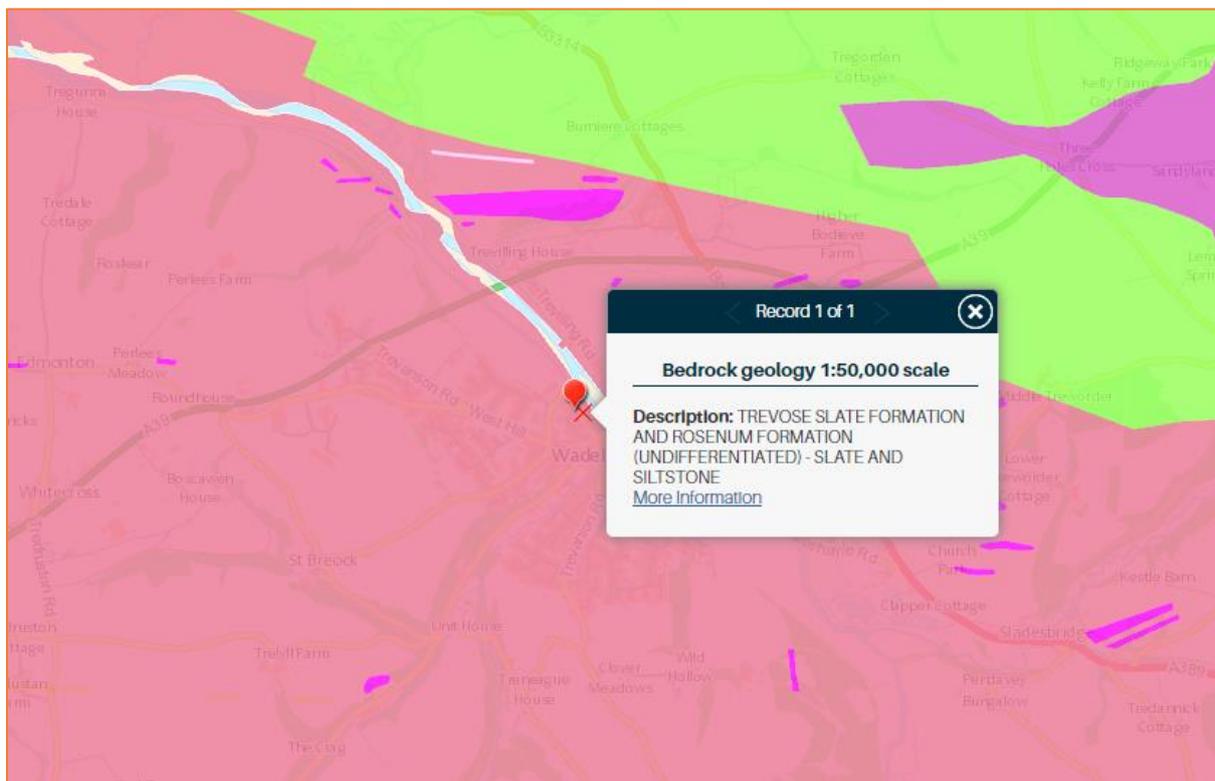


Figure 5: Bedrock Geology (Source: BGS)

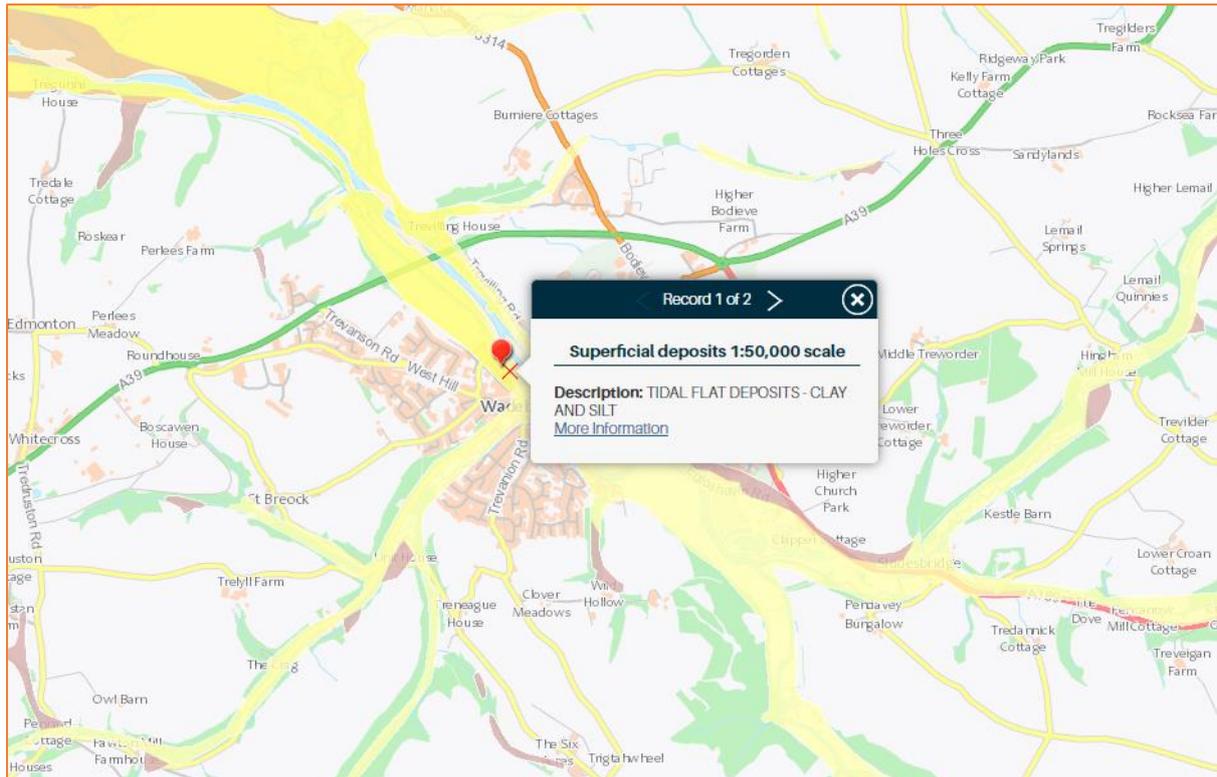


Figure 6: Superficial Deposits (Source: BGS)

Development Proposal

The proposed development consists of Change of use from commercial to residential on the first and second floors.

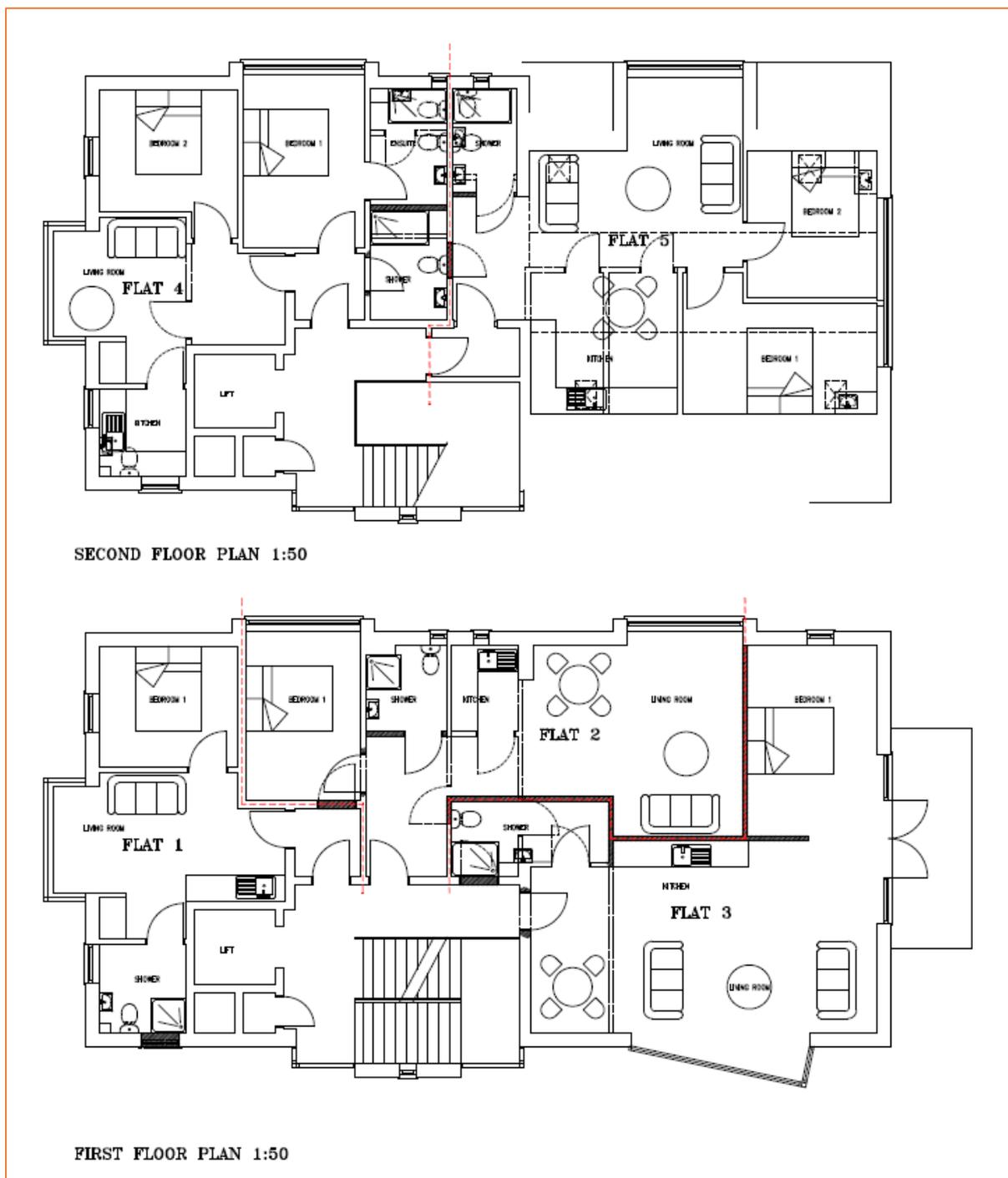


Figure 7: Proposed site layout (Source: Eddystone SIPP)

The proposed site plans are provided in the report Appendix.

Assessment of Flood Risk

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.

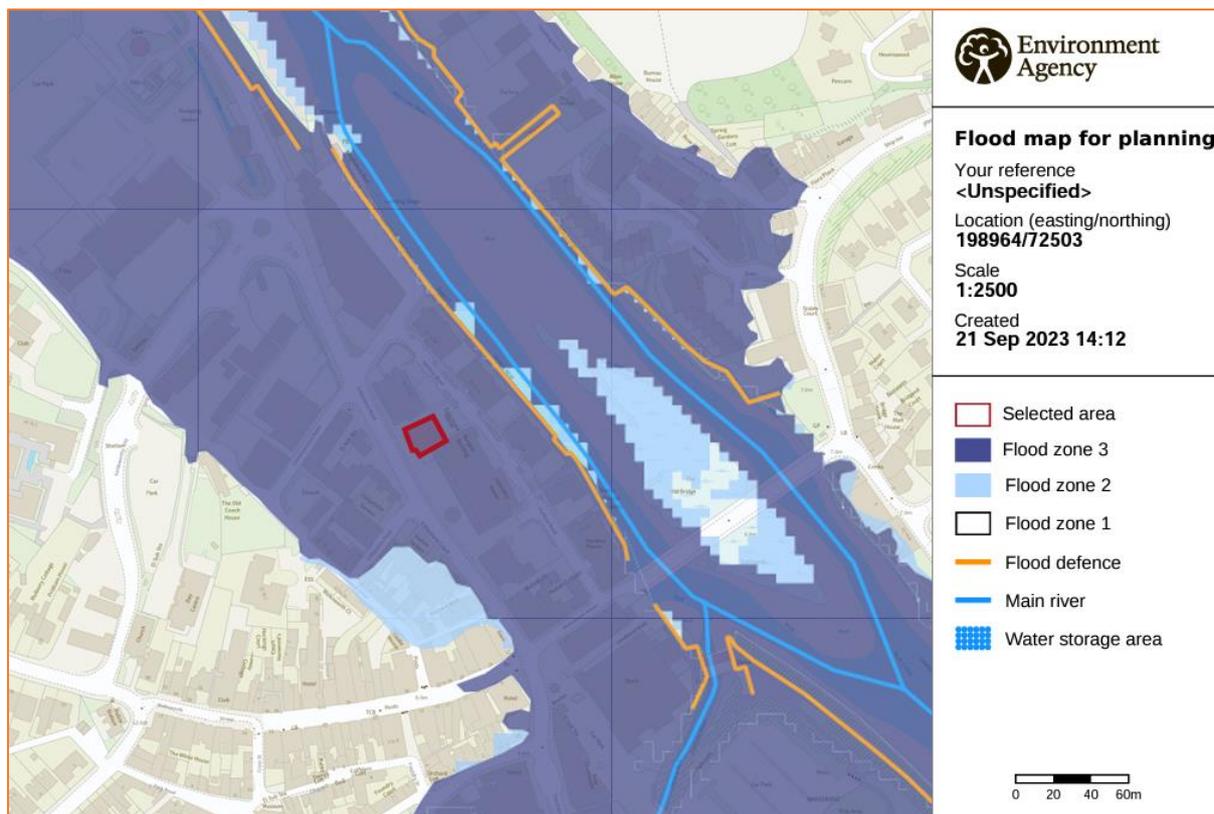


Figure 8: Environment Agency Flood Map for Planning (Rivers and Sea) (Source: EA)

The site is located partially within Flood Zone 3 (High Probability), which means it is defined as land having at least a 1 in 200 annual probability of tidal flooding or 1 in 100 annual probability of fluvial flooding.

The risk would appear to be predominantly tidal, and originate from the River Camel which is tidally influenced in this reach, with potential fluvial risk from the Polmorla Brook.

Cornwall Council have also produced Flood Zone mapping as part of their SFRA. The site is shown to be within Flood Zone 3a, and entirely outside of Flood Zone 3b.



Figure 9: Cornwall Council Flood Zones (Source: Cornwall Council online SFRA map)

Tidal (River Camel):

The River Camel is a river in Cornwall, England. It rises on the edge of Bodmin Moor and with its tributaries its catchment area covers much of North Cornwall. The river flows into the eastern Celtic Sea between Stepper Point and Pentire Point having covered about 30 miles, making it the second longest river wholly in Cornwall. The river is tidal upstream to Egloshayle.

The River Camel Estuary is approximately 44m to the northwest of the site.

Modelled flood levels:

The EA has provided Data from the Coastal Flood Boundary Study 2018.

Extreme Sea Levels have been provided from the Coastal Flood Boundary Study 2018.

	1:200 year Extreme Tide Level	1:1000 year Extreme Tide Level
Present day	5.19m AOD	5.31m AOD
2125 Higher Central	6.31m AOD	6.43m AOD
2125 Upper End	6.70m AOD	6.82m AOD

Table 2: Extreme sea levels (Source: EA)

The site is located within Flood Zone 3, and is classified as “more vulnerable”. The Flood Risk Assessments: climate change allowances guidance – updated May 2022, states for flood risk assessments both the higher central and upper end allowances should be assessed.

The 'Flood risk assessments: climate change allowances' guidance for the South West area of England provides the following sea level allowances:

Area of England		2000 to 2035 (mm)	2036 to 2065 (mm)	2066 to 2095 (mm)	2096 to 2125 (mm)	Cumulative rise 2000 to 2125 / metres (m)
South West	Higher Central	5.8	8.8	11.7	13.1	1.21
South West	Upper End	7	11.4	16	18.4	1.62

Table 3: Sea Level Allowances for the South West River Basin District for each epoch in mm per year (Source: 'Flood risk assessments: climate change allowances)

Area of England		2017 to 2035 (mm)	2036 to 2065 (mm)	2066 to 2095 (mm)	2096 to 2125 (mm)	Cumulative rise 2017 to 2125 / metres (m)
Site	Higher Central	110	264	351	393	1.12
Site	Upper End	133	342	480	552	1.51

Table 4: Sea Level Allowances for the site for each epoch in mm per year (Source: 'Flood risk assessments: climate change allowances)

The design flood levels for planning are the 1:200 year with Higher Central, and Upper End climate change. The 1:200 year flood levels are 6.31mAOD and 6.70mAOD respectively. Comparison of these flood levels with topographic site levels (4.68mAOD to 4.75mAOD) shows that the site is below the coastal flood levels, with a potential maximum flood depth of 1.63m for the 1:200yr plus Higher Central and 1.75m for the 1:200yr plus Upper End climate change allowances.

Fluvial (Polmorla Brook):

The Polmorla brook is a tributary of the River Camel, and rises on St Breock Downs. The Polmorla Brook is approximately 190m to the east of the site.

Modelled flood levels:

Flood levels have been provided from JFLOW, which is national generalised modelling, which is not based on a specific channel survey. Neither water depths nor water levels were specified as outputs from JFLOW when it was commissioned. Whilst the modelling process does provide some information on depth of water, the EA has confirmed that this type of modelling was developed, tested and reviewed for production of the Flood Zone extents only, we have no information on the accuracy of the water depth data.

Water depth or level outputs from this model are only suitable to be used for decision making at a broad catchment scale and is not fit for the purpose of a site specific FRA.

No detailed flood modelling has been provided by the EA for the Polmorla Brook.

The maximum 1:100 year and 1:1000 year JFLOW flood levels for the in-channel upstream node closest to the site (node reference 1617) are 4.19mAOD and 4.51mAOD respectively. Comparison of these JFLOW flood levels with topographic site levels (4.68mAOD to 4.75mAOD) shows that the site is entirely above these flood levels.

The site is located within Flood Zone 3, and is classified as "more vulnerable". The Flood Risk Assessments: climate change allowances guidance – updated May 2022, states for flood risk assessments the central peak river flow allowance should be assessed. The site falls within the North Cornwall, Seaton, Looe and Fowey Management Catchment, where the Central allowance for the 2080's is a 36% increase in flows.

No detailed modelling has been undertaken for the Polmorla Brook, and as such no modelled flows are available so a 36% increase in flows cannot be estimated. The Cornwall Council SFRA states that in fluvial flood risk areas it is considered that Flood Zone 2 gives a reasonable representation of a climate change Flood Zone for fluvial zone 3.

As such, the 1:100 year flood level with allowance for climate change is therefore 4.51mAOD. Comparison of this derived flood level with topographic site levels (4.68mAOD to 4.75mAOD) shows that the site is entirely above this level.

Flood defences:

The flood defences on the River Camel Estuary in this reach are generally in the form of Flood Walls and Flood Embankments, with a design standard of protection of 1:200 year.

The Shoreline Management Plan Log Term Policy for the Camel Estuary (Stepper Point to Pentire Point) at Wadebridge is to Hold the Line

The flood defences on the Polmorla Brook are described as natural high ground, with a design standard of protection of 1:50 year.

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.

In the event of failure (breach) or overtopping (exceedance) of the flood defences in place, the site may be at risk of inundation.

Historical flood events:

EA records indicate that flooding occurred in Wadebridge in 1979, 1980, 1984, 1986, 1992, 1993, 1998, 1999, 2000, 2002, 2012, 2014 and 2019.

The site is shown to be entirely outside of all these historic flood extents.

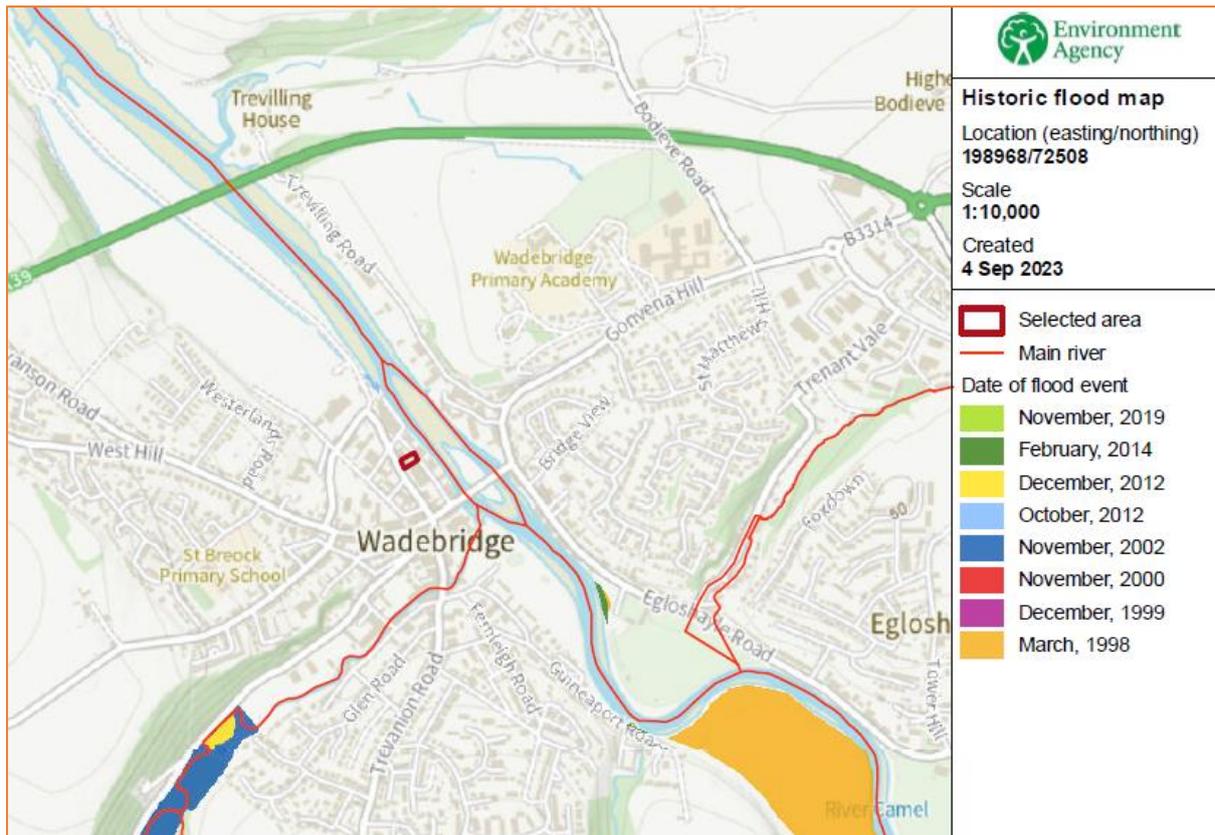


Figure 10: Environment Agency recorded flood outlines 1 (Source: EA)

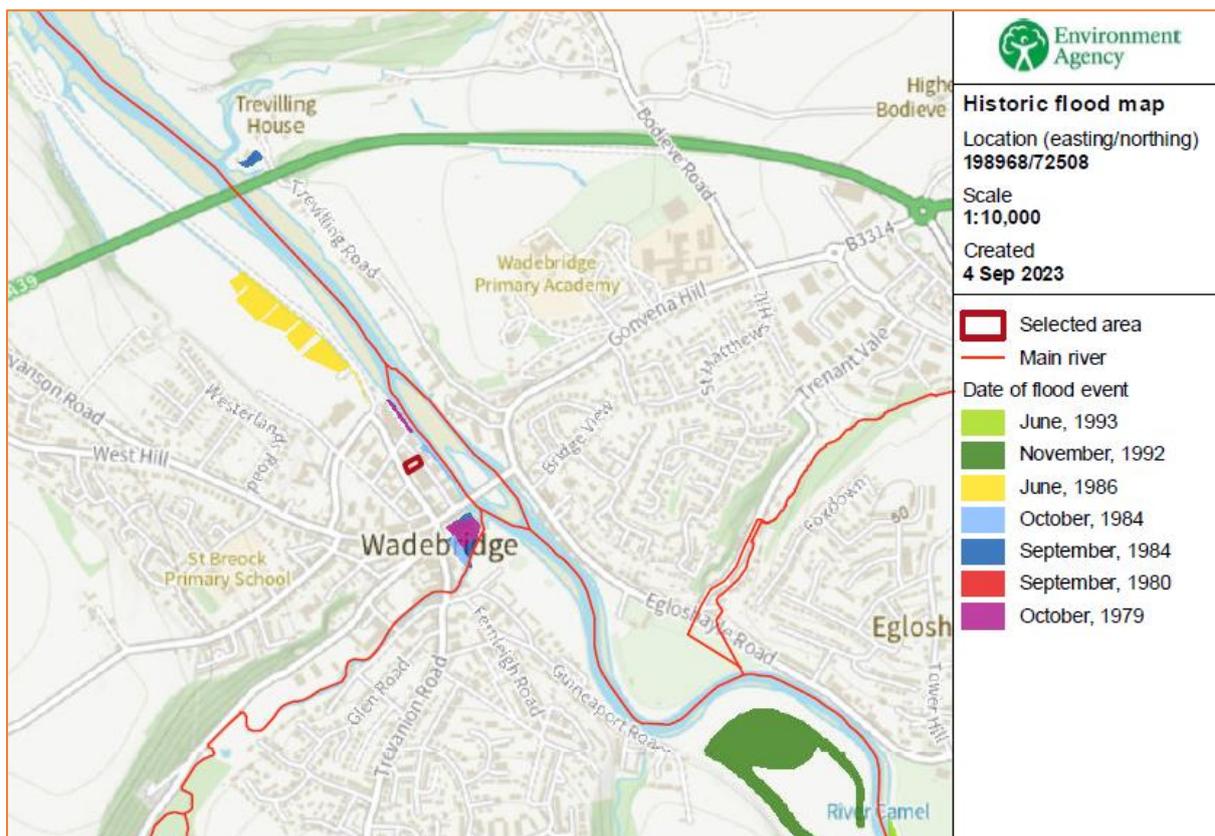


Figure 11: Environment Agency recorded flood outlines 2 (Source: EA)

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 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 in an area of "Very Low" risk of flooding from surface water, with Eddystone Road adjacent to the site to be within an area of "Low" to "High" risk of flooding from surface water.

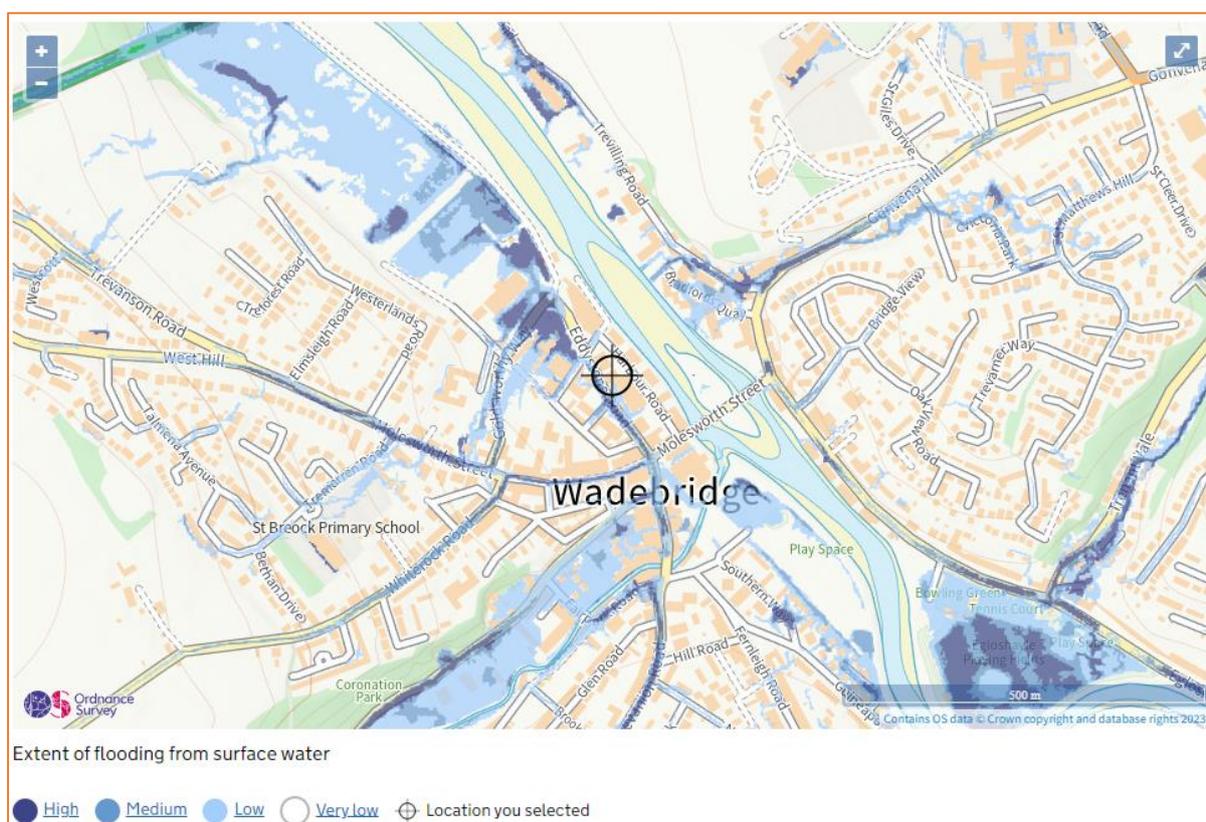


Figure 12: Extract from Environment Agency Surface Water Flood Map (Source: EA)

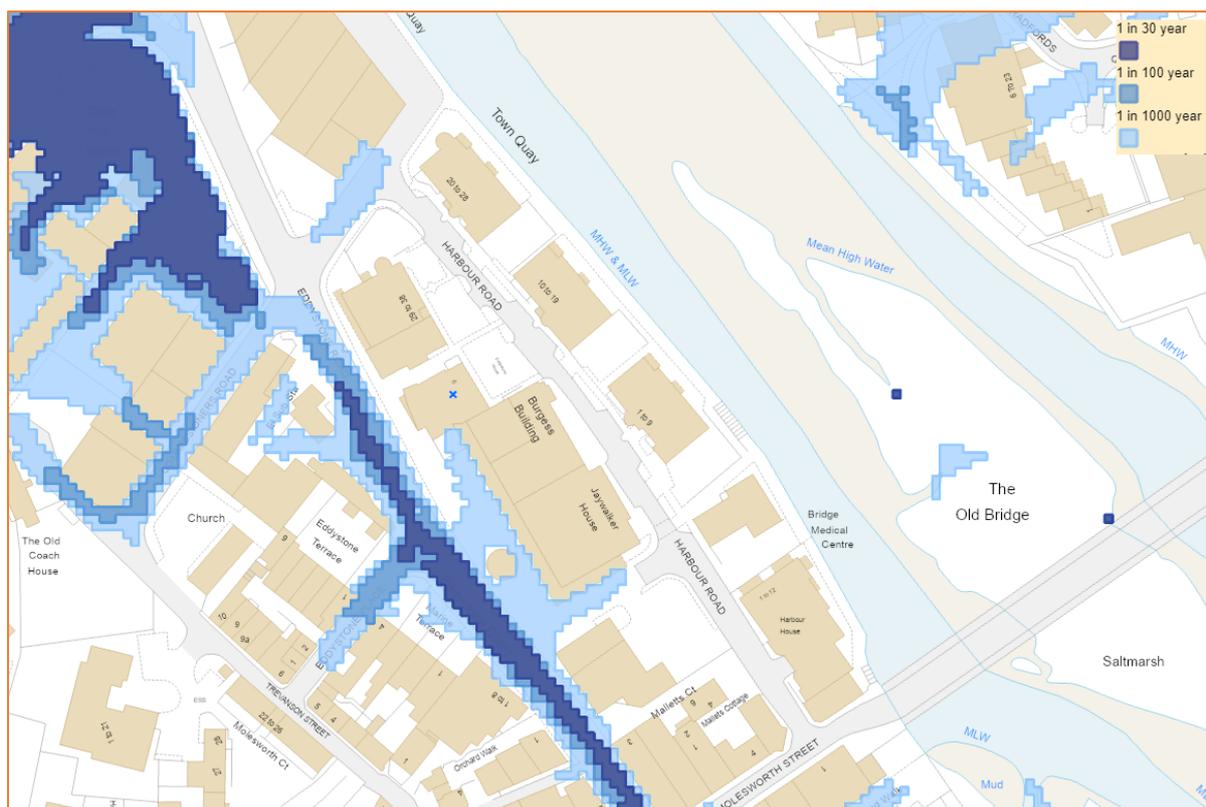


Figure 13: Extract from Cornwall Council Surface Water Flood Map (Source: Cornwall Council online SFRA)

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.

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

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 has flooded from sewer surcharge flooding previously.

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 within the "Maximum extent of flooding" from reservoir failure when there is also flooding from rivers. 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.

There do not appear to be any further artificial (man-made) sources of flood risk (such as raised canals) in the immediate vicinity of the site.



Figure 14: Extract from Environment Agency Risk of Flooding from Reservoirs Map (Source: EA)

Flood Risk Management

Vulnerability to flooding:

The NPPF classifies property usage by vulnerability to flooding.

The existing site is occupied by a building which is understood to be occupied by commercial uses, which is classified as “less vulnerable” under the NPPF. Post development, the site will become “more vulnerable” on the first and second floors, as the application is for the Change of use from commercial to residential on the first and second floors.

Based on the plans provided, there will be no change to the ground floor usage of the building.

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 annex or additional commercial unit.

The proposal includes the introduction of 5 additional residential flats.

Physical Design Measures:

The NPPF requires new residential floor levels to be set at least 300mm above the suitable modelled 1:100 with allowance for climate change modelled flood level.

The proposal however is for the change of use of the existing first and second floors of the existing building. No residential uses will therefore be located at ground floor level, and as such all residential uses will be above the potential maximum flood depth of 1.63m for the 1:200yr plus Higher Central and 1.75m for the 1:200yr plus Upper End climate change allowances.

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.

Environment Agency 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.

As such, the following measures are recommended:

- Closed-cell foam used in wall cavities;
- Exterior ventilation outlets, utility points and air bricks fitted with removable waterproof covers;
- 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 residential external doors replaced with flood proof doors.

It is recommended that self-closing air bricks and demountable flood defence barriers to defend ground level doorways and low windows up to 600mm above finished ground floor level are installed if flood doors are not practical or other planning constraints prevent it.

Flood resistance measures (such as demountable flood barriers) are recommended to a maximum height of 600mm above ground level, as depths over 600mm can cause structural problems.

Safe Escape:

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 proposed development consists of Change of use from commercial to residential on the first and second floors.

The flood depths along the adjacent roads and across the wider area are too deep to provide safe escape during the climate change 1:200 year event as per the definitions within the NPPF

As such, safe escape will therefore be provided by a formal flood warning and evacuation plan, which will be prepared in liaison with the Emergency Planners and tied in with the existing Emergency Plans for the area.

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

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 the ~North Cornwall Coast from Chapel Porth to The Rumps excluding the tidal River Camel Environment Agency Flood Warning Area. The EA issue flood warnings to specific areas when flooding is expected. It is recommended that the applicant registers online with the free Environment Agency Floodline Warnings Direct service at <https://fwd.environment-agency.gov.uk/app/olr/register> to receive flood warnings by phone, text or email.

The applicant has agreed to subscribe to the EA's flood warning service.

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 5: Flood Warnings

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:

- 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.

Off-Site Impacts:

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 3a when using the Environment Agency Flood Map for Planning (Rivers and Sea), and the application is for the Change of use from commercial to residential on the first and second floors.

The proposal is for the change of use of the first and second floor of the existing building, and the site lies within an area which is predominantly tidally influenced.

As such, there will be no unacceptable loss of flood storage post development.

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 situated within Flood Zone 3 when using the Environment Agency Flood Map for Planning (Rivers and Sea), and within an area of very low risk of flooding from surface water.

Post development, the first and second floors of the building will become “more vulnerable” (residential) throughout, and there will be an increase in the number of residential units on site.

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 6: Flood risk vulnerability and flood zone ‘compatibility’

The Sequential and Exception Tests do not need to be applied to minor developments and changes of use (this application is for the change of use of the first and second floor of the existing building).

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 nature and scale of the development (proposed change of use of the first and second floor of an existing building), a full Surface Water Drainage Strategy is not required at this stage of planning.

Conclusions

Unda Consulting Limited have been appointed by Eddystone SIPP (hereinafter referred to as “the applicant”) to undertake a Flood Risk Assessment for the proposed development at Eddystone House, Eddystone Road, Wadebridge, PL27 7AL (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 existing site is occupied by a building which is understood to be occupied by commercial uses, which is classified as “less vulnerable” under the NPPF. Post development, the site will become “more vulnerable” on the first and second floors, as the application is for the Change of use from commercial to residential on the first and second floors.

Based on the plans provided, there will be no change to the ground floor usage of the building.

The site is located within Flood Zone 3 (High Probability), which means it is defined as land having at least a 1 in 200 annual probability of tidal flooding or 1 in 100 annual probability of fluvial flooding.

The risk would appear to be predominantly tidal, and originate from the River Camel which is tidally influenced in this reach, with potential fluvial risk from the Polmorla Brook.

Cornwall Council have also produced Flood Zone mapping as part of their SFRA. The site is shown to be within Flood Zone 3a, and entirely outside of Flood Zone 3b.

The EA has provided Data from the Coastal Flood Boundary Study 2018.

The site is located within Flood Zone 3, and is classified as “more vulnerable”. The Flood Risk Assessments: climate change allowances guidance – updated May 2022, states for flood risk assessments both the higher central and upper end allowances should be assessed.

The design flood levels for planning are the 1:200 year with Higher Central, and Upper End climate change. The 1:200 year flood levels are 6.31mAOD and 6.70mAOD respectively. Comparison of these flood levels with topographic site levels (4.68mAOD to 4.75mAOD) shows that the site is below the coastal flood levels, with a potential maximum flood depth of 1.63m for the 1:200yr plus Higher Central and 1.75m for the 1:200yr plus Upper End climate change allowances.

No detailed flood modelling has been provided by the EA for the Polmorla Brook.

Flood levels have been provided from JFLOW, which is national generalised modelling, which is not based on a specific channel survey. Neither water depths nor water levels were specified as outputs from JFLOW when it was commissioned. Whilst the modelling process does provide some information on depth of water, the EA has confirmed that this type of modelling was developed, tested and reviewed for production of the Flood Zone extents only, we have no information on the accuracy of the water depth data.

The maximum 1:100 year and 1:1000 year JFLOW flood levels for the in-channel upstream node closest to the site (node reference 1617) are 4.19mAOD and 4.51mAOD respectively. Comparison of these JFLOW flood levels with topographic site levels (4.68mAOD to 4.75mAOD) shows that the site is entirely above these flood levels.

The site is located within Flood Zone 3, and is classified as “more vulnerable”. The Flood Risk Assessments: climate change allowances guidance – updated May 2022, states for flood risk assessments the central peak river flow allowance should be assessed. The site falls within the North Cornwall, Seaton, Looe and Fowey Management Catchment, where the Central allowance for the 2080’s is a 36% increase in flows.

No detailed modelling has been undertaken for the Polmorla Brook, and as such no modelled flows are available so a 36% increase in flows cannot be estimated. The Cornwall Council SFRA states that in fluvial flood risk areas it is considered that Flood Zone 2 gives a reasonable representation of a climate change Flood Zone for fluvial zone 3.

As such, the 1:100 year flood level with allowance for climate change is therefore 4.51mAOD. Comparison of this derived flood level with topographic site levels (4.68mAOD to 4.75mAOD) shows that the site is entirely above this level.

EA records indicate that flooding occurred in Wadebridge in 1979, 1980, 1984, 1986, 1992, 1993, 1998, 1999, 2000, 2002, 2012, 2014 and 2019.

The site is shown to be entirely outside of all these historic flood extents.

The EA Risk of Flooding from Surface Water Map suggests that the site lies in an area of "Very Low" risk of flooding from surface water, with Eddystone Road adjacent to the site to be within an area of "Low" to "High" risk of flooding from surface water.

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

Safe escape will be provided by a formal flood warning and evacuation plan which will be prepared in liaison with the Council's Emergency Planners and be tied in with the existing emergency plans for the area.

The proposal is for the change of use of the existing first and second floors of the existing building. No residential uses will therefore be located at ground floor level, and as such all residential uses will be above the potential maximum flood depth of 1.63m for the 1:200yr plus Higher Central and 1.75m for the 1:200yr plus Upper End climate change allowances.

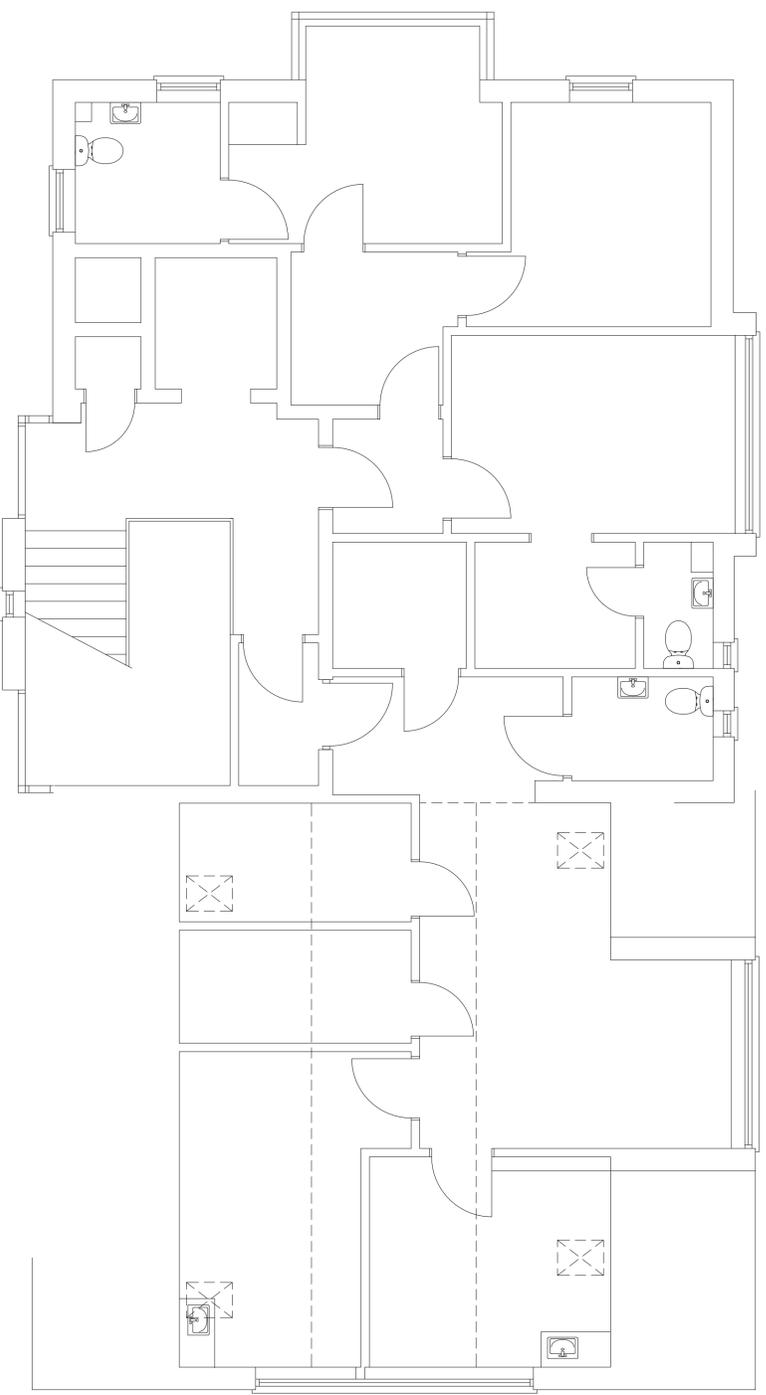
The applicant has confirmed that:

- The application is for the Change of use from commercial to residential on the first and second floors.
- The proposal is for the change of use of the existing first and second floors of the existing building. No residential uses will therefore be located at ground floor level, and as such all residential uses will be above the potential maximum coastal 1:200 year flood levels with allowance for climate change.
- Flood proofing of the development will be incorporated as appropriate.
- Safe escape will be provided by a formal flood warning and evacuation plan which will be prepared in liaison with the Council's Emergency Planners and tied in with the existing emergency plans for the area.
- The applicant will register with the free Environment Agency Floodline Warnings Direct service.

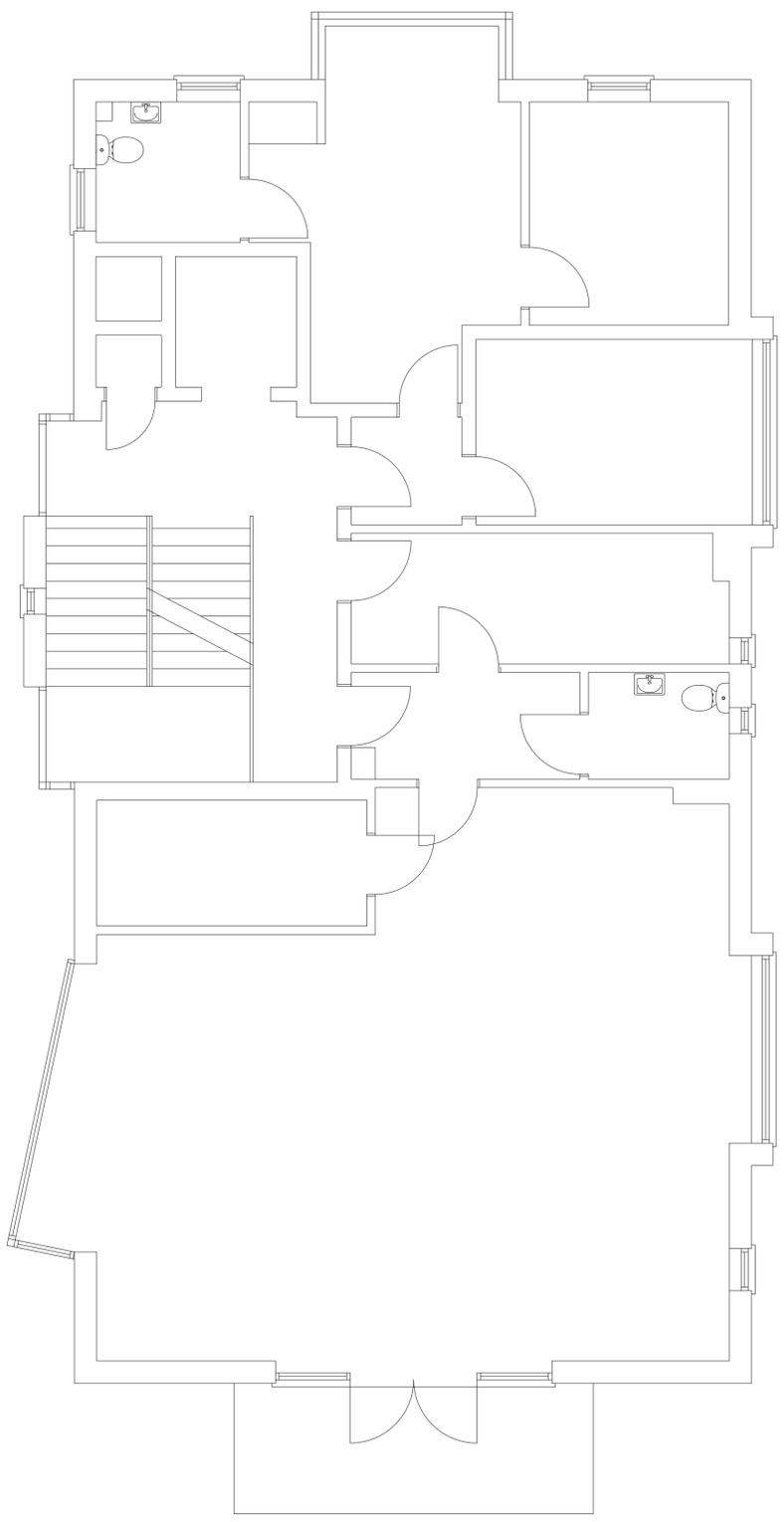
The proposed drainage arrangements will provide betterment over the existing. Assuming accordance with these flood risk management measures, Unda Consulting Limited consider the proposed application to be suitable in flood risk terms.

Appendix

- Existing and proposed plans.
- Environment Agency Product 4 data.



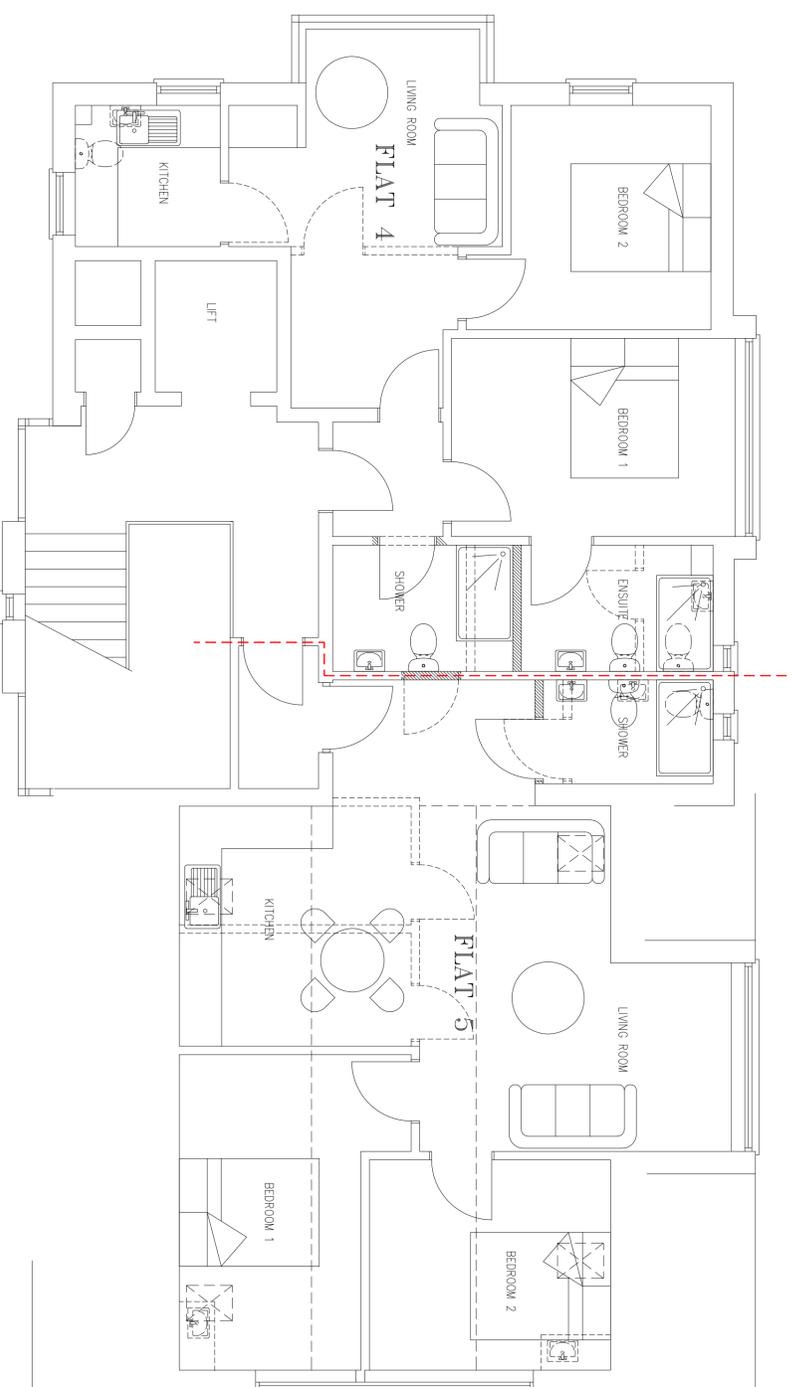
SECOND FLOOR PLAN 1:50



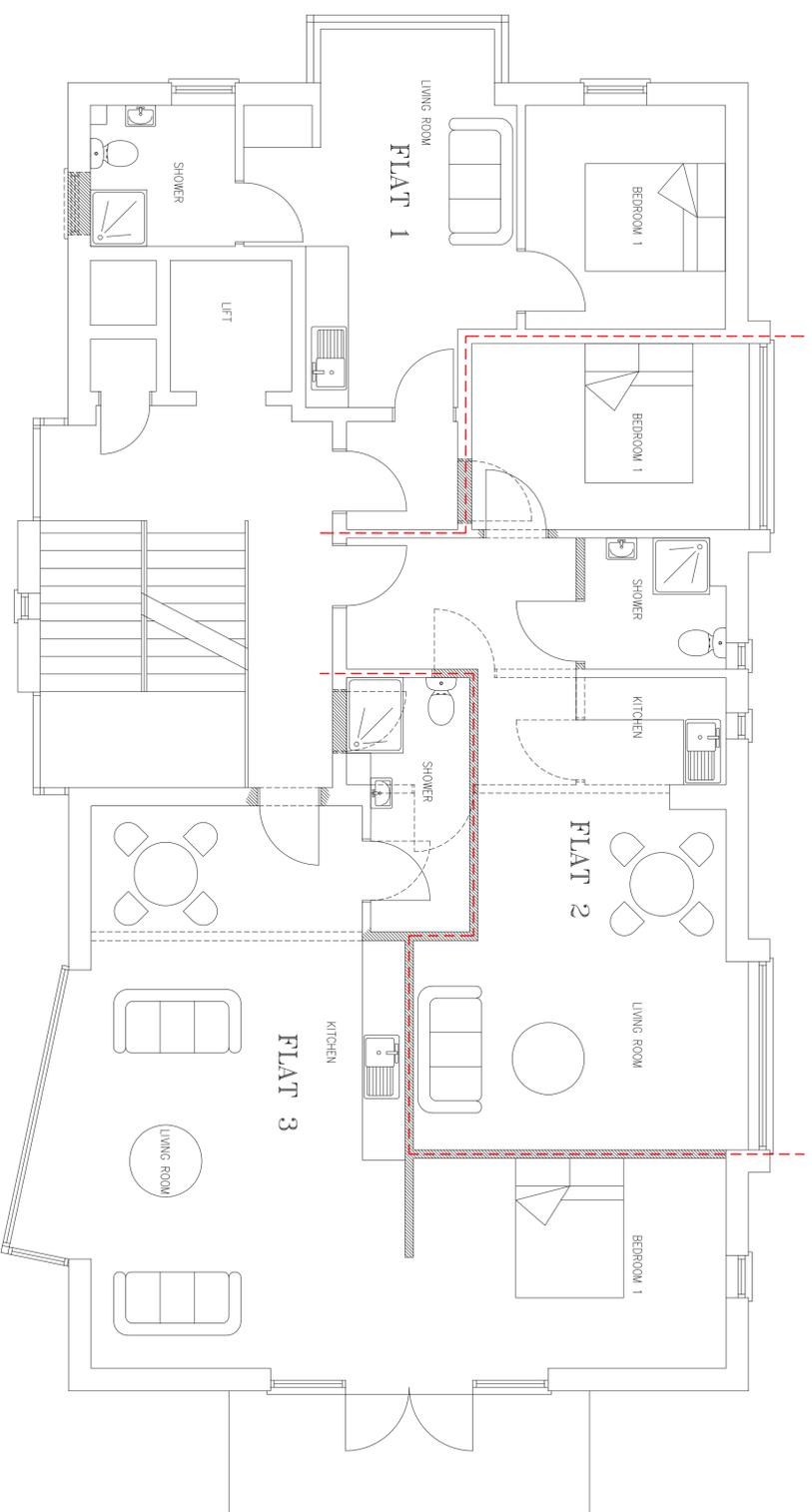
FIRST FLOOR PLAN 1:50



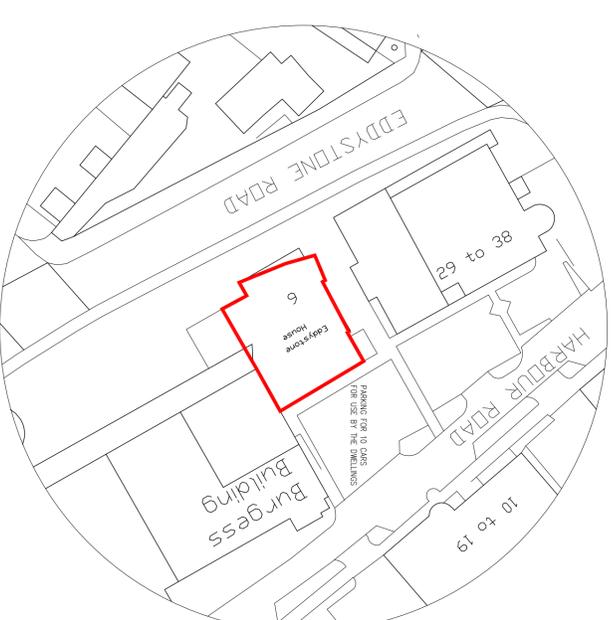
SURVEY
 TOWN QUAY, EDDYSTONE ROAD
 WADEBRIDGE, CORNWALL, PL27 7AL
 FOR EDDYSTONE GROUP SIPP
 2496/1
 1:50@A1



SECOND FLOOR PLAN 1:50



FIRST FLOOR PLAN 1:50



BLOCK PLAN 1:500

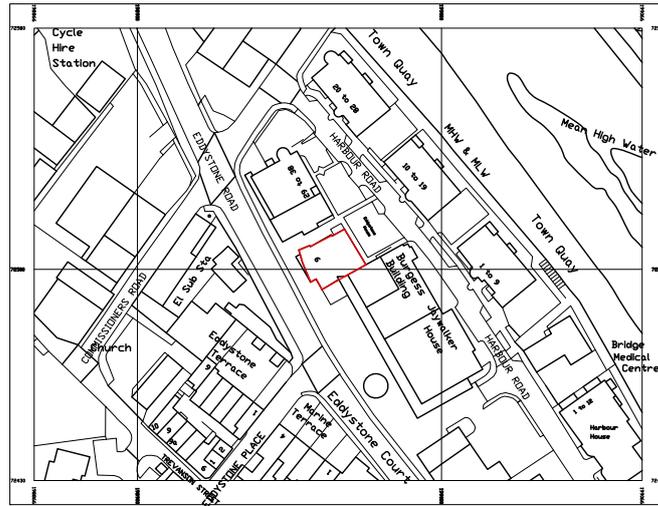


SCALE 1:50

SCHEME
TOWN QUAY, EDDYSTONE ROAD
WADEBRIDGE, CORNWALL, PL27 7AL
FOR EDDYSTONE GROUP SIPP

2496/2

1:50@A1



LOCATION PLAN 1:2500



SCHEME
TOWN QUAY, EDDYSTONE ROAD
WADEBRIDGE, CORNWALL, PL27 7AL
FOR EDDYSTONE GROUP SIPP

Flood risk assessment data

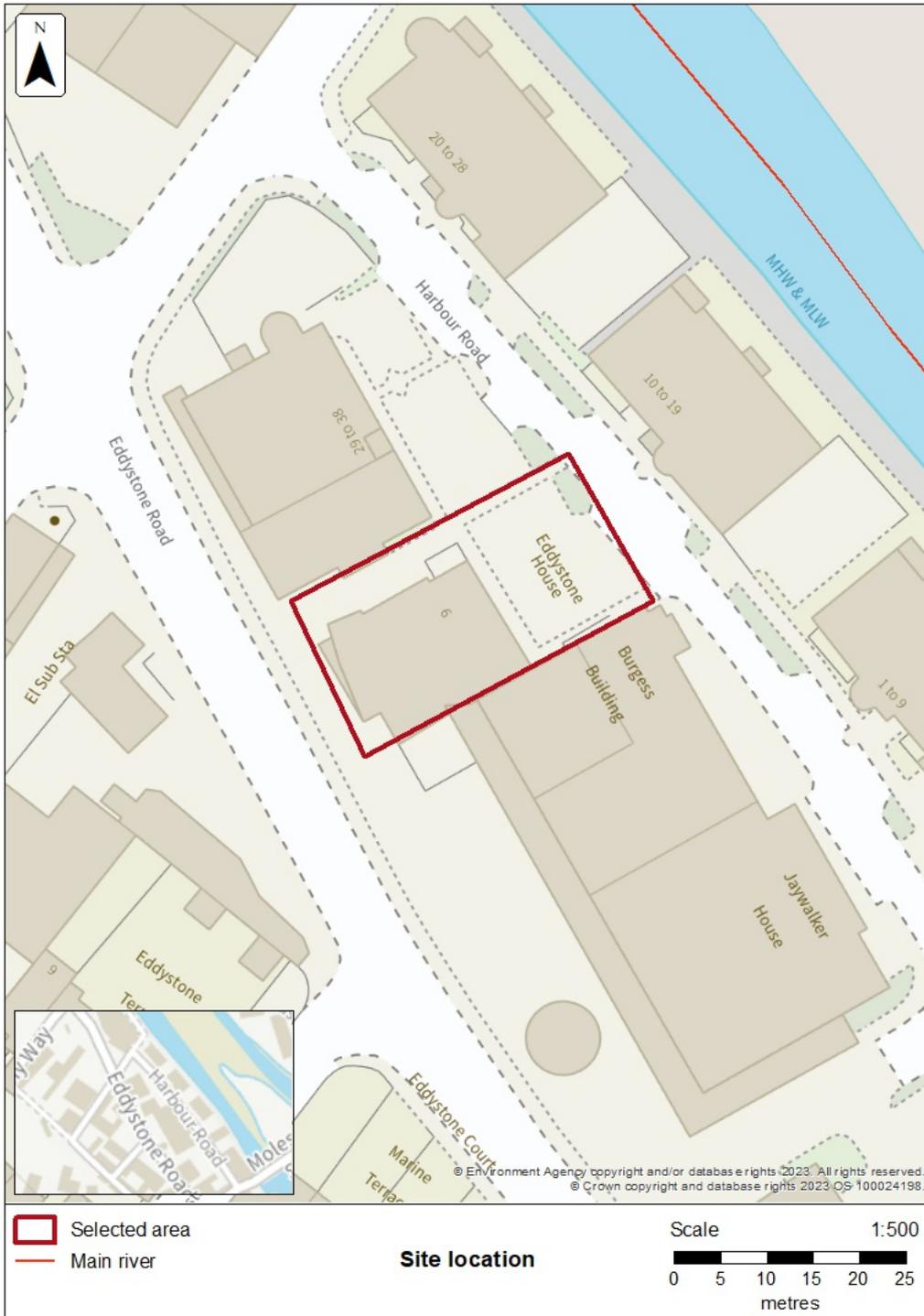
Location of site: 198968 / 72508 (shown as easting and northing coordinates)

Document created on: 4 September 2023

This information was previously known as a product 4.

Customer reference number: U6Y7JF6AAYPX

Map showing the location that flood risk assessment data has been requested for.



Flood map for planning (rivers and the sea)

Your selected location is in flood zone 3.

Flood zone 3 shows the area at risk of flooding for an undefended flood event with a:

- 0.5% or greater probability of occurring in any year for flooding from the sea
- 1% or greater probability of occurring in any year for fluvial (river) flooding

Flood zone 2 shows the area at risk of flooding for an undefended flood event with:

- between a 0.1% and 0.5% probability of occurring in any year for flooding from the sea
- between a 0.1% and 1% probability of occurring in any year for fluvial (river) flooding

It's important to remember that the flood zones on this map:

- refer to the land at risk of flooding and do not refer to individual properties
- refer to the probability of river and sea flooding, ignoring the presence of defences
- do not take into account potential impacts of climate change

This data is updated on a quarterly basis as better data becomes available.



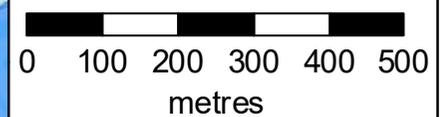
Flood map for planning

Location (easting/northing)
198968/72508

Scale
1:10,000

Created
4 Sep 2023

-  Selected area
-  Main river
-  Flood defence
-  Flood zone 3
-  Flood zone 2



Historic Information

The map below is an indicative outline of areas that have previously flooded.

Historic outlines may not be visible where they overlap. You can download the outlines separately via the link below.

[Download recorded flood outlines in GIS format](#)

Our historic flood event outlines:

- are an indication of the geographical extent of an observed flood event. We map flooding to land, not individual properties.
- not give any indication of flood levels for individual properties. They also do not imply that any property within the outline has flooded internally.
- are based on a combination of anecdotal evidence, Environment Agency staff observations and survey.
- do not provide a definitive record of flooding.

It is possible that there will be an absence of data in places where we have not been able to record the extent of flooding. It is also possible for errors to occur in the digitisation of historic records of flooding.

Remember that: other flooding may have occurred that we do not have records for

Please note that our records are not comprehensive. We would therefore advise that you make further enquiries locally with specific reference to flooding at this location. You should consider contacting the relevant Local Planning Authority and/or water/sewerage undertaker for the area.



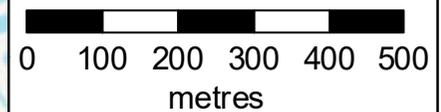
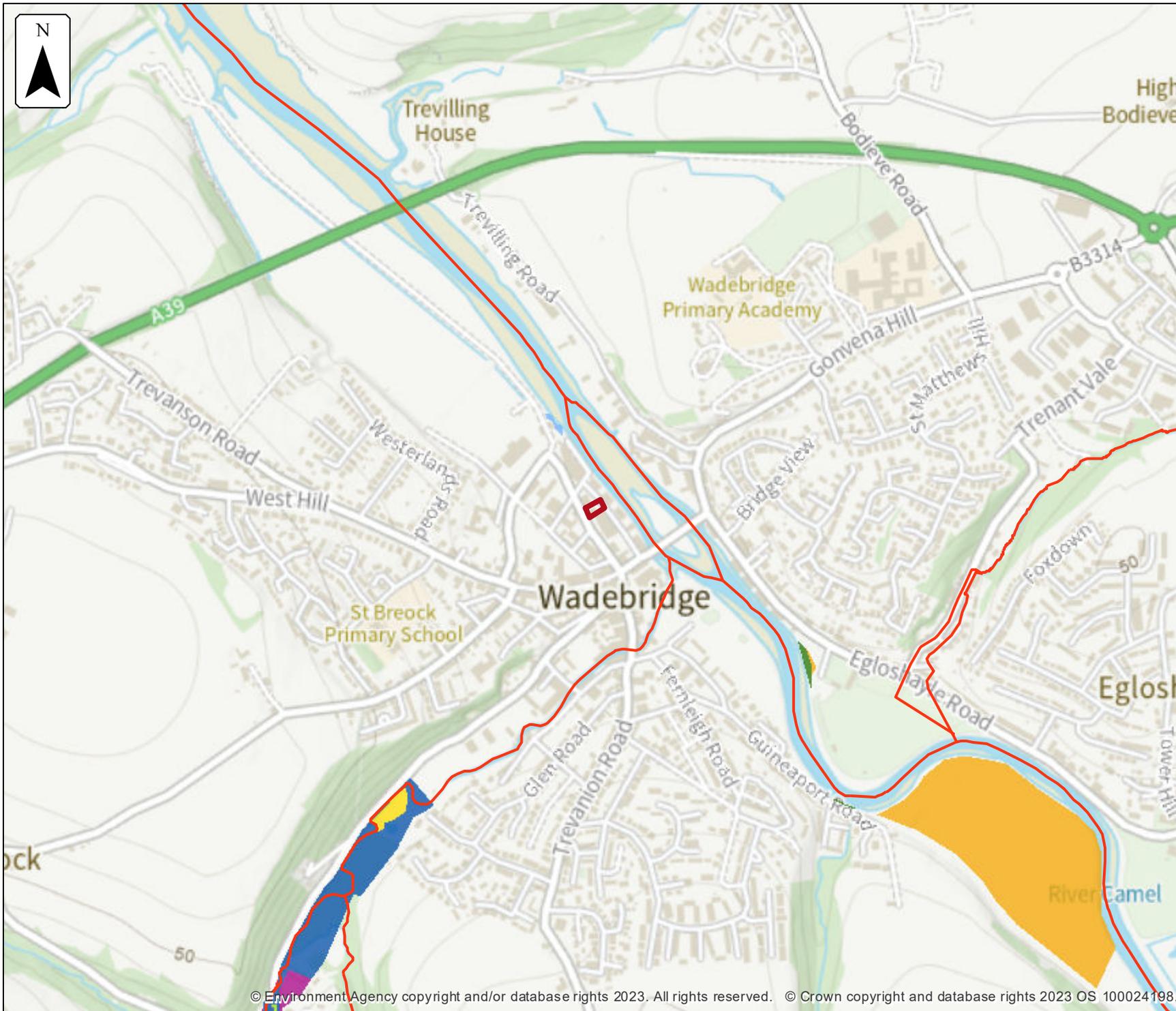
Historic flood map

Location (easting/northing)
198968/72508

Scale
1:10,000

Created
4 Sep 2023

-  Selected area
-  Main river
- Date of flood event
-  November, 2019
-  February, 2014
-  December, 2012
-  October, 2012
-  November, 2002
-  November, 2000
-  December, 1999
-  March, 1998





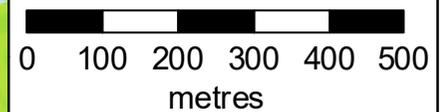
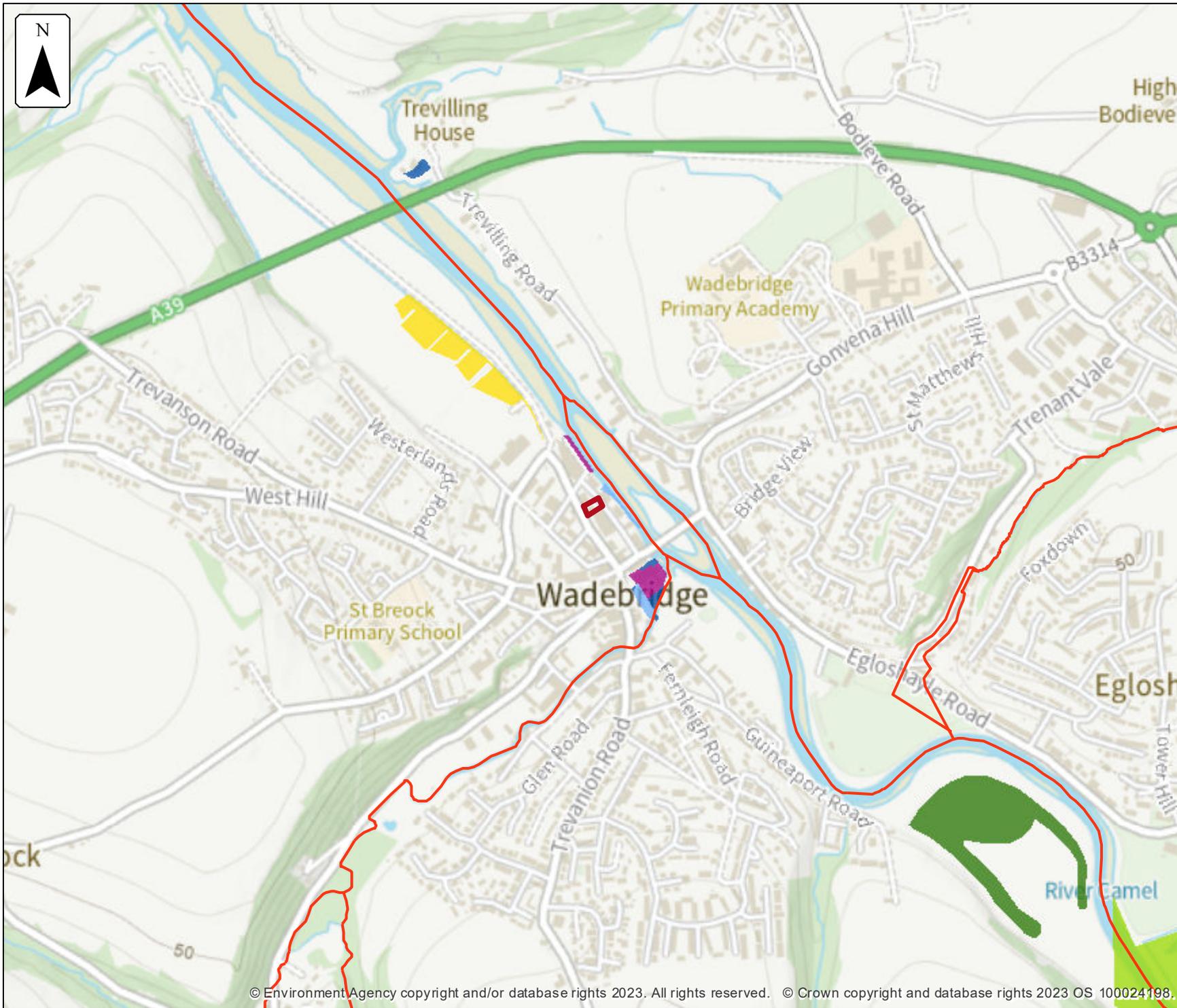
Historic flood map

Location (easting/northing)
198968/72508

Scale
1:10,000

Created
4 Sep 2023

-  Selected area
-  Main river
- Date of flood event**
-  June, 1993
-  November, 1992
-  June, 1986
-  October, 1984
-  September, 1984
-  September, 1980
-  October, 1979



Flood defences and attributes

The flood defences map shows the location of the flood defences present.

The flood defences data table shows the type of defences, their condition and the standard of protection. It shows the height above sea level of the top of the flood defence (crest level). The height is in mAOD which is the metres above the mean sea level at Newlyn, Cornwall.

It's important to remember that flood defence data may not be updated on a regular basis. The information here is based on the best available data.

Use this information:

- to help you assess if there is a reduced flood risk for this location because of defences
- with any information in the modelled data section to find out the impact of defences on flood risk



Flood defences

Location (easting/northing)
198968/72508

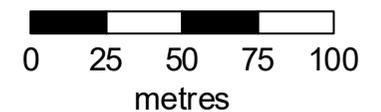
Scale
1:2,500

Created
4 Sep 2023

-  Selected area
-  Main river
-  Flood defence



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Flood defences data

Label	Asset ID	Asset Type	Current condition	Downstream actual crest level (mAOD)	Upstream actual crest level (mAOD)	Effective crest level (mAOD)
1	170698	Embankment	Good	5.33	5.47	
2	6261	Wall	Good	5.19	5.32	
3	6329	Wall	Good	5.30	5.19	
4	7036	Embankment	Fair	5.37	5.25	
5	170699	Wall	Poor	5.25	5.20	
6	15800	Wall	Good	5.19	5.25	
7	330197	Flood Gate	Fair	5.30	5.30	
8	6916	Wall	Good	5.32	5.32	
9	55077	Wall		5.21	5.26	
10	56450	Embankment	Fair	5.42	4.55	
11	6567	Wall	Good	5.30	5.42	
12	6867	Embankment	Good	5.31	5.19	
13	6868	Embankment	Good	5.19	5.11	
14	58649	Embankment	Good	5.11	5.17	

Any blank cells show where a particular value has not been recorded for an asset.

Modelled data

About the models used

Model name: JFLOW

Date: 2007

This model contains the most relevant data for your area of interest.

You will need to consider the [latest flood risk assessment climate change allowances](#) and factor in the new allowances to demonstrate the development will be safe from flooding.

Terminology used

Annual exceedance probability (AEP)

This refers to the probability of a flood event occurring in any year. The probability is expressed as a percentage. For example, a large flood which is calculated to have a 1% chance of occurring in any one year, is described as 1% AEP.

Metres above ordnance datum (mAOD)

All flood levels are given in metres above ordnance datum which is defined as the mean sea level at Newlyn, Cornwall.

Coastal Flood Boundary Data - Tidal Levels (2018)



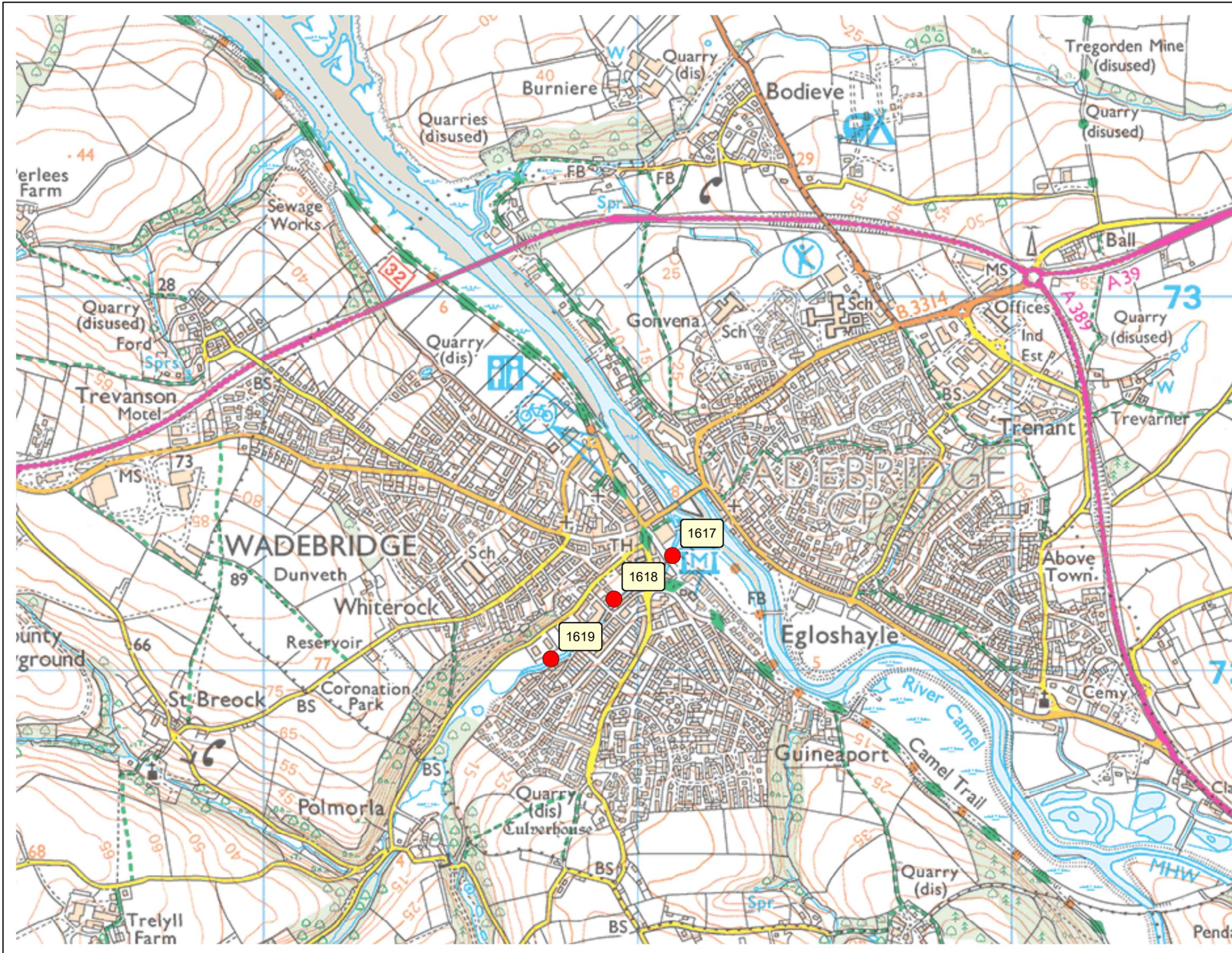
Site	Grid Ref		Tidal Still Water Level (m OD) for return period Base year is 2017					
	Easting	Northing	50% AEP 1 in 2 year	20% AEP 1 in 5 year	10% AEP 1 in 10 year	2% AEP 1 in 50 year	0.5% AEP 1 in 200 year	0.1% AEP 1 in 1000 year
Wadebridge Estuary	199113	72481	4.81	4.92	4.97	5.08	5.19	5.31
Confidence intervals (2.5%)			4.80	4.90	4.95	5.05	5.14	5.22
Confidence intervals (97.5%)			4.82	4.93	4.99	5.13	5.29	5.56

Although levels are given to 2 decimal places, practitioners should treat them as only accurate to 1 decimal place. Confidence levels are provided when conducting sensitivity testing in a study or design.

Correct as of 04 / 09 / 2023

JFLOW Model Node Location Map

Please note this map is intended only as a guide - it is not accurate at individual property level



Legend

● JFLOW Model Node Locations

Please refer to the enclosed table, for modelled water level data, and the enclosed caveat when considering modelled levels.

1:10,000 Correct as of the 4th September 2023 

Modelled JFLOW Flood levels



This data is taken from the JFLOW model. Please refer to the attached caveat when considering JFLOW modelled levels.

Jflow Study: Jflow_2007

Node Reference	Easting	Northing	Modelled Flood levels, in mAOD	
			1% AEP (1 in 100 year)	0.1% AEP (1 in 1000 year)
1617	199093	72305	4.19	4.51
1618	198936	72189	5.64	4.85
1619	198768	72029	5.29	5.42

Correct as of 04 / 09 / 2023

Strategic flood risk assessments

We recommend that you check the relevant local authority's strategic flood risk assessment (SFRA) as part of your work to prepare a site specific flood risk assessment.

This should give you information about:

- the potential impacts of climate change in this catchment
- areas defined as functional floodplain
- flooding from other sources, such as surface water, ground water and reservoirs

About this data

This data has been generated by strategic scale flood models and is not intended for use at the individual property scale. If you're intending to use this data as part of a flood risk assessment, please include an appropriate modelling tolerance as part of your assessment. The Environment Agency regularly updates its modelling. We recommend that you check the data provided is the most recent, before submitting your flood risk assessment.

Flood risk activity permits

Under the Environmental Permitting (England and Wales) Regulations 2016 some developments may require an environmental permit for flood risk activities from the Environment Agency. This includes any permanent or temporary works that are in, over, under, or nearby a designated main river or flood defence structure.

[Find out more about flood risk activity permits](#)

Help and advice

Contact the Devon Cornwall and the Isles of Scilly Environment Agency team at dcisenquiries@environment-agency.gov.uk for:

- [more information about getting a product 5, 6, 7 or 8](#)
- general help and advice about the site you're requesting data for