



Flood Risk Assessment for Planning

September 2018

Our reference:

88294-Collins-Havant

Prepared for:

Tim Collins

Location:

9 Eastern Road,
Havant
PO9 2JE



Document Issue Record

Project: Flood Risk Assessment for Planning
Client: Tim Collins
Location: 9 Eastern Road, Havant PO9 2JE
Application: Development of a single storey annex in the rear garden
Our reference: 88294-Collins-Havant
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Lead Consultant: Mr Thomas Smith
Document Check: Mr Edward Bouët
Authorisation: Mrs Emma Jeffery

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Key Facts

Flood Risk Posed:

- The majority of the site, including land where the annex is proposed to be developed, is located within Flood Zone 1, defined as land having less than a 1 in 1000 annual probability of fluvial flooding. The centre of the site is situated within a Flood Zone 2 and 3;
- The risk along Eastern Road would appear to be fluvial and originate from the Lavant Stream 90m west;
- Site defended to 1:40 year standard of protection against fluvial flooding;
- The EA Surface Water Flood Map suggests that the site is located in an area at “Low” to “High” risk of flooding from surface water;
- The risk posed by groundwater, sewer surcharge and reservoir flooding would appear to be low.

Flood Risk Management:

- The finished floor level of the proposed development will be set at least 11.03m AOD; 300mm above the 1:100 year flood level with allowance for climate change;
- So as not to displace any floodwater on site the applicant has agreed to construct the entire house using voids thereby ensuring that there is no loss of flood storage on site;
- Flood proofing will be incorporated as appropriate;
- A flood warning and evacuation plan will be implemented post development;
- 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 Tim Collins (hereinafter referred to as “the applicant”) to undertake a Site Specific Flood Risk Assessment (FRA) for Planning at 9 Eastern Road, Havant PO9 2JE (hereinafter referred to as “the site”). The FRA has been undertaken in accordance with the National Planning Policy Framework (NPPF) July 2018 and the associated technical guidance, as well as relevant Local Policies.

The site appears to be located entirely 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.

Given that the proposed application site is located within Flood Zone 3 (High Risk of flooding from rivers or the sea), and the proposal includes building works, the applicant is required to submit a FRA under the NPPF. 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.

The objectives of a FRA to support a planning application are to establish:

- 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.

Existing Situation

Site Usage:

The site is currently occupied by a single, detached residential dwelling. The residential dwelling is located in the south of the site with a 50m rear garden to the north. The wider area is largely occupied by residential housing with an unnamed watercourse situated approximately 80m west.

See report Appendix for development plans.



Figure 1: Street view of the site from Eastern Road (Source: Google Earth)

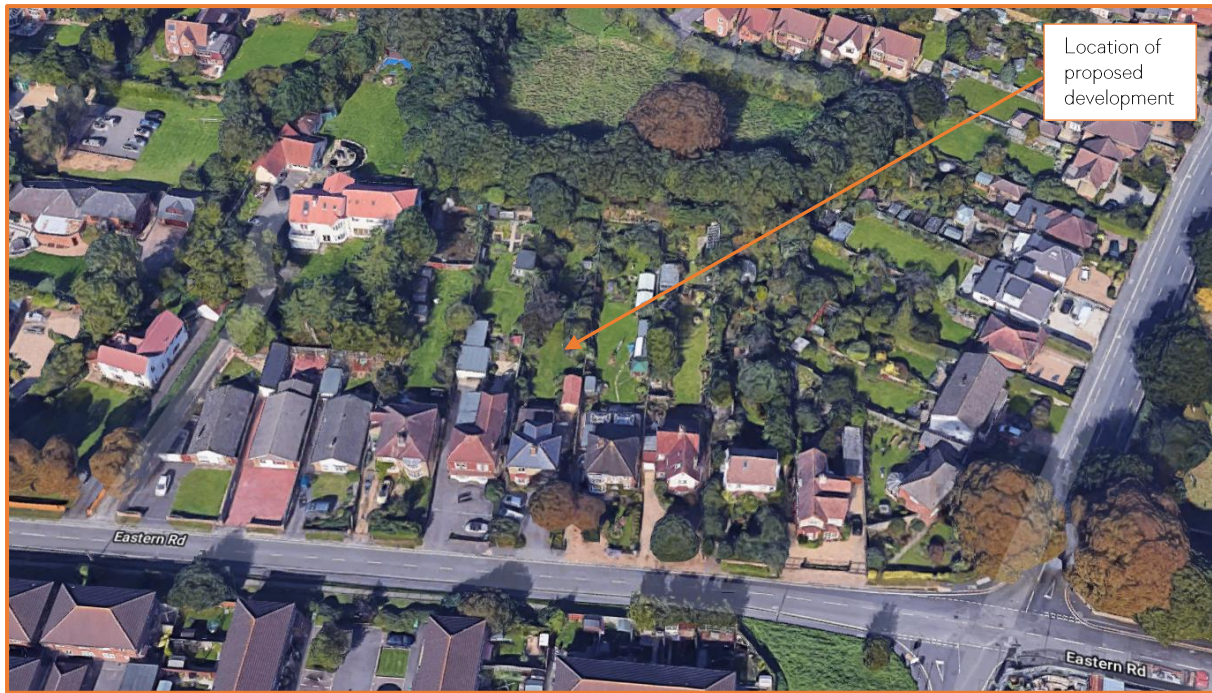


Figure 2: Aerial view of the site (Source: Google Earth)

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.

Data suggests that the ground topography on site ranges from approximately 10.35mAOD in the centre of the site to 10.70mAOD along the northern and southern boundaries.

The proposed annex will be situated on land at an elevation of approximately 10.50mAOD.

Geology and Soil:

The British Geological Survey (BGS) Map indicates that the bedrock underlying the site is London Clay Formation – Clay and Silt; laid during the Ypresian Age.

The superficial geology underlying the site comprises of Head – Clay and Gravel, deposited during the Quaternary Period.

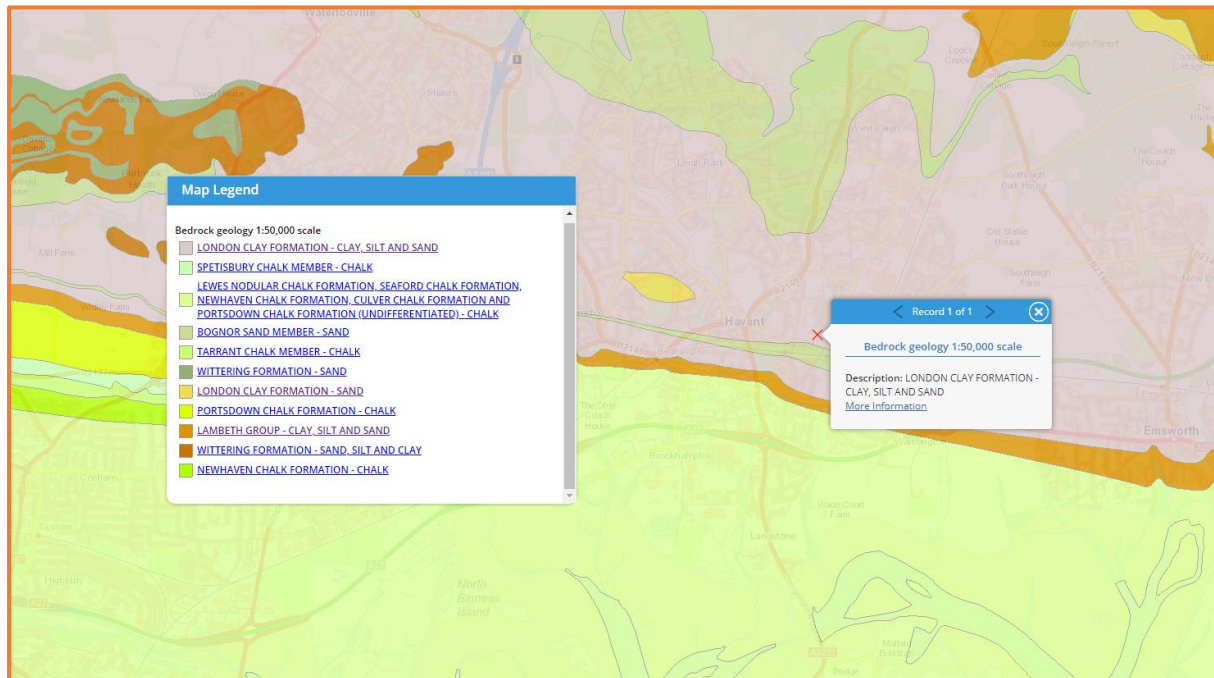


Figure 3: Local bedrock geology (Source: BGS)

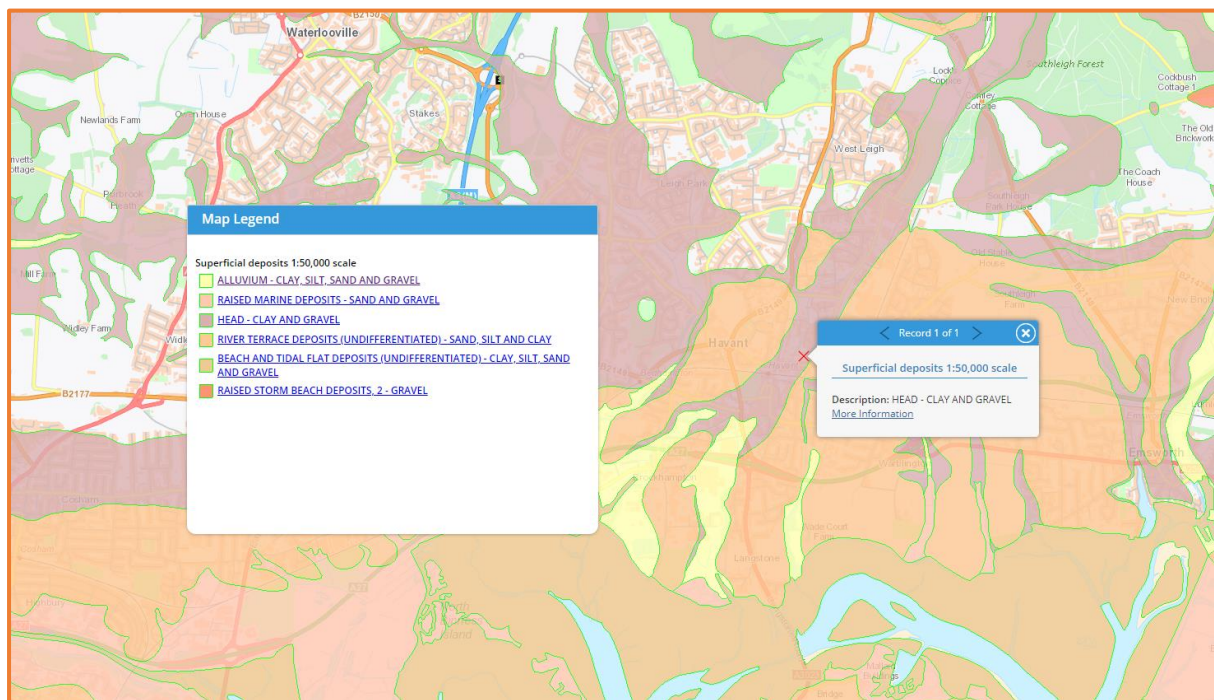


Figure 4: Local superficial geology (Source: BGS)

The soil type on site, taken from the UKSO data, is deep Colluvium parent material with a sand to sandy loam texture.

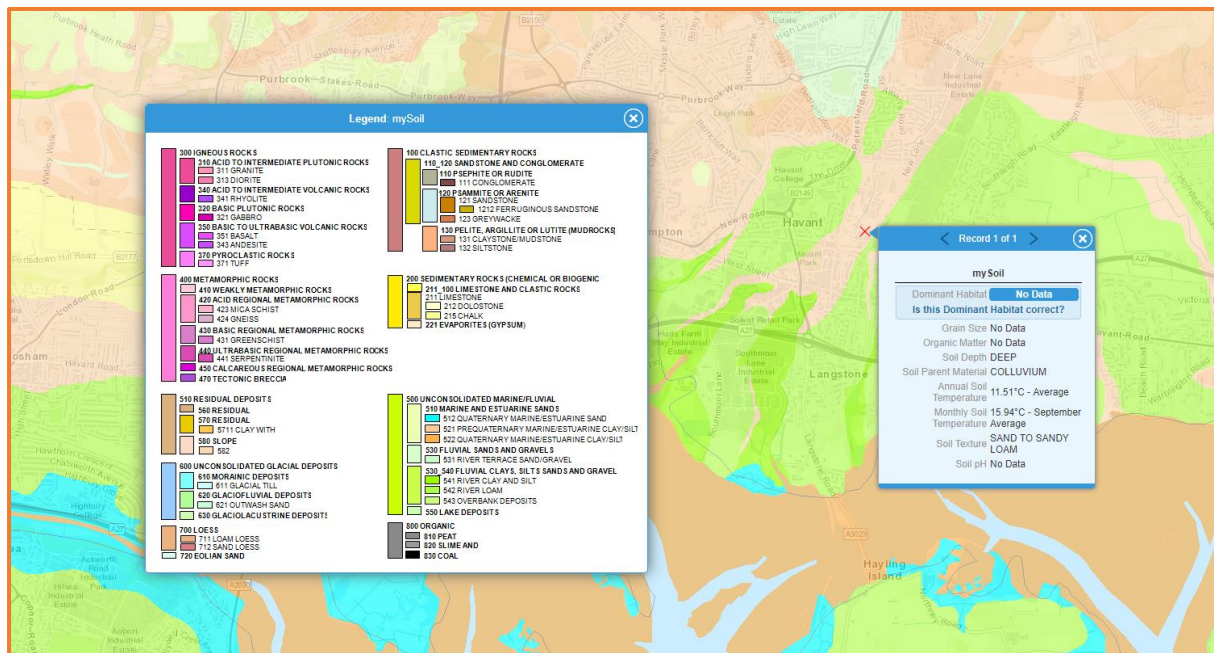


Figure 5: Local soil types (Source: UKSO)

Proposed Development

The proposed planning application is for the development of a single storey annex in the rear garden. Post development the built footprint will increase by approximately 32m².

Proposed plans are provided in the report Appendix.

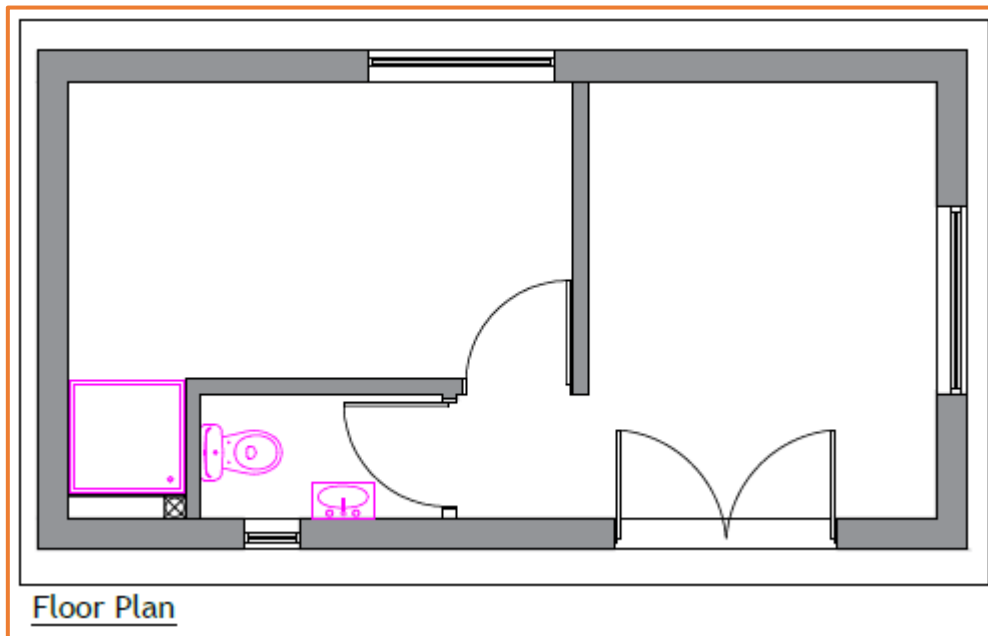


Figure 6: Proposed Annex Plan (Source: Exley Design and Planning)

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 web site.

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.

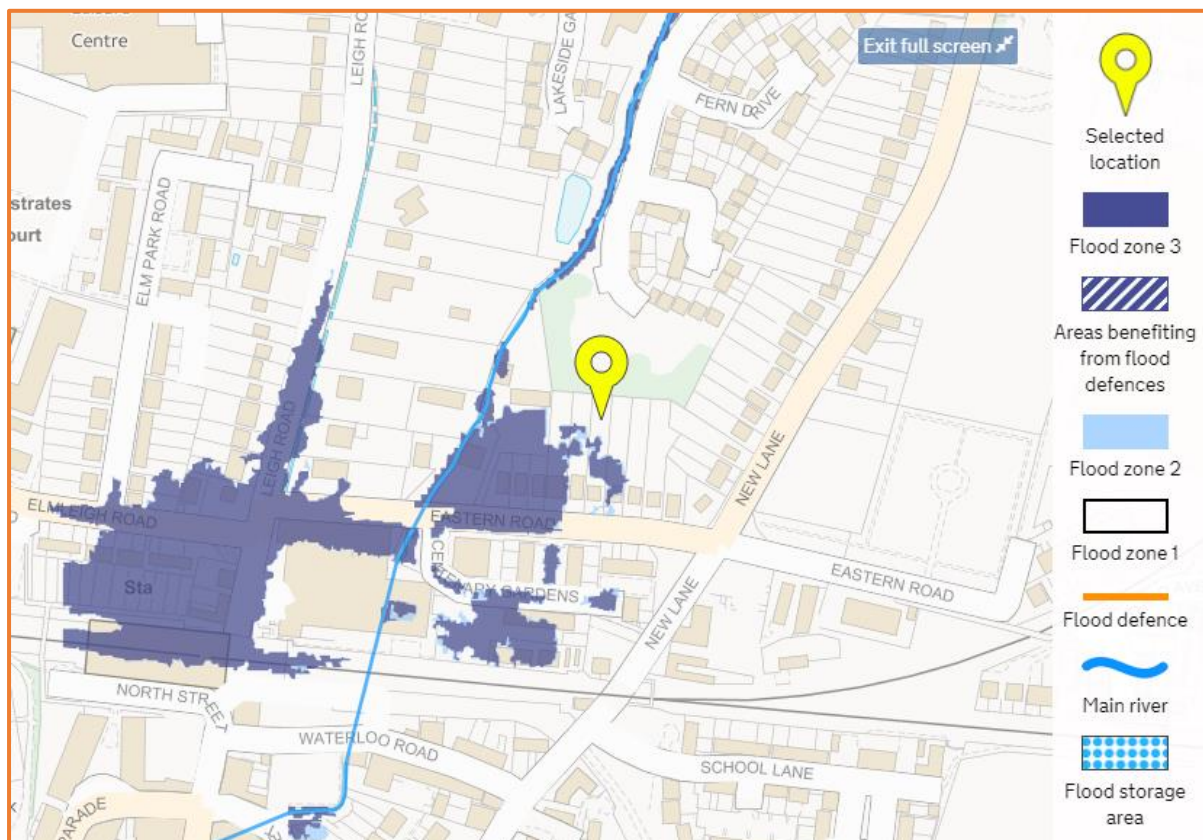


Figure 7: Environment Agency Flood Map for Planning (Rivers and Sea) (Source: EA)

The majority of the site, including land where the annex is proposed to be developed, is located within Flood Zone 1, defined as land having less than a 1 in 1000 annual probability of fluvial flooding. The centre of the site is situated within a Flood Zone 2 and 3. Flood Zone 3 is defined as land having greater than a 1 in 100 annual probability of fluvial flooding.

The risk along Eastern Road would appear to be fluvial and originate from the Lavant Stream 90m west.

Fluvial (Lavant Stream):

The Lavant Stream is a small watercourse that flows in a southerly direction through the centre of Havant, discharging into Langstone Harbour. The Lavant Stream is sourced in Chalton and has an approximately length of 6.5km. According to the Environment Agency the Lavant Stream drains a catchment area of 57km² and is classified as not designated artificial or heavily modified.

Detailed flood modelling:

Modelled flood levels and flood extents have been requested from the Hampshire and Isle of Wight area Environment Agency as part of a Product 4 data request (reference SSD/97122). The data is taken from the Havant Flood Mapping Study, completed by Atkins, in 2008.

Undefended modelled fluvial flood levels for the 1 in 100 year and 1 in 1000 year have been provided relating to in-channel nodes within the Lavant Stream. These are shown below in Figures 8 and 9 plotted within the flood model extent map.

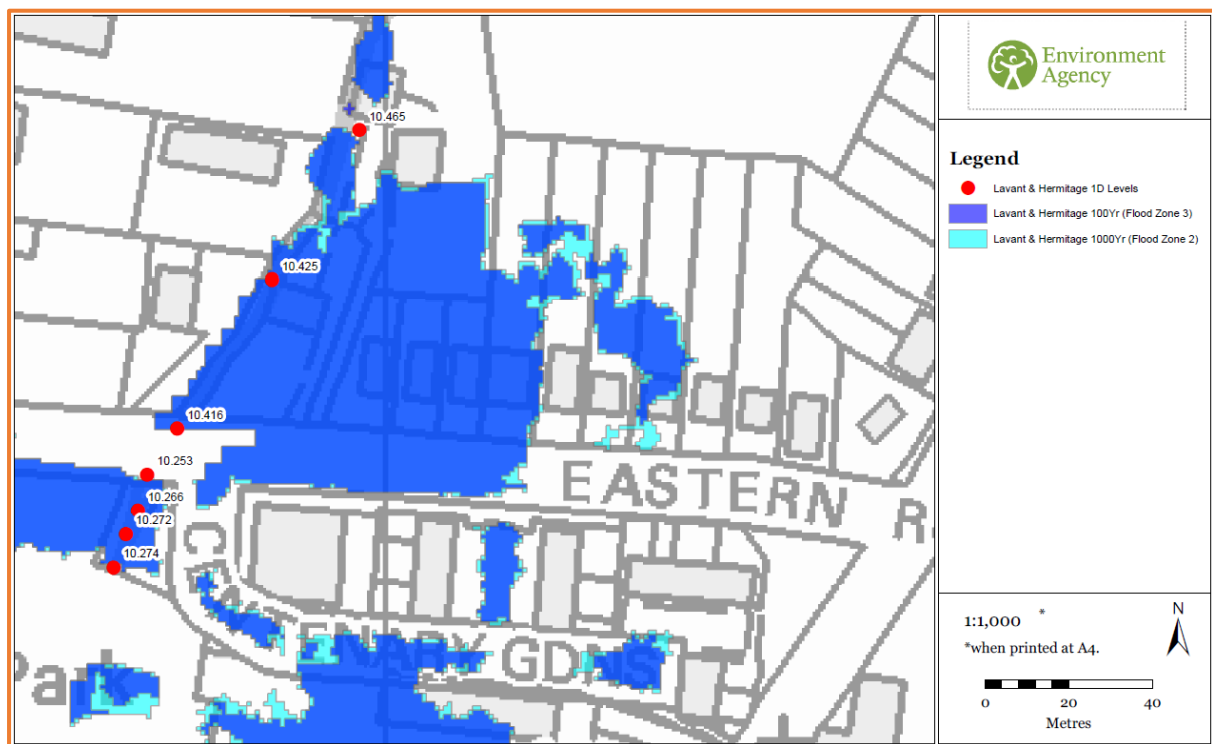


Figure 8: 1 in 100 year 1D Flood Levels from the Havant Flood Mapping Study 2008 (Source: EA)

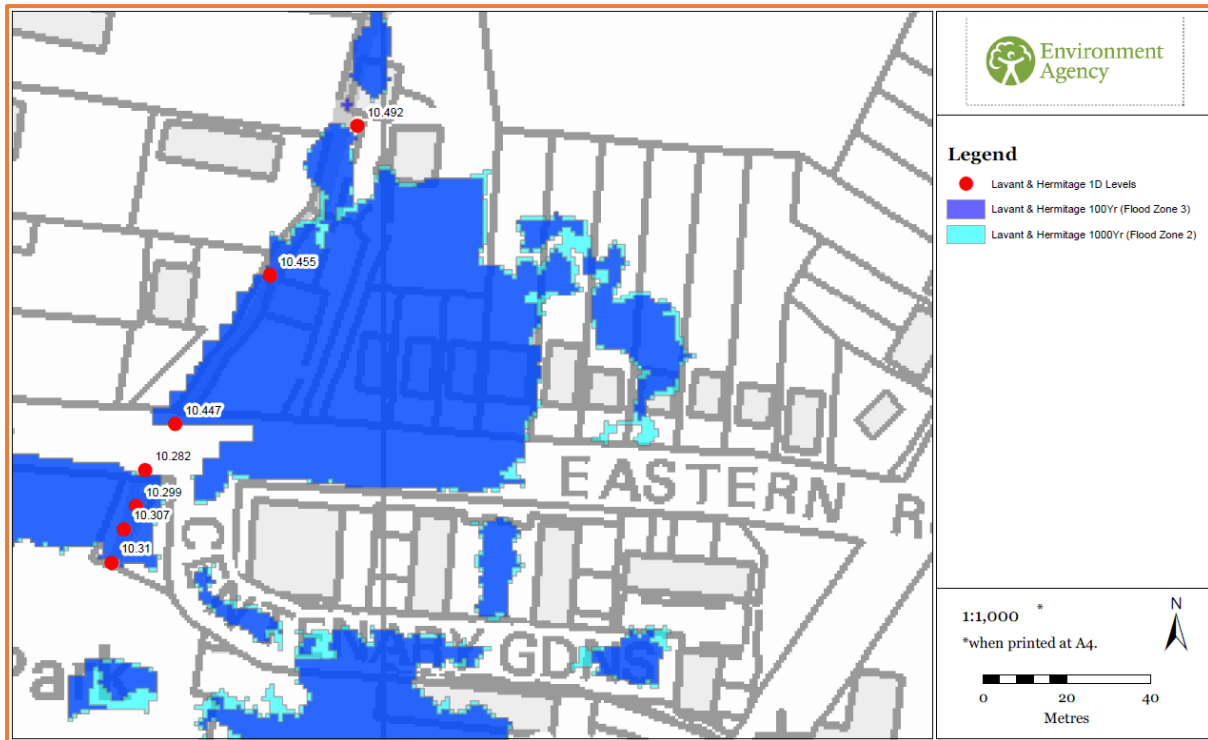


Figure 9: 1 in 1000 year 1D Flood Levels from the Havant Flood Mapping Study 2008 (Source: EA)

An in-channel node is positioned slightly upstream of the site, and is used for the purpose of this assessment. Of importance are the 1:100 year fluvial modelled level of 10.43mAOD and the 1:1000 year fluvial modelled level of 10.46mAOD.

Whilst modelling has been carried out for the site, further information is required to correctly assess the impact of climate change. As such, secondary enquiries were raised with Aimee Cox, Partnership and Strategic Overview Officer at the Environment Agency, to ascertain whether any flows are available for the Lavant Stream. A written response was received on 21st September 2018 stating that no flows are available for this watercourse.

Solent and South Downs Area have also not provided any mm allowances for climate change. Therefore, in the absence of any modelled flows or mm allowances, the most appropriate level for use within the assessment is the 1 in 100 year fluvial level of 10.43mAOD with an addition of 300mm to accommodate for climate change.

Accordingly, the 1:100 year plus allowance for climate change (+300mm) flood level is 10.73mAOD.

Details of the Product 4 data are provided in the report Appendix.

Flood defences:

The Environment Agency have confirmed that the site is protected by high ground designed to a 40 year standard of protection. This defence is privately maintained therefore the Environment Agency are unaware of the maintenance schedule.

The performance of a flood defence asset is recorded as the condition of the asset. EA asset inspectors subjectively assess the conditions of assets (during visual inspection site visits) with reference to a national standard template. Each asset is given a rating between one and five with one being very good condition and five being very poor. A condition rating of 3, or 'fair' is the minimal acceptable standard for a critical asset, such as a defence wall that protects properties. The EA are striving to improve all assets below 'fair' to an acceptable standard. All flood defence assets within the vicinity of the site have been assigned a condition rating of 3.

Asset inspections are undertaken on average every six months, although some critical assets are assessed on a more regular basis. It is possible that adjacent assets are inspected on different dates, which may result in two

assets of a similar state of repair having different condition ratings. It is unclear when both assets were last inspected.

Condition ratings of assets may also be affected by the time of year the surveys are conducted, as vegetation may obscure the asset in the summer months, or accessibility may be an issue during winter months. These factors would not usually affect the recorded condition rating of an asset unless the asset is on a borderline between two ratings.

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.

Historical flood events:

The Environment Agency confirm that they are aware of the area historically flooded in 1995, 2005 and 2013, but have no specific details.

Despite this there is no information to suggest that the site itself has ever been impacted by flooding.

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 and 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 Surface Water Flood Map suggests that the site is located in an area at "Low" to "High" risk of flooding from surface water.

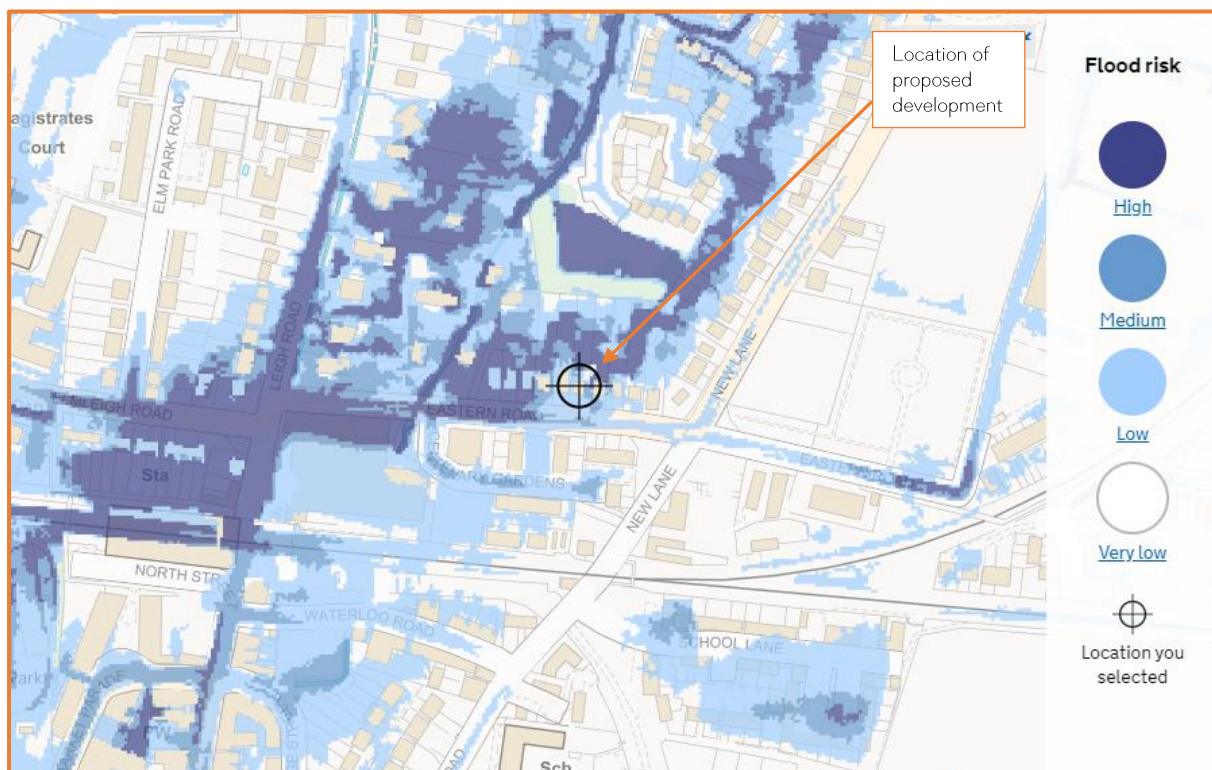


Figure 10: Extract from Environment Agency Surface Water Flood Map (Source: EA)

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 is susceptible to 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 is susceptible to sewer surcharge flooding.

Other Sources:

The EA Risk of Flooding from Reservoirs Map suggests that the site lies outside the “Maximum extent of flooding” from reservoir failure. The EA also advise on their website that reservoir flooding is extremely unlikely. All major reservoirs have to be inspected by specialist dam and reservoir Engineers. 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 flooding to occur.

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

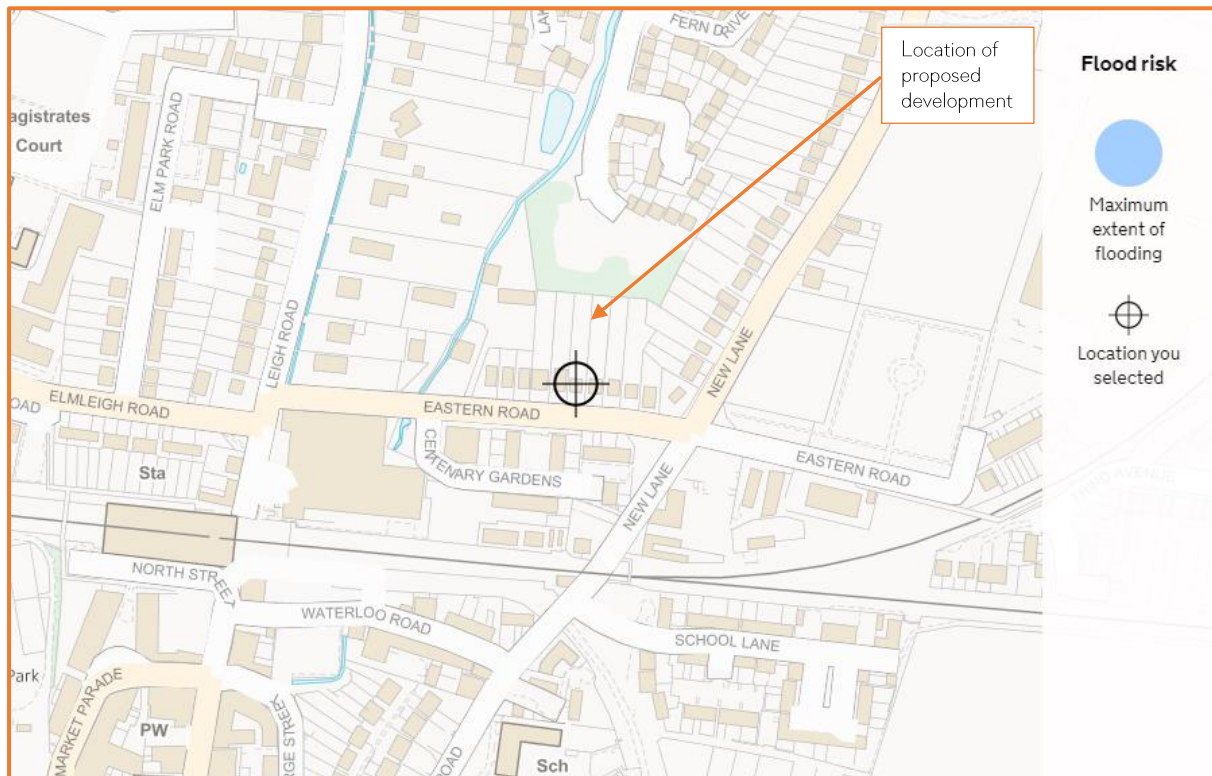


Figure 11: Extract from Environment Agency Reservoir Flood Map (Source: EA)

Flood Risk Management

Vulnerability to flooding:

The NPPF classifies property usage by vulnerability to flooding.

The existing site usage is classified as "more vulnerable" throughout, as it is currently occupied by a single, detached residential dwelling. Post development, the site will remain "more vulnerable", as the application is for the development of a single storey annex in the rear garden.

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

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.

Physical Design Measures:

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

In the absence of any modelled flows or mm allowances, the most appropriate level for use within the assessment is the 1 in 100 year fluvial level of 10.43mAOD with an addition of 300mm to accommodate for climate change. Accordingly, the 1:100 year plus allowance for climate change (+300mm) flood level is 10.73mAOD.

Given the development plans, floor levels will be raised at least 300mm above the 1:100 year plus allowance for climate change flood level (10.73mAOD). This equates to a minimum finished floor level of 11.03mAOD – which is approximately 0.53m above the existing ground level at the area proposed to be developed. This ensures that there is safe refuge above the modelled undefended flood levels.

To further help protect against flooding during extreme events, flood resistant design measures should be implemented into the development, in consultation with the Local Authority building control department. These measures can include the following:

- Solid concrete basement and ground floor, with waterproof membrane;
- Waterproof screed used on floors;
- Closed-cell foam used in wall cavities;
- Waterproof basement and ground floor internal render;
- External walls rendered resistant to flooding to first floor level;
- Exterior ventilation outlets, utility points and air bricks fitted with removable waterproof covers;
- Boilers, control and water storage / immersion installed at ground floor level or above where possible;
- Gas meter installed at ground floor level or above where possible;
- 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;
- New kitchen units of solid, water resistant material;

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

Safe Escape:

The NPPF requires a route of safe escape for all residents and uses to be provided from residential properties in Flood Zone 3. Safe escape is usually defined as being through slow moving flood water no deeper than 25cm.

Part of the site is situated in Flood Zone 3 when using the Environment Agency Flood Map for Planning (Rivers and Sea).

In the case of an extreme flood event without warning, occupants and users should seek refuge within the building.

In the event of a severe flood warning, a potential egress route from the site to an area within Flood Zone 1 (black hashed line) can be provided. This can be achieved by walking through the rear garden, alongside 9 Eastern Road and east along Eastern Road.

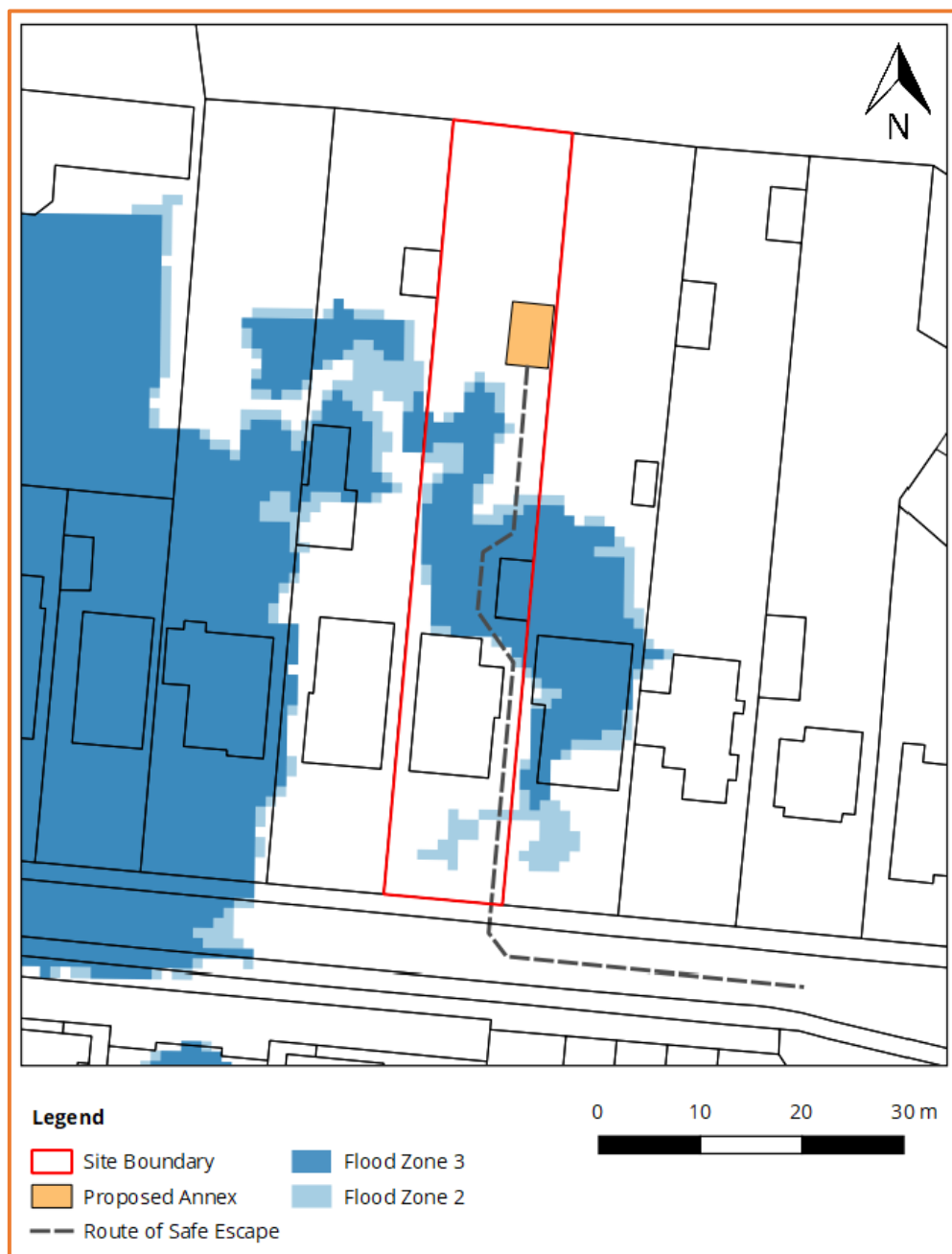


Figure 12: OS Mapping showing potential safe egress route from the site into Flood Zone 1 (black dashed line)
(Source: EA Flood Zones, OS)

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 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://www.fws.environment-agency.gov.uk/app/olr/register> to receive flood warnings by phone, text or email.

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

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

Table 2: Flood Warnings

Flood Plan:

It is recommended that the applicant and future owners, occupiers and Landlords of the flats 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:

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.

Whilst the EA Flood Map for Planning shows the site to lie within Flood Zone 2 and 3, comparison of topographic site levels with the derived 1:100 year plus allowance for climate change (+300mm) flood level (10.73mAOD) indicates that the site is situated entirely below the 1:100 year climate change flood level.

The proposed development will increase the built footprint on the site by approximately 32m². Therefore, in order to provide betterment, the applicant has agreed to construct the entire annex using voids thereby ensuring that there is no reduction in flood storage post development;

- The voids will be at least 1m wide at every opening;
- The minimum height of the void beneath the houses will be from ground level to 11.03mAOD (300mm above the modelled 1:100 year plus climate change flood level);
- There will be a void opening at least every 5m, on all sides of the building;
- Vertical bars will be installed at 100mm centres.

The voids will be constructed in accordance with the aforementioned criteria.

The entire annex will be constructed using voids. The construction of the entire annex using voids also means that the new structure will not affect flood conveyance routes across the site.

It is recommended that the design and maintenance of the voids is secured through inclusion in the deeds of the property such that they remain accessible and clear for the lifetime of the 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 proposed annex will be situated entirely within Flood Zone 1, when using the Environment Agency Flood Map for Planning (Rivers and Sea), thus following a sequential approach to site layout. Post development, the site will remain “more vulnerable”.

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, 2 and is considered to be suitable within Flood Zone 3a, further to implementation of the Exception Test.

Conclusion

Unda Consulting Limited have been appointed by Tim Collins to undertake a Site Specific Flood Risk Assessment (FRA) for Planning at 9 Eastern Road, Havant PO9 2JE. The FRA has been undertaken in accordance with the National Planning Policy Framework (NPPF) July 2018 and the associated technical guidance, as well as relevant Local Policies.

The proposed planning application is for the development of a single storey annex in the rear garden. Post development the built footprint will increase by approximately 32m².

The existing site usage is classified as "more vulnerable" throughout, as it is currently occupied by a single, detached residential dwelling. Post development, the site will remain "more vulnerable", as the application is for the development of a single storey annex in the rear garden.

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

The majority of the site, including land where the annex is proposed to be developed, is located within Flood Zone 1, defined as land having less than a 1 in 1000 annual probability of fluvial flooding. The centre of the site is situated within a Flood Zone 2 and 3. Flood Zone 3 is defined as land having greater than a 1 in 100 annual probability of fluvial flooding. The risk along Eastern Road would appear to be fluvial and originate from the Lavant Stream 90m west.

Modelled flood levels and flood extents have been requested from the Hampshire and Isle of Wight area Environment Agency as part of a Product 4 data request (reference SSD/97122). The data is taken from the Havant Flood Mapping Study, completed by Atkins, in 2008.

Undefended modelled fluvial flood levels for the 1 in 100 year and 1 in 1000 year have been provided relating to in-channel nodes within the Lavant Stream.

Whilst modelling has been carried out for the site, further information is required to correctly assess the impact of climate change. Aimee Cox, Partnership and Strategic Overview Officer at the Environment Agency, confirmed on 21st September 2018 that no flows are available for this watercourse. Solent and South Downs Area have also not provided any mm allowances for climate change.

Therefore, in the absence of any modelled flows or mm allowances, the most appropriate level for use within the assessment is the 1 in 100 year fluvial level of 10.43mAOD with an addition of 300mm to accommodate for climate change.

Accordingly, the 1:100 year plus allowance for climate change (+300mm) flood level is 10.73mAOD.

Given the development plans, floor levels will be raised at least 300mm above the 1:100 year plus allowance for climate change flood level (10.73mAOD). This equates to a minimum finished floor level of 11.03mAOD – which is approximately 0.53m above the existing ground level at the area proposed to be developed. This ensures that there is safe refuge above the modelled undefended flood levels.

So as not to displace any floodwater on site the applicant has agreed to construct the entire house using voids thereby ensuring that there is no loss of flood storage on site.

In the event of a severe flood warning, a potential egress route from the site to an area within Flood Zone 1 (black hashed line) can be provided. This can be achieved by walking through the rear garden, alongside 9 Eastern Road and east along Eastern Road.

The EA Surface Water Flood Map suggests that the site is located in an area at "Low" to "High" risk of flooding from surface water.

The risk of flooding posed to the site by groundwater and sewer surcharge flooding appears to be low.

Summary:

- The finished floor level of the proposed development will be set at least 11.03mAOD; 300mm above the 1:100 year flood level with allowance for climate change;
- So as not to displace any floodwater on site the applicant has agreed to construct the entire house using voids thereby ensuring that there is no loss of flood storage on site;
- Flood proofing will be incorporated as appropriate;
- A flood warning and evacuation plan will be implemented post development;
- 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.

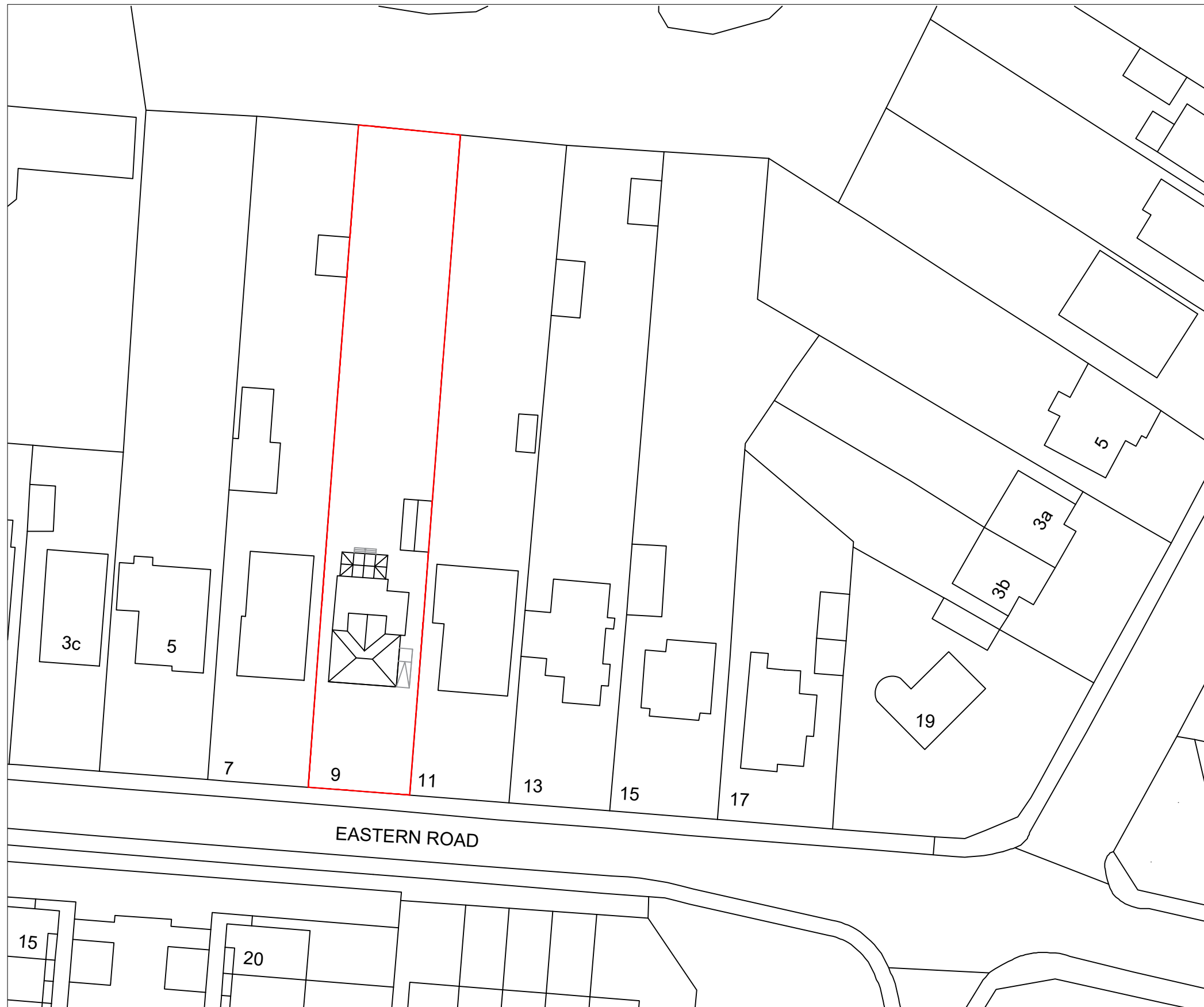
Appendix

Existing Plan (1 Page);

Proposed Plans (2 Pages);

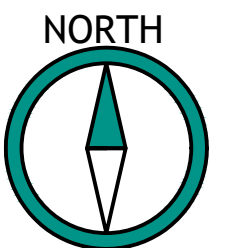
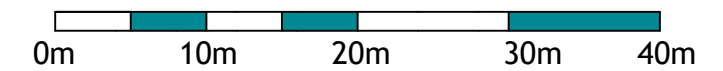
Route of Safe Escape (1 Page);

Environment Agency Product 4 and Correspondence (9 Pages).



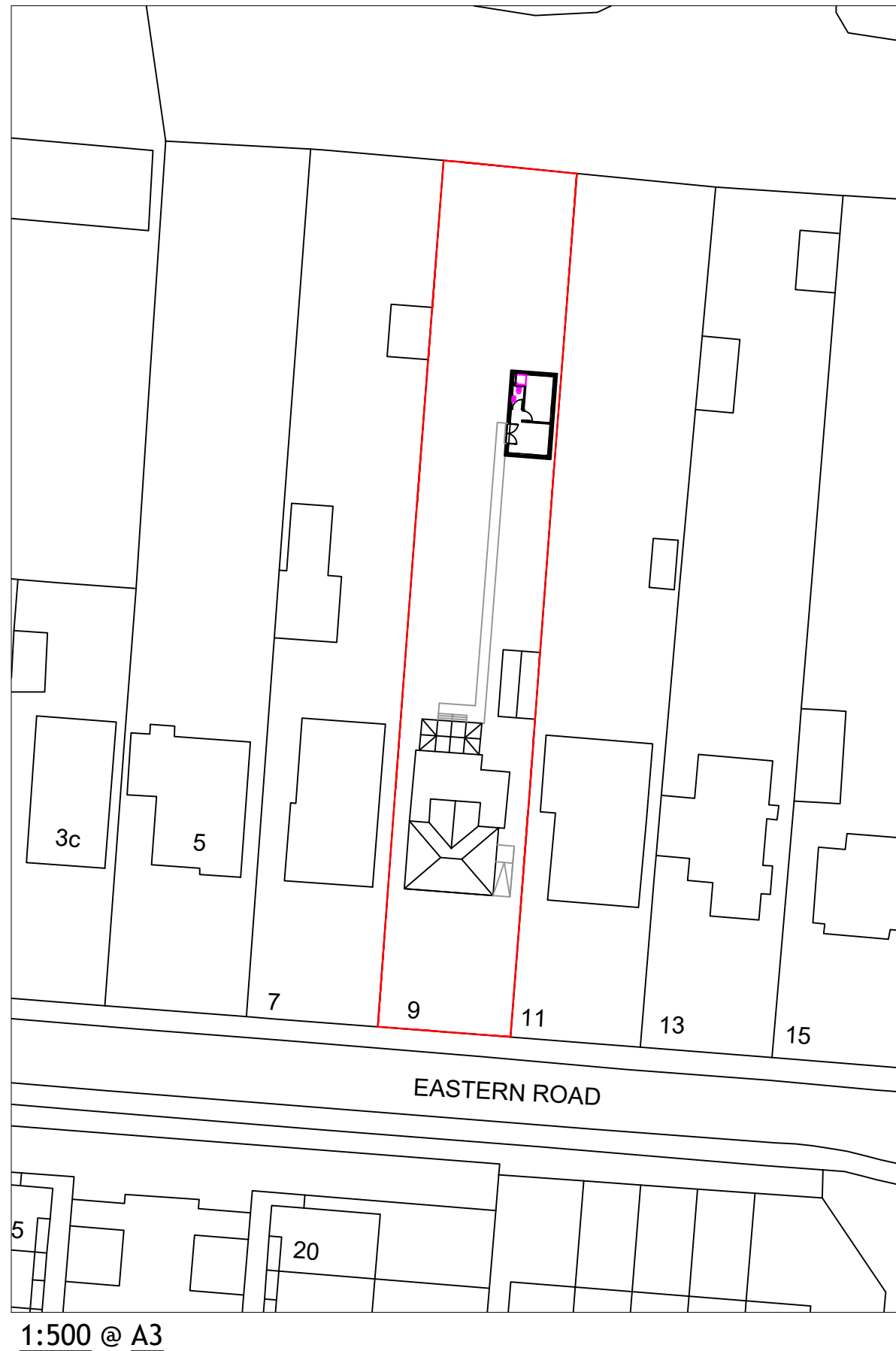
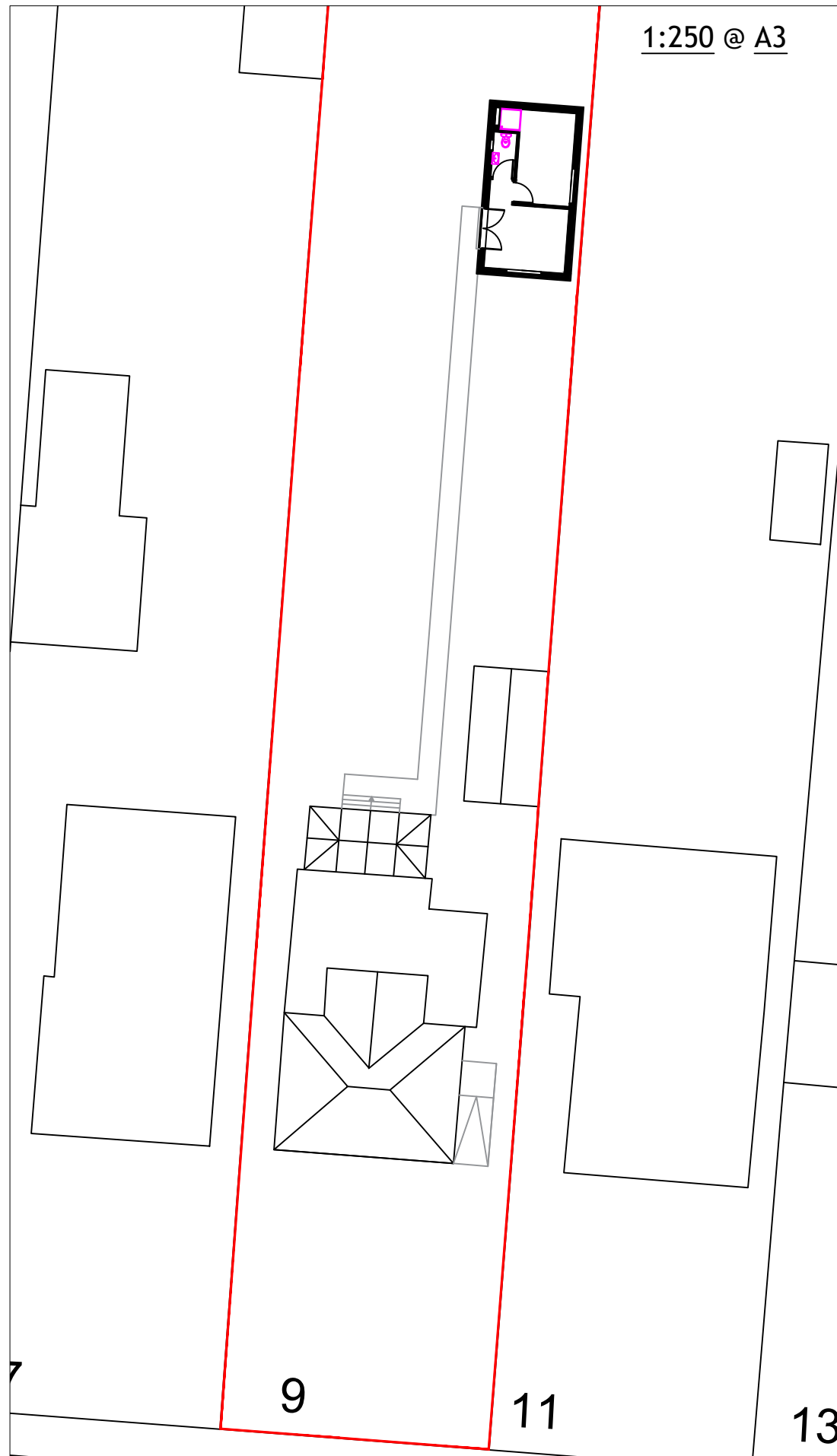
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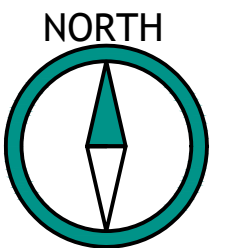
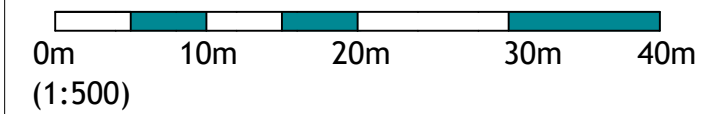
Scale 1:500 @ A3

EXLEY <i>Design & Planning</i>	
www.Exley-DP.co.uk Tel. 07725 340 410 Email: Info@exley-DP.co.uk	
PROJECT: 9 Eastern Road, Havant, PO9 2JF	
TITLE: Site Location Plan Ref. 211 P-001	
DATE: 27th of June 2018	



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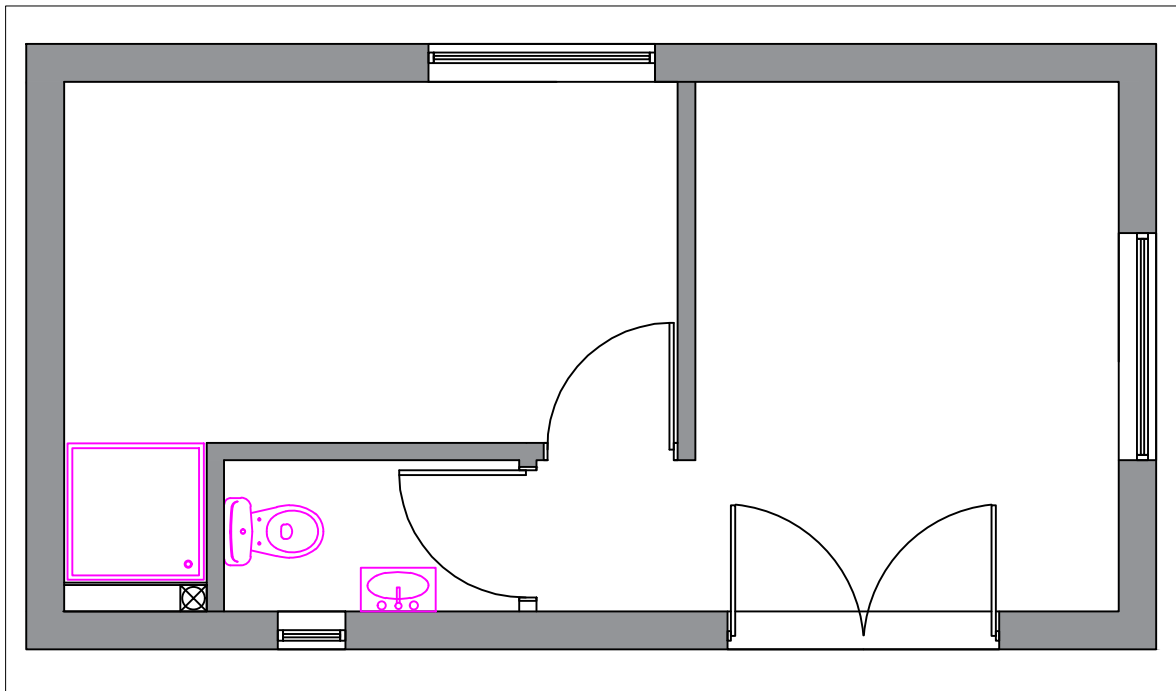
PROJECT:

9 Eastern Road,
Havant,
PO9 2JF

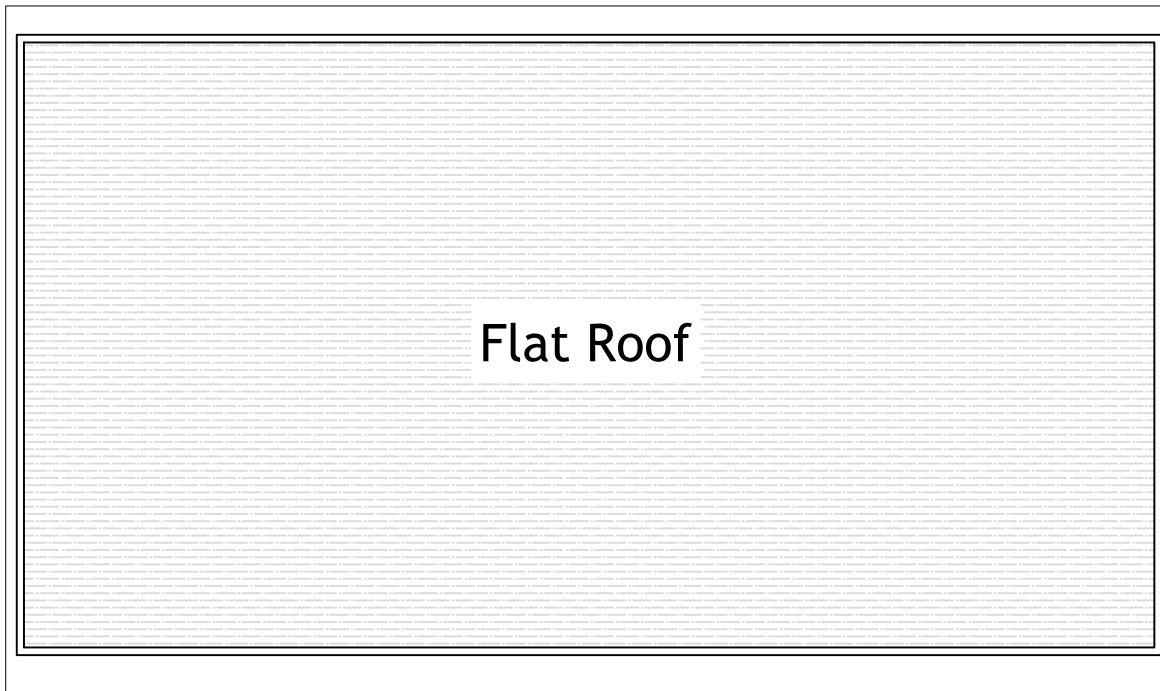
TITLE:
Proposed Site Plan

Ref. 211 P-003

DATE: 27th of June 2018



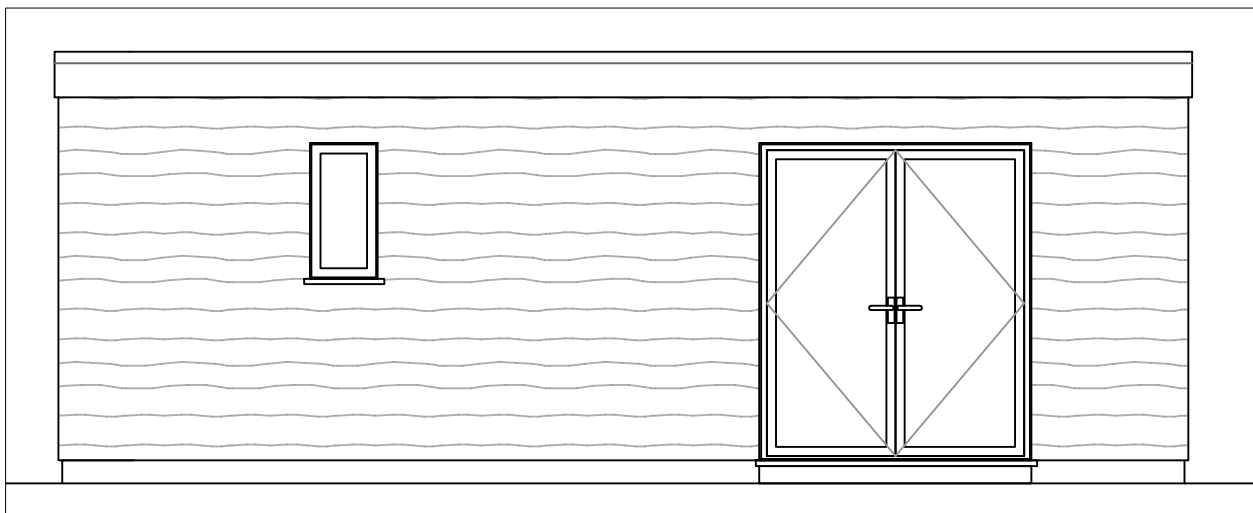
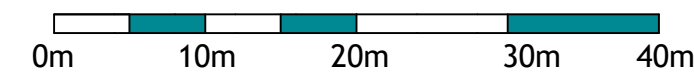
Floor Plan



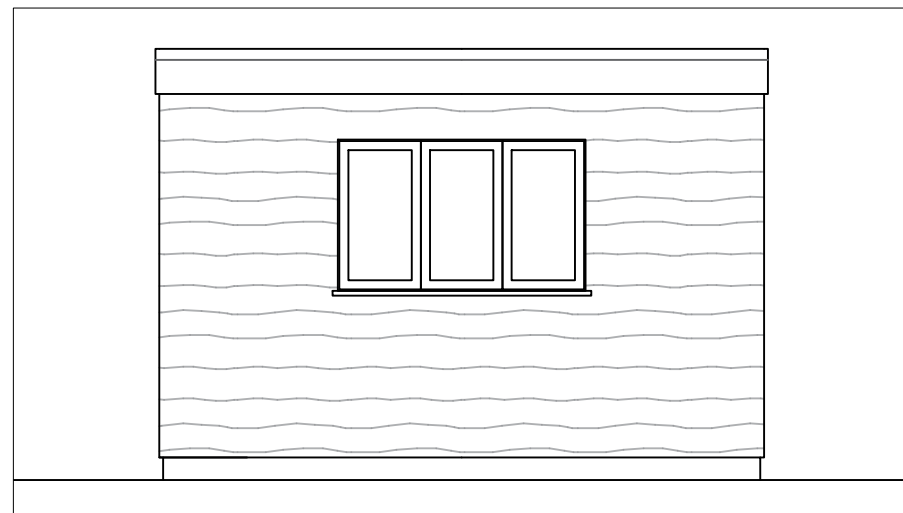
Roof Plan

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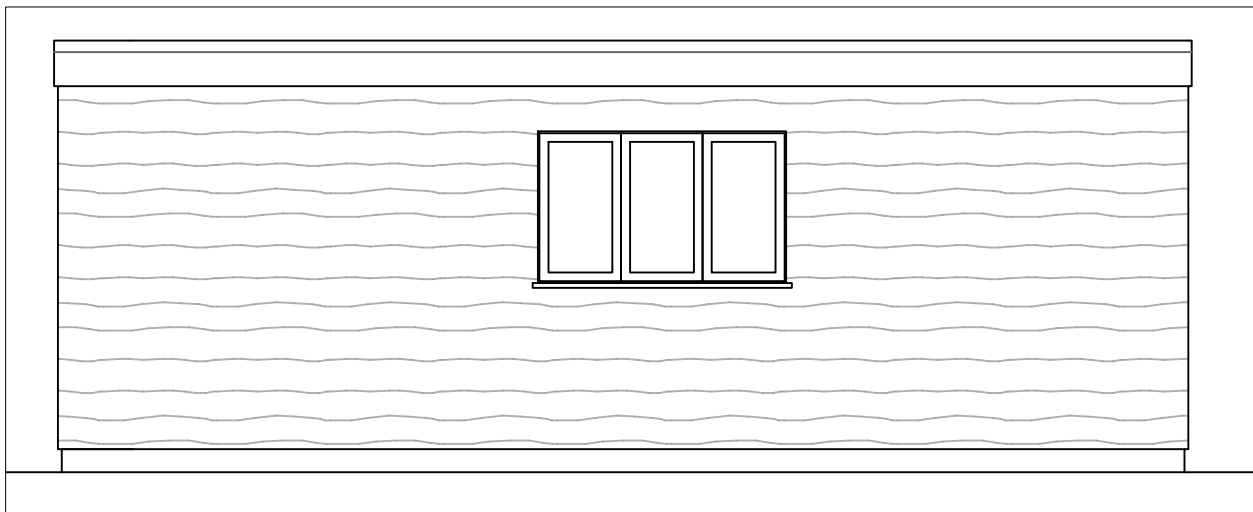
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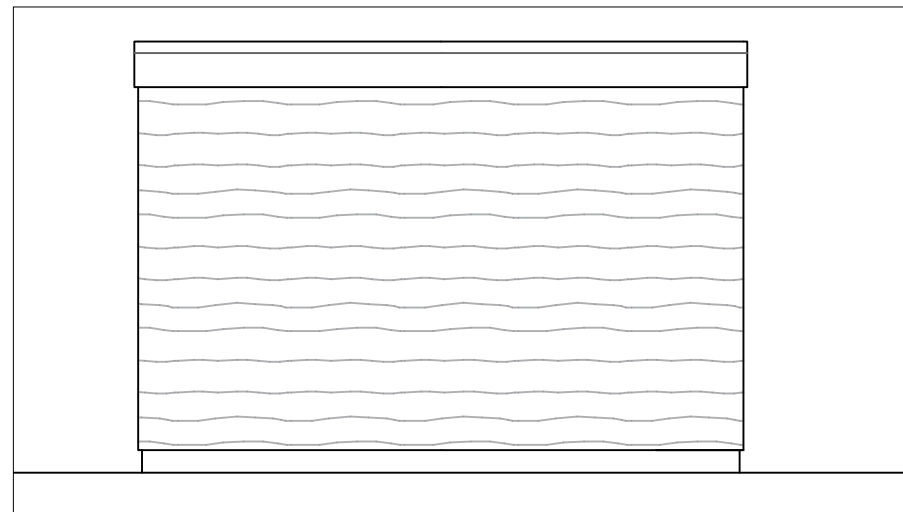
West Elevation



South Elevation



East Elevation



North Elevation

Scale 1:500 @ A3

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PROJECT:

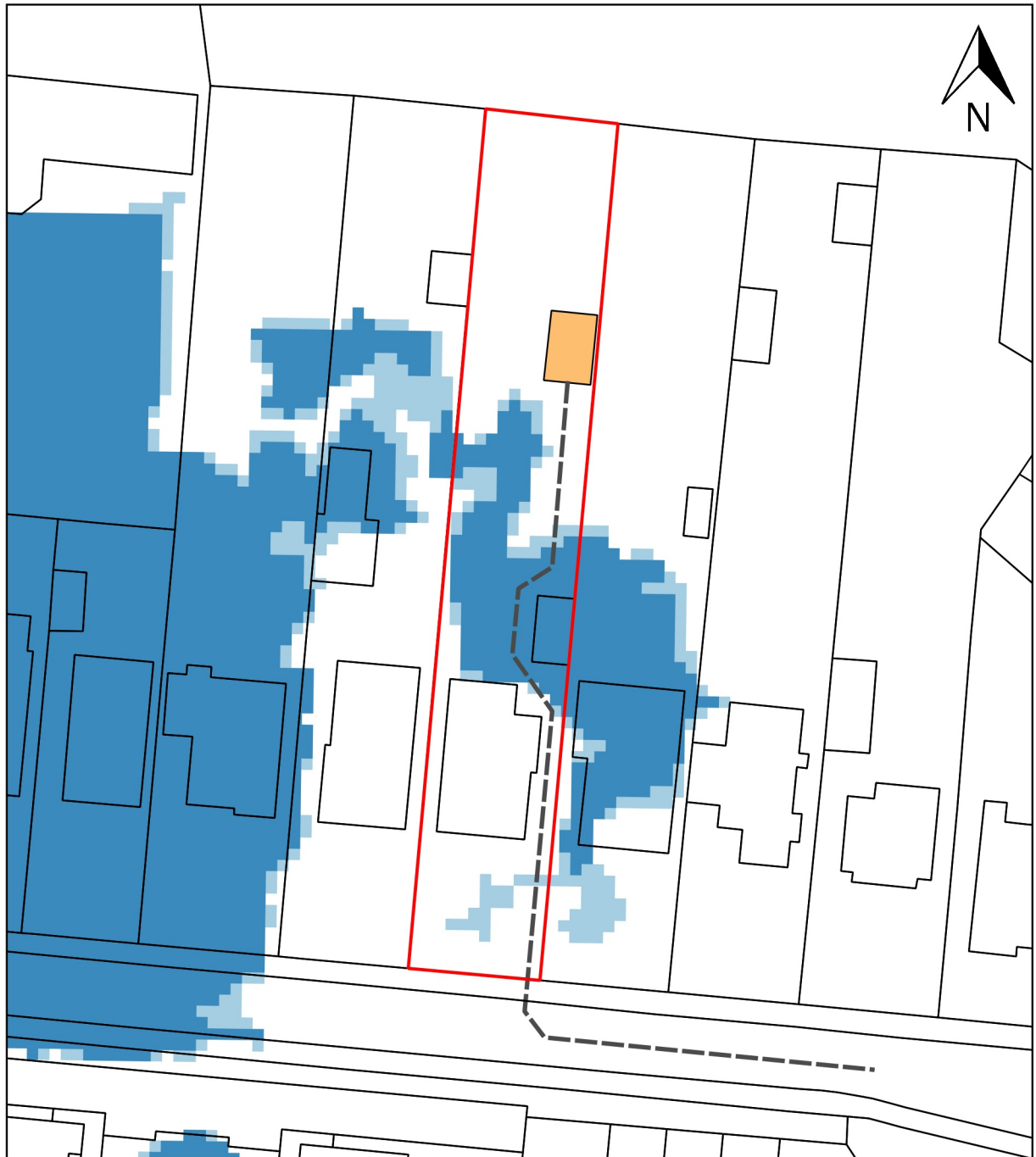
 9 Eastern Road,
 Havant,
 PO9 2JF

TITLE:
 Proposed Plans and Elevations

 Ref. 211 P-002

DATE: 27th of June 2018

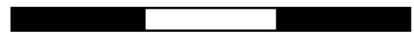
Safe Escape Route



Legend

- | | |
|--|--|
|  Site Boundary |  Flood Zone 3 |
|  Proposed Annex |  Flood Zone 2 |
|  Route of Safe Escape | |

0 10 20 30 m



Thomas Smith

From: Partnership and Strategic Overview team, HIOW <psohiow@environment-agency.gov.uk>
Sent: 18 September 2018 16:52
To: Jackie Stone; Thomas Smith
Cc: SSD Enquiries
Subject: Flood Risk Information for Eastern Road - Ref: SSD/97122 (Your Ref: 88294)
Attachments: 100yr Levels Map.pdf; 1000yr Levels Map.pdf; Defences Map.pdf; Flood Map for Planning (Rivers and Sea).pdf; Risk of Flooding from Surface Water.pdf; Open Government Licence.pdf; Use of EA Information for FRAs.pdf

Follow Up Flag: Follow up
Flag Status: Flagged

Dear Jackie,

Enquiry regarding Product 4 for 9 Eastern Road, Havant PO9 2JE.

Thank you for your enquiry which was received on 17 August 2018.

We respond to requests under the Freedom of Information Act 2000 and Environmental Information Regulations 2004. The information is attached.

The site may be affected by an extreme flood. According to our published flood map, which provides a general estimate of the likelihood of flooding across England & Wales, the site is shown to be within Flood Zone 3 - an area which may have a 1% chance of flooding annually (1 in 100), **ignoring** the presence and effect of any flood defences.

The Environment Agency is aware of flooding to this area in 1995, 2005 and 2013, but have no specific details. Please note our records are not comprehensive and may not include all events. I recommend contacting the Lead Local Flooding Authority, Hampshire County Council or the Local Authority, Havant Borough Council for a more comprehensive flood history check.

Defences – Please see the attached map.

Flood Levels – Please see the attached maps showing the flood levels for your site. These levels have been taken from the Havant Flood Mapping Study that was carried out in 2008 by Atkins.

[FRA advisory text](#)

Name	Product 4
Description	Basic / Detailed Flood Risk Assessment Map for 9 Eastern Road, Havant, PO9 2JE
Licence	Open Government Licence
Information Warnings	The majority of our models will not have the new climate change allowances. +20% is not suitable for the majority of planning purposes and the new allowances to use should be checked here: https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances
Information Warning - OS background mapping	<i>The mapping of features provided as a background in this product is © Ordnance Survey. It is provided to give context to this product. The Open Government Licence does not apply to this background mapping. You are granted a non-exclusive, royalty free, revocable licence solely to view the Licensed Data for non-commercial purposes for the period during which the Environment Agency makes it available. You are not permitted to copy, sub-license, distribute, sell or otherwise make available the Licensed Data to third parties in any form. Third party rights to enforce the terms of this licence shall be reserved to OS.</i>
Attribution	Contains Environment Agency information © Environment Agency and/or database rights. Contains Ordnance Survey data © Crown copyright 2017 Ordnance Survey 100024198.

Data Available Online

Many of our flood datasets are available online:

- Flood Map For Planning ([Flood Zone 2](#), [Flood Zone 3](#), [Flood Storage Areas](#), [Flood Defences](#), [Areas Benefiting from Defences](#))
- [Risk of Flooding from Rivers and Sea](#)
- [Historic Flood Map](#)
- [Current Flood Warnings](#)

Does Your Proposal Have Environmental Issues or Opportunities? Speak To Us Early!

If you are planning a new project or development, we want to work with you to make the process as smooth as possible. Early engagement can improve subsequent planning applications to you and your clients' benefit and deliver environmental outcomes. For a cost recovery fee of £100 per hour plus VAT we will provide you with a project manager who will coordinate all meetings and reviews in order to give you detailed specialist advice with guaranteed delivery dates. More information can be found on our website [here](#).

Please get in touch if you have any further queries or contact us within two months if you'd like us to review the information we have sent.

Yours sincerely,

Aimee Cox
Partnership and Strategic Overview team, Hampshire and Isle of Wight
Environment Agency

Direct dial 020 8474 5815

Email psohiow@environment-agency.gov.uk

Part Time Tuesday, Wednesday, Thursday and Friday

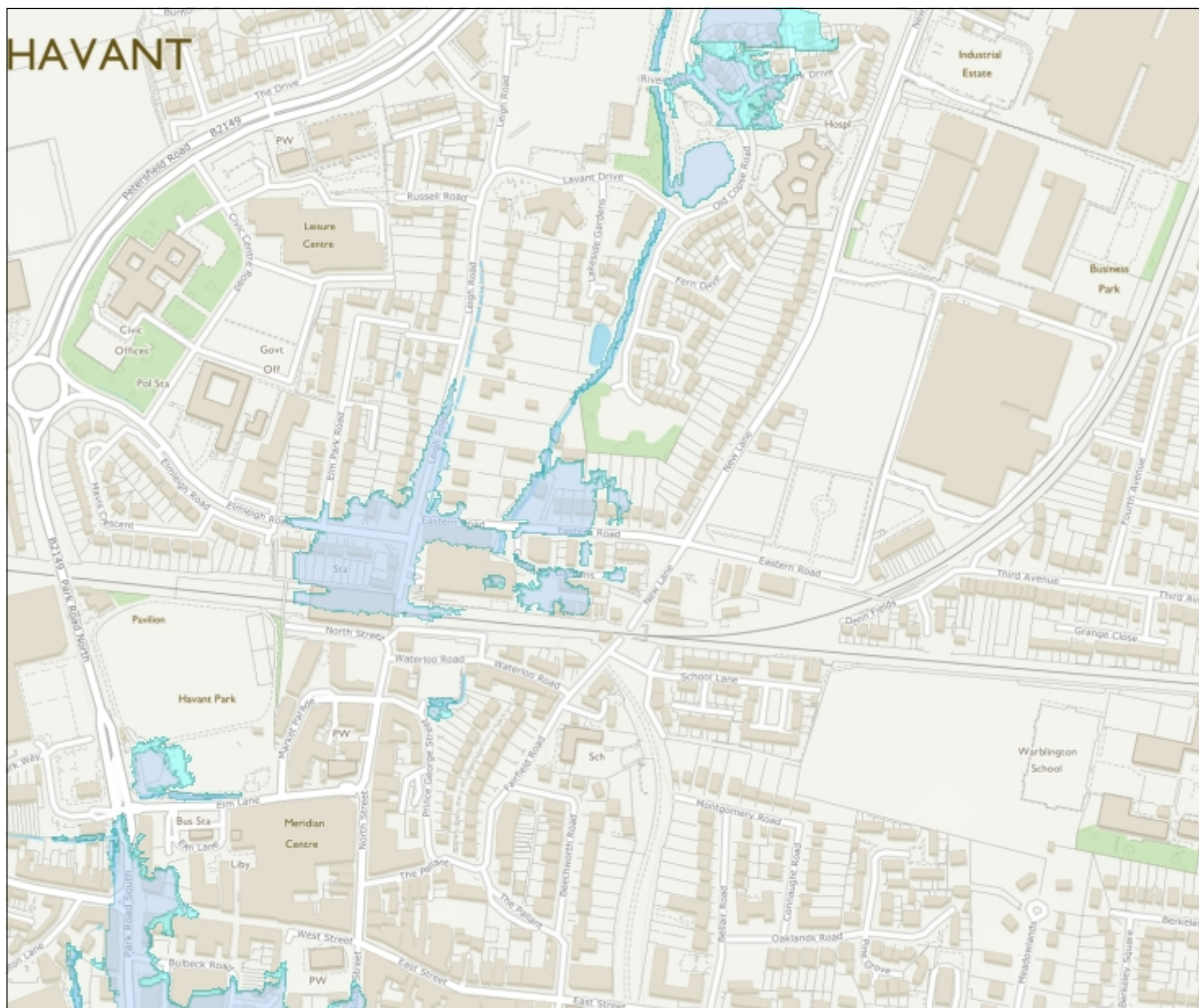
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Flood Map for Planning (Rivers and Sea) Centred on Eastern Road - Created 18 September 2018



Scale 1: 6,250



Flood Map for Planning (Rivers & Sea)

- Defences
- Flood Storage Areas
- Areas benefiting from flood defences
- Flood Zone 3
- Flood Zone 2

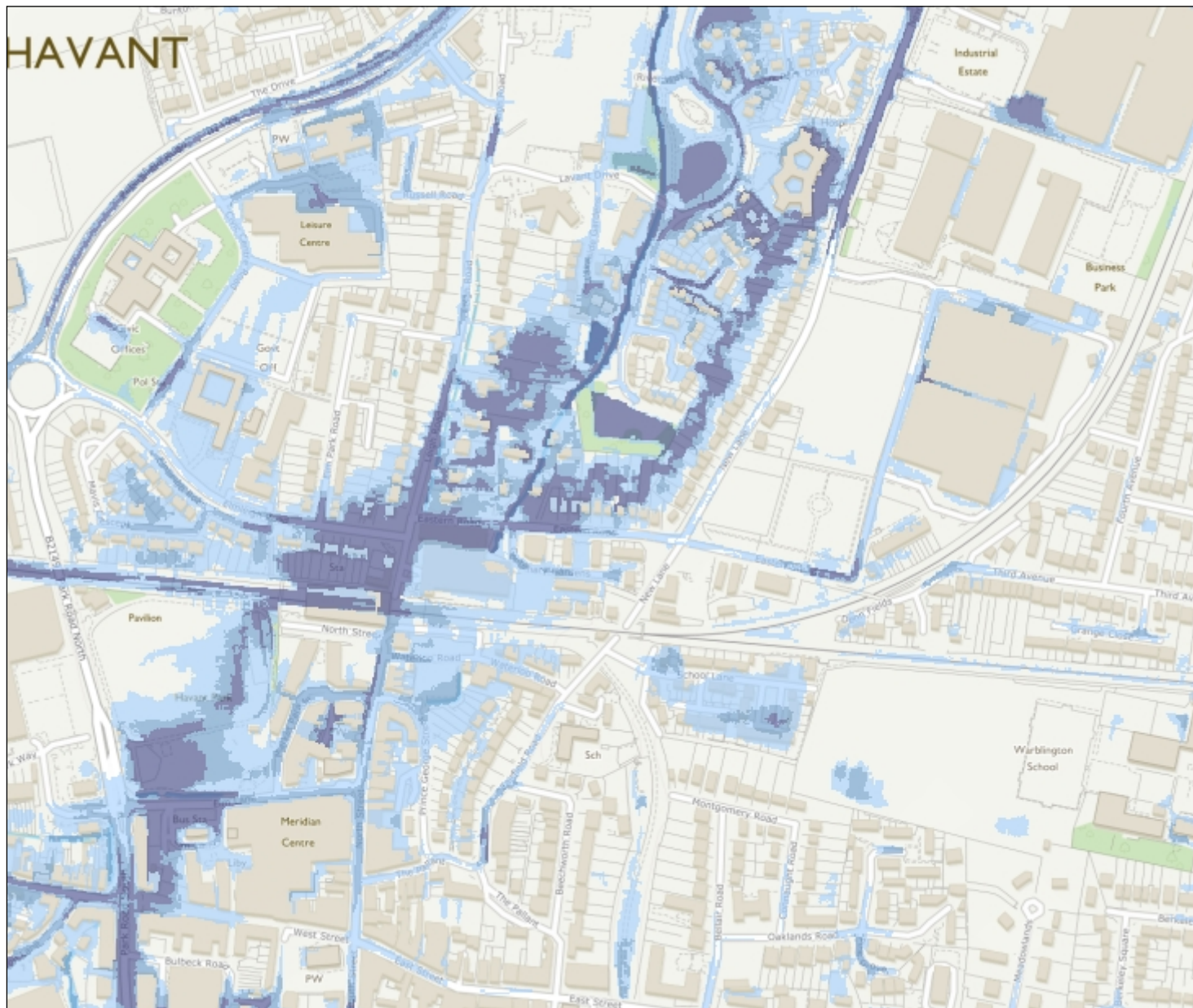
Flood Map Areas (assuming no defences)

Flood Zone 3 shows the area that could be affected by flooding:

- from the sea with a 1 in 200 or greater chance of happening each year
- or from a river with a 1 in 100 or greater chance of happening each year.

Flood Zone 2 shows the extent of an extreme flood from rivers or the sea with up to a 1 in 1000 chance of occurring each year.

Risk of flooding from Surface Water Centred on Eastern Road - Created 18 September 2018



Scale 1:6,250



Likelihood of flooding from Surface Water

- High ($\geq 3.3\%$)
- Medium (3.3% - 1%)
- Low (1% - 0.1%)
- Very Low

Likelihood of flooding from Surface Water

- High:** Greater than or equal to 3.3% (1 in 30) chance in any given year
- 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

This information is shown on the Risk of Flooding from Surface Water map on our website.

1:100 year 1D Flood Levels Centred on Eastern Road - Created 18 Sept 2018

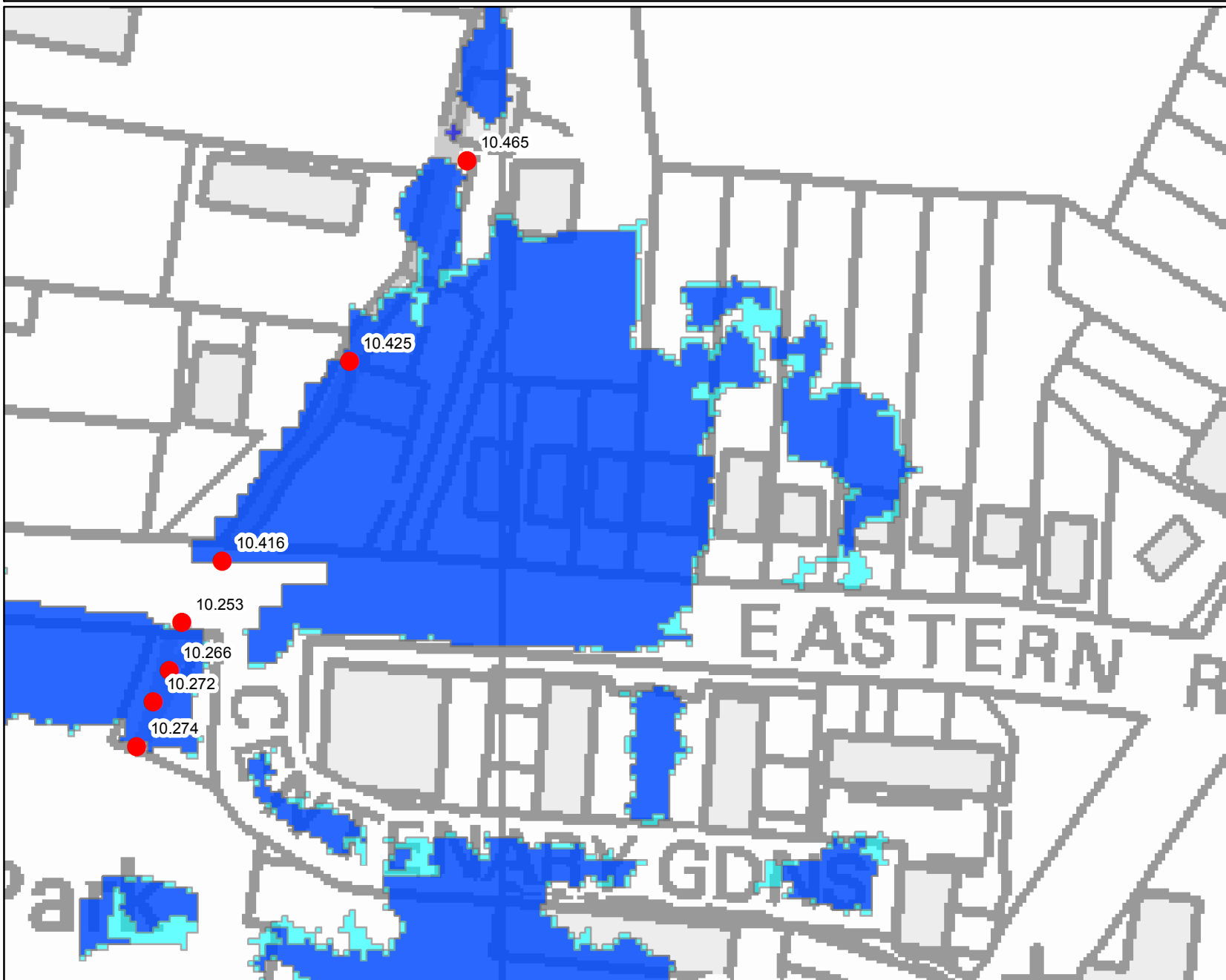
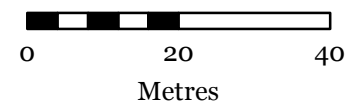


Legend

- Lavant & Hermitage 1D Levels
- Lavant & Hermitage 100Yr (Flood Zone 3)
- Lavant & Hermitage 1000Yr (Flood Zone 2)

1:1,000 *

*when printed at A4.



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1:1000 year 1D Flood Levels Centred on Eastern Road - Created 18 Sept 2018

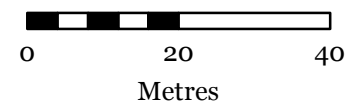


Legend

- Lavant & Hermitage 1D Levels
- Lavant & Hermitage 100Yr (Flood Zone 3)
- Lavant & Hermitage 1000Yr (Flood Zone 2)

1:1,000 *

*when printed at A4.



Defences Centred on Eastern Road - Created 18 Sept 2018

Asset Id	Asset Sub-type	Length (m)	Asset Maintainer	Actual Condition	Estimated Standard of Protection	Last Inspection Date
22894	high_ground	146.05	private	Fair	1:40	25/05/2018
22943	high_ground	146.3	private	Fair	1:40	25/05/2018
47719	high_ground	56.91	unknown	Fair	1:40	25/05/2018
48696	high_ground	583.95	private	Fair	1:50	15/05/2018
81760	high_ground	59.57	unknown	Fair	1:40	25/05/2018
119546	high_ground	588.87	private	Fair	1:40	15/05/2018
181693	high_ground	26.7	private	Fair		25/05/2018
183089	high_ground	22.28	private	Fair		25/05/2018
22944	simple_culvert	125.2	private	Fair	1:40	25/05/2018
47816	simple_culvert	229.92	private	Fair	1:40	25/05/2018
181694	simple_culvert	12.6	private	Fair		25/05/2018

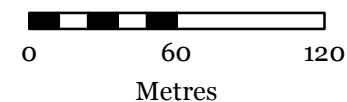


Legend

ASSET_ID

- 22894
- 22943
- 47719
- 48696
- 81760
- 119546
- 181693
- 183089
- 22944
- 47816
- 181694

1:3,079 *
*when printed at A4.



Thomas Smith

From: Partnership and Strategic Overview team, HIOW <psohiow@environment-agency.gov.uk>
Sent: 21 September 2018 09:30
To: Thomas Smith
Subject: Climate Change Allowance 9 Eastern Road - Ref: SSD/97122
Attachments: Attachments.html

ShareFile Attachments

Expires October 20, 2018

Open Government Licence.pdf	76.4 KB
Product_5.zip	41.3 MB

Download Attachments

PSO HIOW uses ShareFile to share documents securely. [Learn More.](#)

Hi Tom,

Sorry I have missed your calls I have been in a meeting for most of today and only work till 3pm.

Unfortunately There are no flows available for the watercourse but the model report does contain some information regarding flows. I have attached the model reports for your information. Our guidance available regarding climate change can be found using the link below.

<https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances#what-climate-change-allowances-are>

If you have any further questions please don't hesitate to contact me.

Kind regards

Aimee

Aimee Cox | Partnership and Strategic Overview Officer | Solent and South Downs Area | Flood and Coastal Risk Management

Environment Agency | Romsey District Office | Canal Walk | Romsey | SO51 7LP

psohiow@environment-agency.gov.uk

+442084745815

Part Time Tuesday, Wednesday, Thursday and Friday

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