



**PROPOSED DWELLING AT
43 COLNE ROAD,
BRIGHTLINGSEA, ESSEX**

FLOOD RISK ASSESSMENT

MARCH 2021

REPORT REF: 2665/RE/03-21/01

CONTRACT

Evans Rivers and Coastal Ltd has been commissioned by Mr G Hockey to carry out a flood risk assessment for a proposed dwelling at 43 Colne Road, Brightlingsea, Essex.

QUALITY ASSURANCE, ENVIRONMENT AND HEALTH AND SAFETY

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This project comprises various stages including data collection; depth analysis; and reporting. Quality will be maintained throughout the project by producing specific methodologies for each work stage. Quality will also be maintained by providing specifications to third parties such as surveyors; initiating internal quality procedures including the validation of third party deliverables; creation of an audit trail to record any changes made; and document control using a database and correspondence log file system.

To adhere to the Environmental Policy, data will be obtained and issued in electronic format and alternatively by post. Paper use will also be minimised by communicating via email or telephone where possible. Documents and drawings will be transferred in electronic format where possible and all waste paper will be recycled. Meetings away from the office of Evans Rivers and Coastal Ltd will be minimised to prevent unnecessary travel, however for those meetings deemed essential, public transport will be used in preference to car journeys.

The project will follow the commitment and objectives outlined in the Health and Safety Policy operated by Evans Rivers and Coastal Ltd. All employees will be equipped with suitable personal protective equipment prior to any site visits and a risk assessment will be completed and checked before any site visit. Other factors which have been taken into consideration are the wider safety of the public whilst operating on site, and the importance of safety when working close to a water source and highway. Any designs resulting from this project and directly created by Evans Rivers and Coastal Ltd will also take into account safety measures within a "designers risk assessment".

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1. INTRODUCTION

1.1 Project Scope

1.1.1 Evans Rivers and Coastal Ltd has been commissioned by Mr G Hockey to carry out a flood risk assessment for a proposed dwelling at 43 Colne Road, Brightlingsea, Essex.

1.1.2 It is understood that this Flood Risk Assessment will be submitted to the Planning Authority and Environment Agency (Agency, hereafter) as part of a planning application. Specifically, this assessment intends to:

- a) Consider the impacts of the 1 in 20 year, 1 in 200 year and 1 in 1000 year flood events (all inclusive of climate change), in accordance with NPPF;
- b) Review any literature and guidance specific to this area such as the SFRA;
- c) Determine the extents of the aforementioned NPPF Flood Zones across the site, together with depths of floodwater and hazard;
- d) Assess the risks to people and property and propose mitigation measures accordingly;
- e) Review existing evacuation and warning procedures for the area;
- f) Carry out an appraisal of flood risk from any other sources such as groundwater as required by NPPF;
- g) Report findings and recommendations.

1.1.3 This assessment is carried out in accordance with the requirements of the National Planning Policy Framework (NPPF) dated 2019. Other documents which have been consulted include:

- DEFRA/EA document entitled *Framework and guidance for assessing and managing flood risk for new development Phase 2 (FD2320/TR2)*, 2005;
- Communities and Local Government 2007. *Improving the Flood Performance of New Buildings*. HMSO.
- DEFRA/EA document entitled *The flood risks to people methodology (FD2321/TR1)*, 2006;
- EA *Supplementary Note on Flood Hazard Ratings and Thresholds for Development Planning and Control Purpose*, 2008;
- National Planning Practice Guidance – Flood Risk and Coastal Change.
- Tendring District Council Strategic Flood Risk Assessment (SFRA hereafter) carried out by JBA Consulting in 2009.
- Tendring District Council Strategic Flood Risk Assessment (SFRA 2017 hereafter) carried out by Essex County Council Flood Services in 2017.
- Essex County Council Local Flood Risk Management Strategy (LFRMS) dated 2013.

- Essex County Council Preliminary Flood Risk Assessment dated 2011 (PFRA).
- Essex and South Suffolk Shoreline Management Plan dated 2010.
- UK Government's climate change allowances guidance dated February 2016.

2. DATA COLLECTION

2.1 To assist with this report, the data collected included:

- Ordnance Survey 1:10,000 street view map (Evans Rivers and Coastal Ltd OS licence number 100049458).
- 1:250,000 *Soil Map of Eastern England* (Sheet 4) published by Cranfield University and Soil Survey of England and Wales 1983.
- 1:625,000 *Hydrogeological Map of England and Wales*, published in 1977 by the Institute of Geological Sciences (now the British Geological Survey).
- Product 6 Colne and Blackwater modelling update flood level data provided by the Agency as ascii grid GIS files.
- Breach mapping provided by the Environment Agency (Appendix A)
- Filtered LIDAR data at 1m resolution.
- Topographical survey of the site carried out by A and B Surveys (shown on Drawing Number LS5934/1).
- British Geological Survey Online Geology Viewer.
- British Geological Survey Groundwater Susceptibility Map.

3. SITE CHARACTERISTICS

3.1 Existing Site Characteristics and Location

- 3.1.1 The site is located at 43 Colne Road, Brightlingsea, Essex. The approximate Ordnance Survey (OS) grid reference for the site is 608404 216480 and the location of the site is shown on Figure 1.

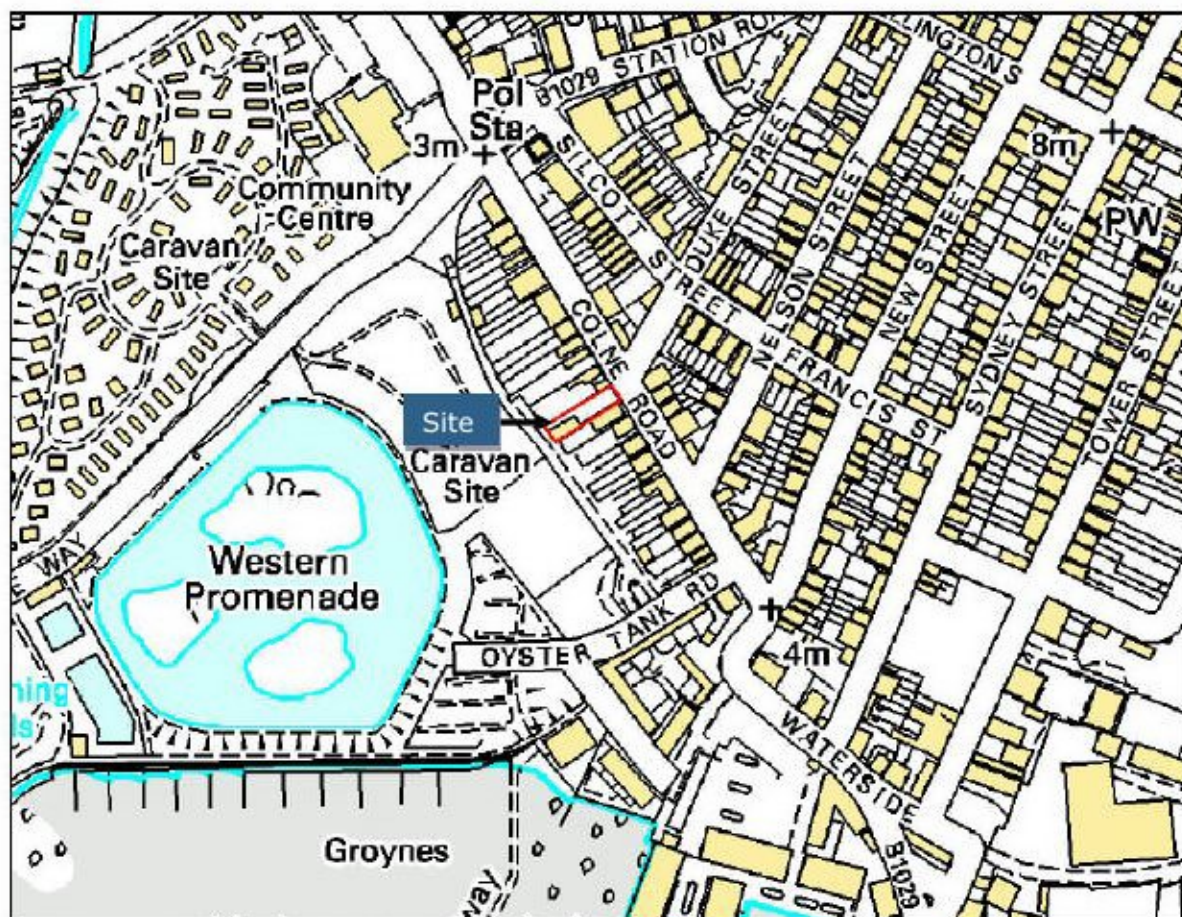
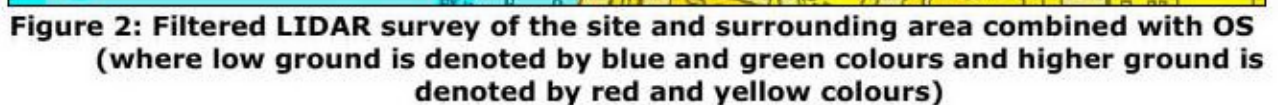


Figure 1: Site location plan (Source: Ordnance Survey)

- 3.1.2 The site is rectangular in shape and comprises a commercial site set in a residential area with a two-storey building and hardstanding areas. The site is accessed from Colne Road to the north east.
- 3.1.3 A topographical survey has been carried out by A and B Surveys (shown on Drawing Number LS5934/1). Filtered LIDAR data at 1m resolution has also been obtained in order to determine and illustrate the topography across the site and surrounding area (Figure 2).
- 3.1.4 The survey data indicates that ground levels across the site fall in a south westerly direction. The area intended for the proposed dwelling is set at approximately 3.90m AOD.



- 3.2.1 It is the Client's intention to develop the site with a two-storey dwelling together with gardens, driveway and garage.
- 3.2.2 There will be general living areas across the ground floor and bedrooms across the first floor.
- 3.2.3 The finished ground floor level will be 3.90m AOD and the first floor level will be set at 6.60m AOD.
- 3.2.4 The proposed layout can be seen on Drawing Number 21039/SK1.
- 3.2.5 The proposals are classified as a "more-vulnerable" use according to Table 2 of the NPPF Planning Practice Guidance.

4. BASELINE INFORMATION

4.1 Environment Agency Flood Zone Map

- 4.1.1 The Environment Agency's Flood Zone Map (Figure 3) shows that the site is located within the "defended" NPPF defined Flood Zone 3a associated with the tidal River Colne/North Sea.
- 4.1.2 The extent of the Flood Zone 3a 'High Probability' is defined as the 1 in 100 year return period fluvial event, or 1 in 200 year tidal event (or a combination of the two).
- 4.1.3 Flood Zone 3b functional floodplain is defined in Table 1 of the NPPG as the area where water flows or is stored during flood events. The functional floodplain is generally defined by the limit of the 1 in 20 year flood envelope.

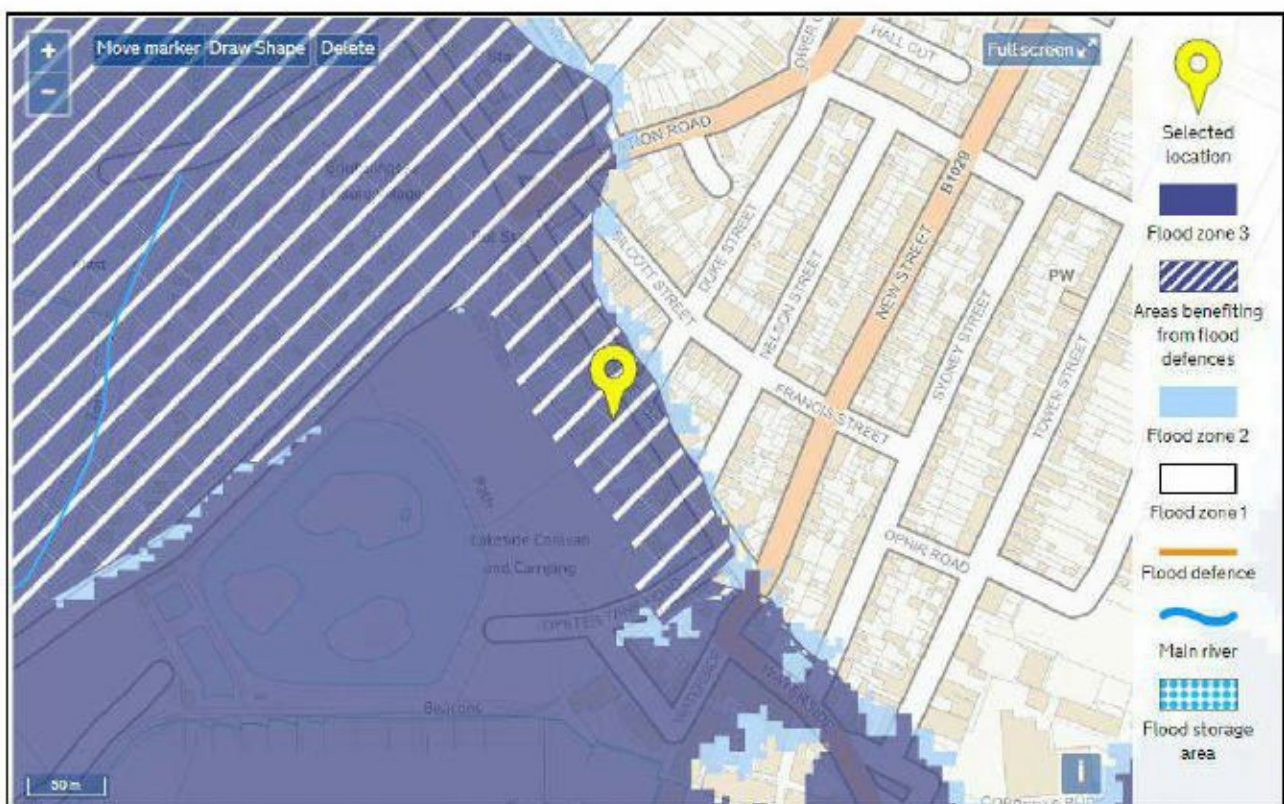


Figure 3: Environment Agency Flood Zone Map (Source: Environment Agency, 2021)

- 4.1.4 The Flood Zone 3b functional floodplain definition as stated in the NPPG is "...land where water has to flow or be stored in times of flood". Paragraph 015 (ID 7-015-20140306) of the NPPG states that "The identification of functional floodplain should take account of local circumstances and not be defined solely on rigid probability parameters".
- 4.1.5 Furthermore, the NPPG states that "The area identified as functional floodplain should take into account the effects of defences and other flood risk management infrastructure. Areas which would naturally flood, but which are prevented from doing so by existing defences and infrastructure or solid buildings, will not normally be identified as functional floodplain".

- 4.1.6 By consulting the flood defence data and defended flood level data extracted from the Colne and Blackwater modelling update, it can be seen that the flood defences reduce the extent of flooding across the site during the defended 1 in 20 year event. Figure 4 shows the area of the site intended for the dwelling is well outside of this area and therefore not located within Flood Zone 3b.

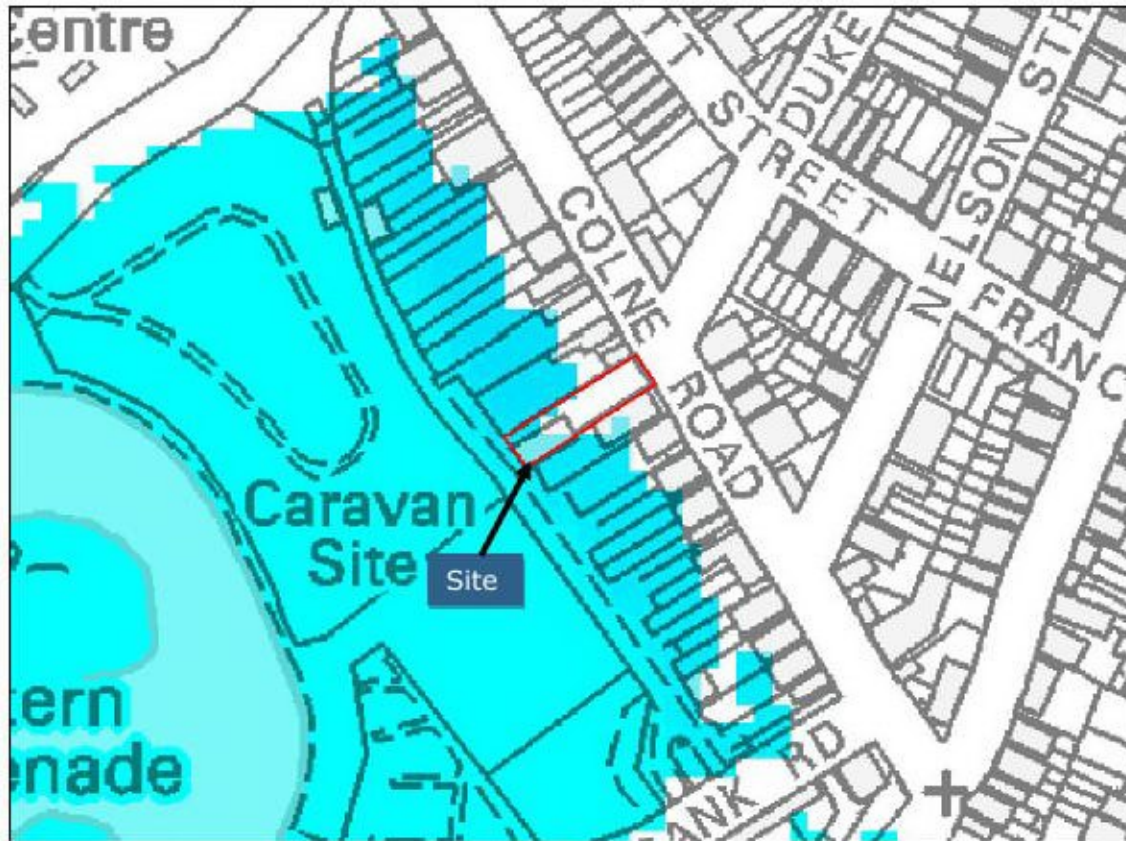


Figure 4: Modelled extent during defended 20yr event

4.2 Flood Defences and Environment Agency Flood Levels

- 4.2.1 The Environment Agency flood defence information via <https://environment.data.gov.uk/asset-management/index.html> and topographical survey indicates that the floodplain is defended by a flood wall.
- 4.2.2 The survey data suggests that the crest level of the defences is set as low as 4.56m AOD within the vicinity of the site, however, the Agency's online asset data indicates that parts of the defence away from the site location are set as low as 3.80m AOD.
- 4.2.3 The second generation Essex and South Suffolk Shoreline Management Plan (SMP) dated 2010, in which the site is identified to be located in Management Unit D4, states that the preferred coastal defence policy is hold the line to year 2105.
- 4.2.4 Product 6 flood level data has been provided by the Agency as ascii grid GIS files and the levels across part of the site intended for the proposed dwelling are summarised in Table 1. The data has been taken from the recent Colne and Blackwater modelling update.

Table 1: Tidal surge flood level data at the site

Location	1 in 20 year (mAOD)	1 in 20 year plus climate change (mAOD)	1 in 200 year (mAOD)	1 in 200 year plus climate change (mAOD)	1 in 1000 year (mAOD)	1 in 1000 year plus climate change (mAOD)
Undefended	3.83	4.97	4.22	5.32	4.66	5.54
Defended	N/A	4.92	4.22	5.32	4.62	5.55

N/A = Event modelled but water did not reach site

4.2.5 The UK Government's climate change allowances guidance updated 16 March 2020 includes new tidal climate change allowances. It is understood that the Environment Agency has decided that for more vulnerable, highly vulnerable and essential infrastructure development the Upper End allowances should be used to assess the flood risk over the lifetime of the proposed development.

4.2.6 It is understood from the Agency that the Upper End climate change allowances applied over the 100 years lifetime of residential development result in a flood level approximately 0.32m higher than the climate change flood levels currently used in the existing modelling.

4.2.7 Therefore applying the Upper End climate change increase of 0.32m results in a defended/undefended 200yrCC flood level of **5.64m AOD** and defended/undefended 1000yrCC flood level of **5.87m AOD and 5.86m AOD respectively**.

4.3 Flood Warning and Emergency Planning

4.3.1 The site is located within Environment Agency Flood Warning area 051FWCDV4C1c (The tidal River Colne from Brightlingsea to Wivenhoe).

4.3.2 The Environment Agency can issue each level of warning when necessary at least 12 hours prior to the next high tide or critical estimated peak surge tide (based on a model run which is reviewed every 6 hours).

4.3.3 Flood Alerts, Flood Warnings and Severe Flood Warnings are issued to residents and businesses within flood risk areas by the Agency's *Floodline Warnings Direct* (FWD) service. This system is managed by the Environment Agency and dials out a message to the recipient when a particular category of flood warning is being advised. The message is conveyed by a constant ringing of the telephone or can alternatively be communicated to mobile phones and computers. The system functions at all times, issuing flood warnings and alerts in conjunction with announcements on radio and other media. Owners and occupiers of dwellings or businesses thought to be at risk can sign up to the scheme. **The owners are encouraged to confirm details with the Agency and to sign up for these warnings.** The various flood warning codes can be seen on Figure 5.



Figure 5: Flood warning codes (Source: Environment Agency)

- 4.3.4 It is understood that in the event of flooding, evacuation is managed by a multi-agency team in conjunction with the Police. The multi-agency team provides suitable premises for shelter, first aid, refreshments and possible transportation with consideration given to the elderly and vulnerable groups. It is essential that occupants produce robust Emergency Flood Plans to avoid putting themselves or emergency services at risk and that they do not rely solely on emergency services during the event.

5. TIDAL FLOOD RISK

5.1 Actual Flood Risk

5.1.1 The “defended” levels provided by the Agency in Table 1 reflect the flood level at the site taking into account the presence of flood defences. These levels can therefore be used to assess the “actual risk” to the site from overtopping of the defences. Table 2 shows the flood depth and hazard across the site.

5.1.2 Although a hazard rating is not provided by the Agency, in order to determine the flood hazard at the site the hazard categories outlined in Table 13.1 of *FD2320/TR2* (Figure 6 below), which is defined by the depth and velocity of the floodwater and the ability of people to evacuate once flooding occurs, has been used (assuming 0.5 m/s velocity). It should be noted that the white cells shown on Figure 6 denote a *Very low* hazard.

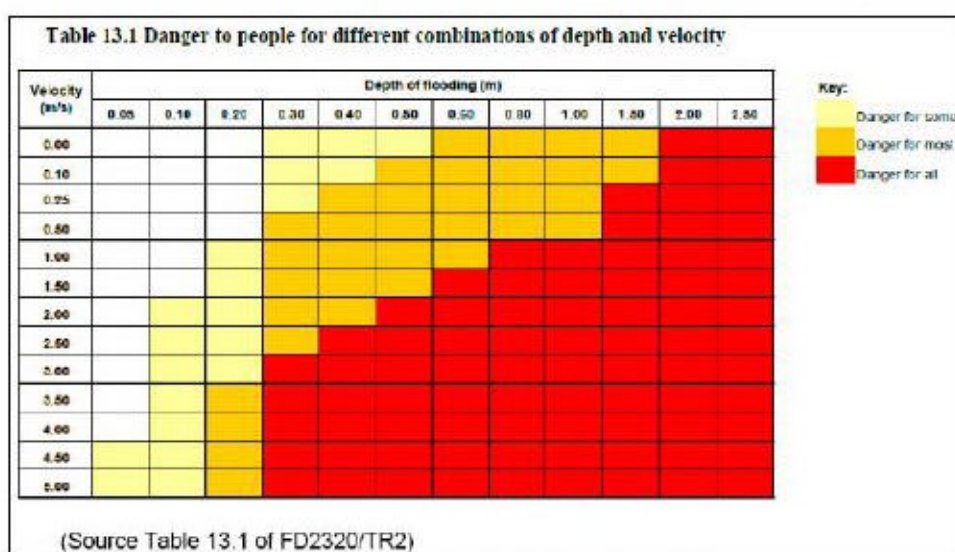


Figure 6: Hazard Classification

Table 2: Flood levels, depths and hazard at the site from overtopping

Location	1 in 20 year	1 in 20 year plus climate change	1 in 200 year	Updated 1 in 200 year plus climate change	1 in 1000 year	1 in 1000 year plus climate change
Defended	N/A	4.92m AOD	4.22m AOD	5.64m AOD	4.62m AOD	5.87m AOD
Flood Depth above ground floor level of 3.90m AOD (m)	N/A	1.02	0.32	1.74	0.72	1.97
Flood Depth above first floor set 6.60m AOD (m)	N/A	0	0	0	0	0
	Very low hazard					
	Dangerous for Some					
	Dangerous for Most					
	Dangerous for All					

- 5.1.3 Table 2 shows that the first floor is set above all modelled flood levels and therefore safe (dry) refuge would be available during all events up to and including the climate change 1 in 1000 year event.

5.2 Undefended Scenario

- 5.2.1 In order to consider no defences present, the “undefended” levels outlined in Table 1 have been compared with the site levels and the expected flood depths at the site are shown in Table 3.

Table 3: Flood levels, depths and hazard across site assuming no defences

Location	1 in 20 year	1 in 20 year plus climate change	1 in 200 year	Updated 1 in 200 year plus climate change	1 in 1000 year	Updated 1 in 1000 year plus climate change
Undefended	3.83m AOD	4.97m AOD	4.22m AOD	5.64m AOD	4.66m AOD	5.86m AOD
Flood Depth above ground floor level of 3.90m AOD (m)	0	1.07	0.32	1.74	0.76	1.96
Flood Depth above first floor set 6.60m AOD (m)	0	0	0	0	0	0
	Very low hazard					
	Dangerous for Some					
	Dangerous for Most					
	Dangerous for All					

5.3 Residual Risk

- 5.3.1 Product 8 depth and hazard breach mapping has been provided by the Agency and the results are provided in Appendix A. The Agency has stated that the mapping considers a defended flood event together with the additional impacts of a breach at specified locations.
- 5.3.2 The Product 8 data indicates that the site would be affected during the present day 1 in 200 year event and the flood depth would be between 0.25m and 1m. During the present day 1 in 1000 year event the depth would be between 1m to 1.50m.
- 5.3.3 During the climate change 1 in 200 year event and climate change 1 in 1000 year event, the mapping shows that the flood depth would be 1.50m to 2m and the hazard could reach *Dangerous for Most* across the area intended for the dwelling.
- 5.3.4 It is understood from the Agency on other projects on the East Coast that it is important to clarify that only the area immediately surrounding the breach will show impacts upon depth and hazard levels, and that the rest of the extent will remain the same as the current defended flood outlines.
- 5.3.5 It is considered that as the site is not located within the immediate vicinity of the modelled breach location, the updated defended data (provided in this assessment)

should be used to consider a worst-case scenario and this data has therefore been taken forward.

- 5.3.6 The flood depths as a result of a breach compare relatively well with the defended and undefended flood depths at the site outlined in Tables 2 and 3.

6. TIDAL FLOOD RISK MITIGATION AND EVACUATION

6.1 Reducing Exposure to the Hazard

- 6.1.1 In order to assess and reduce the exposure to the hazard and the vulnerability to the hazard after the site has been developed, the guidance outlined in the DCLG/DEFRA/EA document entitled *Flood Risk Assessment Guidance for New Development Phase 2; Flood Risks to People, Phase 2; Improving the Flood Performance of New Buildings* has been consulted.
- 6.1.2 In accordance with the Agency's recommendations and Paragraph 055 (ID 7-055-20140306) of the NPPF Planning Practice Guidance, the "design" event for which mitigation measures should be designed to is the tidal "defended" updated climate change 1 in 200 year flood level of 5.64m AOD.
- 6.1.3 The "extreme" tidal "defended" updated climate change 1 in 1000 year flood level is 5.87m AOD.
- 6.1.4 Paragraph 060 (ID 7-060-20140306) of the NPPF Planning Practice Guidance states that the first preference is to avoid flood risk by raising floor levels above the design flood level.
- 6.1.5 Paragraph 060 of the NPPF Planning Practice Guidance continues to state that "Resistance and resilience measures are unlikely to be suitable as the only mitigation measure to manage flood risk, but they may be suitable in some circumstances, such as:
- water-compatible and less vulnerable uses where temporary disruption is acceptable and an appropriate flood warning is provided;
 - in some instances where the use of an existing building is to be changed and it can be demonstrated that no other measure is practicable;
 - as a measure to manage residual flood risk".
- 6.1.6 The site has been identified to have a high "actual risk" of flooding, therefore, the proposals do not comply with the third criterion above. The proposals do not comply with the second criterion above. The site does not comply with the first criterion above as the uses of the site are considered as more-vulnerable according to NPPF.
- 6.1.7 Raising of proposed ground floor levels above the design flood level is not possible at the site as it would be impractical in terms of access and ridge/eaves heights to raise the proposed ground floor by a further 1.74m. Therefore, as discussed above, other mitigation measures such as resistance and resilience measures will be appropriate in this case.
- 6.1.8 The first floor will be set above the "design" flood level and "extreme" flood level. Therefore, safe refuge during all flood events will be available at all times.

6.2 Differential Depth

- 6.2.1 During the design event and extreme the external depth of floodwater against the walls of the building above the floor level would reach 1.74m and 1.97m respectively.
- 6.2.2 Assuming that floodwater is restricted from entering the building somewhat by external doors and walls, the differential depth (i.e. the depth difference between the inside of the building and outside of the building) could therefore reach 1.74m and 1.97m respectively.

- 6.2.3 The DEFRA/EA document entitled *Improving the Flood Performance of New Buildings*, dated 2007, suggests that where the depth of floodwater is higher than 0.5m above the floor level within a building, there will be damage to internal finishes.
- 6.2.4 It is also stated in the aforementioned DEFRA/EA document that there is some damage to buildings if the depth differential between the outside and inside water levels exceeds 0.6m. Severe damage can occur if this reaches 1m even if the buildings are flood proofed.
- 6.2.5 In order to reduce this differential depth to safe limits during the extreme event, it is proposed that floodwater is allowed across the ground floor as part of a *Water Entry Strategy*.

6.3 Water Entry Strategy

- 6.3.1 In accordance with the ODPM guidance document *Preparing for Floods* and the aforementioned DCLG/DEFRA/EA document, a *Water Entry Strategy* essentially permits the passage of floodwater through the building. A *Water Entry Strategy* in this case aims to allow floodwater to enter the building and flood resilience techniques are incorporated across the ground floor to reduce the consequences of flooding. It is proposed that the following mitigation measures are established up to the extreme climate change 1 in 1000 year flood level of 5.87m AOD.

Floors

- 6.3.2 Ground supported floors or suspended floors could be used. A damp-proof membrane should be included within the floor construction and suitable floor finished such as ceramic or concrete based floor tiles are recommended.

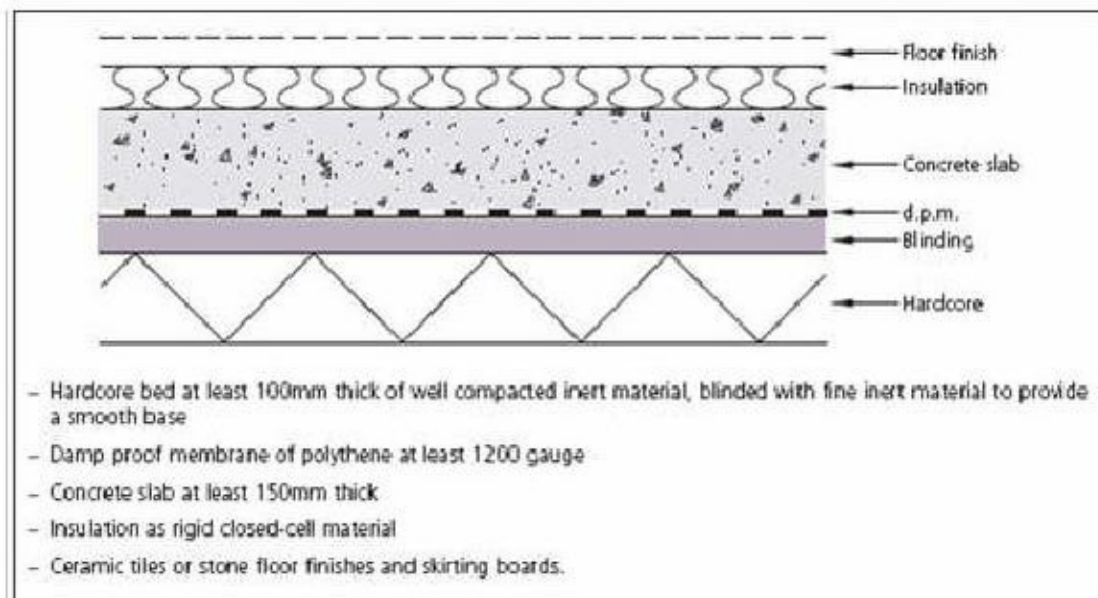


Figure 7: Ground-supported floor (Source: DCLG, 2007)

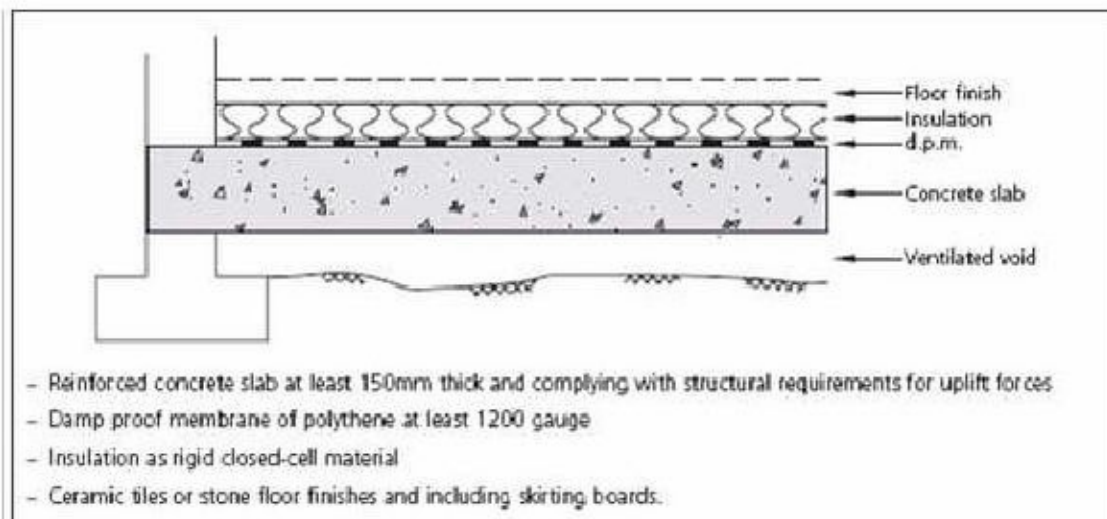


Figure 8: Suspended Concrete Floor (Source: DCLG, 2007)

Walls

- 6.3.3 Suitable flood proofing measures will need to be incorporated within the walls up to the flood level. Concrete block walls dry quicker than other types such as Aircrete blocks. Clear cavity walls (with no insulation) should be used as they also allow for quicker drying. Insulation can be fitted externally as it is easily replaced. If cavity insulation is preferred then rigid closed cell materials should be used as they have a low moisture take-up (Figure 9).
- 6.3.4 Internal cement renders should be avoided as they prevent effective drying. Standard gypsum plasterboard could be used as a sacrificial material and can be removed after the flood. Lime-based plaster and ceramic tiles are also known to offer some resilience.

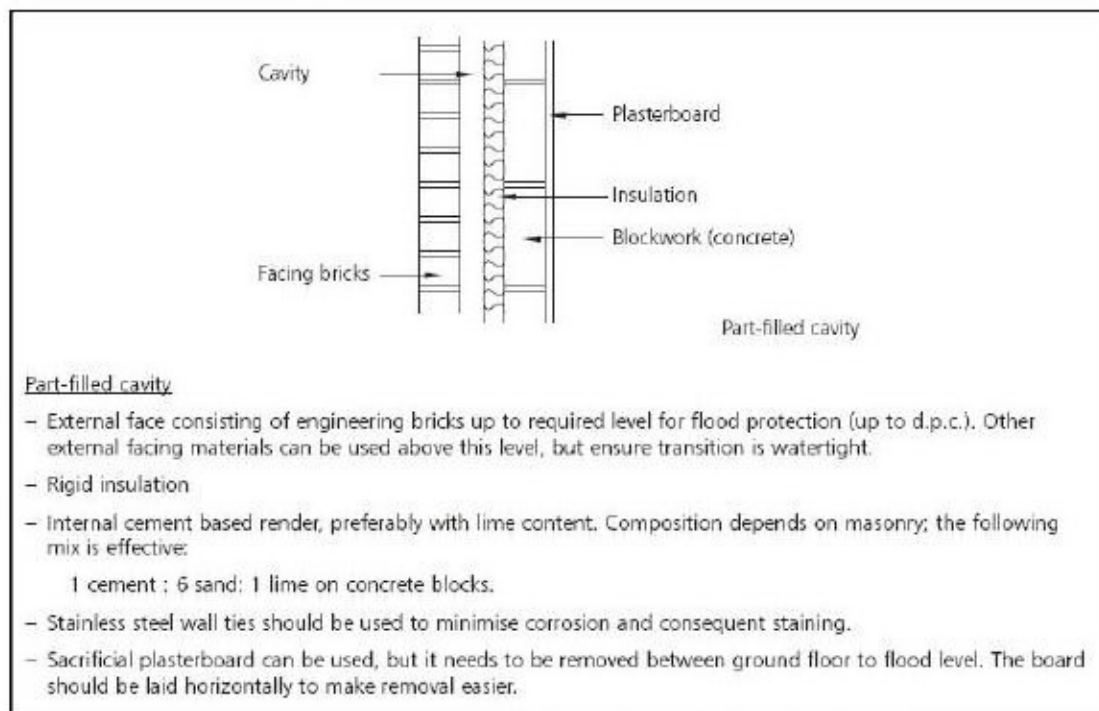


Figure 9: Cavity External Walls (DCLG, 2007)

Fittings

- 6.3.5 Durable fittings which are not affected by floodwater could be used internally (e.g. plastic or stainless steel units). Wood fittings should be avoided; however sacrificial fittings can be installed which can then be replaced easily after the flood. There should be gaps behind the fittings to promote drainage and drying.

Services



- 6.3.6 It will not be practical to raise ground floor electrical sockets above the flood level. However, the mains supply of electric should be turned off in the event of a flood, and boiler units should be placed as high as possible. Wiring for communications should also be insulated to prevent damage. Non-return valves are recommended to prevent back-flow of foul water.
- 6.3.7 It is recommended that after the event, a structural survey is carried out in order to assess any damage due to prolonged periods of flood water exposure. The CIRIA guidance document (C623) entitled *Standards for the repair of buildings following flooding* outlines the various approaches.


6.4 Reducing Vulnerability to the Hazard

- 6.4.1 The Agency aims to provide up to 12 hours notice before the issue of a *Flood Warning* for tidal events. It is understood that the police and other emergency services will assist in the evacuation to rest centres operated by the Council. People at the site will need to make a judgment themselves with regards to the flood hazard if evacuation is attempted and not solely rely on the emergency services.
- 6.4.2 It is recommended that the occupants liaise with the Agency in order to register with the Agency's Flood Warnings Direct service and ensure that they are aware of the flood risk so that they have the option to evacuate upon receipt of a *Flood Warning* or upon the instruction of the emergency services.
- 6.4.3 The occupants should develop a *Family Flood Plan*. Further guidance is offered in the Environment Agency's guidance document entitled *What to do before, during and after a flood*. The *Family Flood Plan* should consider, for example, information about vital medication needed and a *Flood Kit*.
- 6.4.4 A *Flood Kit* is a useful precautionary measure especially if evacuation from the site is prolonged. The kit should be stored in an accessible location to ensure that it is not affected by floodwater. The contents should also be checked every 6 months and items replaced if necessary.
- 6.4.5 It may be sensible to compile two *Flood Kit's* to suit each eventuality. For example, a smaller kit could be compiled which would allow the occupants to carry it during evacuation. A larger kit could also be compiled which included additional food and beverage items in case of ongoing refuge within the property. Both kits should contain the necessary items as suggested below.
1. Important documents
 2. Torch and batteries
 3. Mobile phone (fully charged)
 4. First-aid kit
 5. Wind-up radio
 6. Important telephone numbers

7. Bottled water
8. Non-perishable food provisions
9. Rubber Gloves and wellington boots
10. Medication or information relating to medication and its location
11. Blankets, warm clothes
12. Essential toiletries
13. Camera to record any damage
14. Emergency cash

Table 4: Flood Event Action Plan

Environment Agency Flood Warning Code	What to do!	Evacuate?
Flood Alert (Flooding Possible. Be aware/prepared! Watch Out).  FLOOD ALERT	<ul style="list-style-type: none"> • Monitor flood risk through media and Floodline Warnings Direct. • Locate family members and inform them of risk. If away from the site make assessment on risk if considering returning to site (i.e. how long it will take to return etc). • Check flood kit, check occupants, check pets – BE PREPARED in case the situation gets worse. 	<p>Not necessary.</p> <p>Occupants can evacuate themselves if they feel unsafe providing that they make a judgement in relation to any external flood hazard. Take flood kit, occupants and pets with you.</p>
Flood Warning (Flooding of homes, businesses and main roads is expected. Act now!).  FLOOD WARNING	<ul style="list-style-type: none"> • Maintain communication through Floodline Warnings Direct and the media. • Begin to implement Flood Plan. • Consider advice given from emergency services/Environment Agency. • Check insurance, Check flood kit, Check Pets. • Check alternative accommodation arrangements. 	<p>Occupants can evacuate themselves if they feel unsafe providing that they make a judgement in relation to any external flood hazard. Take flood kit, occupants and pets with you.</p> <p>People who do not evacuate should reside across upper floor.</p> <p>No formal evacuation or rest centre set-up will be undertaken at this warning level, however, if flooding is experienced across the area emergency services will rescue people.</p>
Severe Flood Warning (Severe flooding is expected. Imminent danger to life and property. Act now!).	<ul style="list-style-type: none"> • Leave site immediately if not already done so. • Take flood kit, occupants and pets with you. 	<p>Leave site according to advice given by Emergency Services and Council. Take flood kit,</p>

 <p>SEVERE FLOOD WARNING</p>	<ul style="list-style-type: none"> Follow advice given by Emergency Services and Council. 	<p>occupants and pets with you.</p> <p>If evacuation cannot be undertaken, people should reside across upper floor with <i>flood kit</i> and maintain communication with the emergency services.</p>
<p>Warnings no longer in force (No further flooding is expected in the area. Be careful).</p>	<ul style="list-style-type: none"> Return to site upon instruction from emergency services and assess any damage. Contact insurance company depending on damage caused. Beware of flood debris. Do not touch sources of electricity. Arrange for utilities to reconnect services. Do not dispose of damaged property until your insurance company has agreed. 	<p>Not applicable, however site may be uninhabitable.</p> <p>Return to site upon instruction from emergency services as floodwater may not have receded.</p>

6.5 Vulnerable Groups

6.5.1 The occupants at the site may include vulnerable groups such as elderly people, those with sensory or physical disabilities, minority ethnic groups, or the infirm. Priority will need to be given to these people during the flood event.

6.5.2 Vulnerable groups should be identified and priority should be given to these groups.

6.6 Safe Access/Egress

6.6.1 Safe access/egress would not be available from the site during the peak of the design defended climate change 1 in 200 year event. By reviewing the survey data, together with the Agency's flood data, the hazard to people would be *Dangerous for All* for 15m, *Dangerous for Most* for 48m then *Very low*.

6.6.2 A flood response plan will be compiled to ensure that the occupants are aware of the flood risk and procedures to take before, during and after a flood.

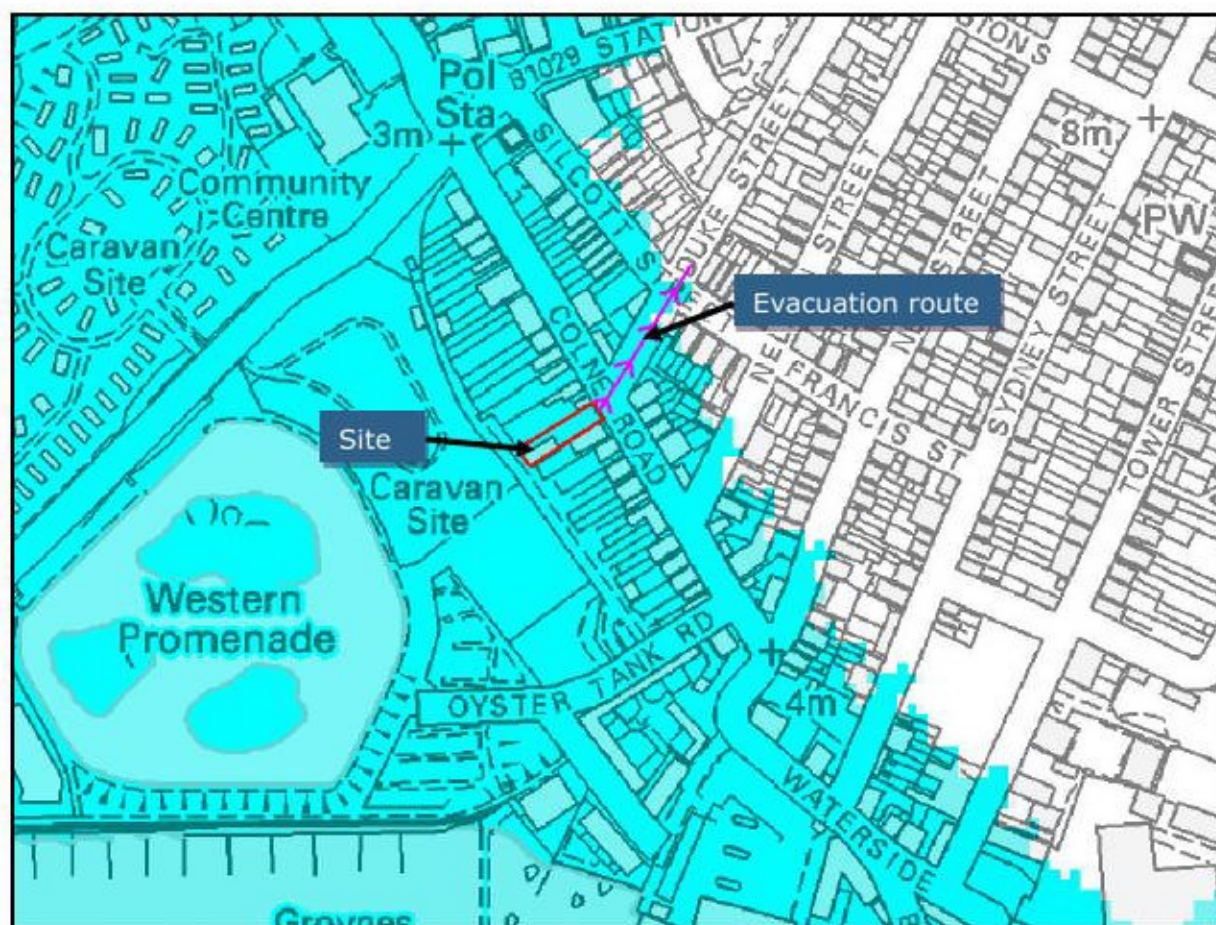


Figure 10: Preferred evacuation route in relation to defended 200yrCC flood extent

6.7 Insurance

- 6.7.1 The Association of British Insurers (ABI) published a guidance document in 2012 entitled *Guidance on Insurance and Planning in Flood Risk Areas for Local Planning Authorities in England*.
- 6.7.2 The ABI guidance sets out the requirements of the insurance industry when considering flood risk and insurability of the property. The guidance suggests that properties should be protected for flood events up to the climate change 1 in 100 year event in order to access insurance at a competitive price.
- 6.7.3 The guidance also states that insurers would of course prefer to cover properties which are not at risk of flooding, however, for those properties which are at risk of flooding insurers would prefer that the properties are raised above the flood level, over resistance measures which prevent floodwater from entering the building, or resilience measures which allows floodwater to enter the building.
- 6.7.4 It is not practical to raise the ground floor level above the flood level, however, flood resilience measures have been proposed up to the climate change 1 in 1000 year event. Therefore, the ABI's requirement of protection during the climate change 1 in 100 year event will be exceeded and there will be a good chance of the property being insured at a competitive rate.

7. OTHER SOURCES OF FLOODING

7.1 Groundwater Flooding

- 7.1.1 In order to assess the potential for groundwater flooding during higher return period rainfall events, the Jacobs/DEFRA report entitled *Strategy for Flood and Coastal Erosion Risk Management: Groundwater Flooding Scoping Study*, published in May 2004, was consulted, together with the guidance offered within the document entitled *Groundwater flooding records collation, monitoring and risk assessment (ref HA5)*, commissioned by DEFRA and carried out by Jacobs in 2006.

Soil and Geology at the Site

- 7.1.2 It can be seen from the various soil and hydrogeological data, listed in Section 2, that the soils beneath the site comprise clay, silt and sand.

Groundwater Flooding Potential at the Site

- 7.1.3 There have been no recorded groundwater flood events across the area between 2000 and 2003, as indicated by the Jacobs study. The 2009 SFRA indicates on Map 3 that there have been no recorded historical incidents of groundwater flooding at the site.
- 7.1.4 Appendix 10 of the SFRA 2017 shows that there is 50% to 75% susceptibility to groundwater flooding.

7.2 Surface Water Flooding and Sewer Flooding

- 7.2.1 Surface water and sewer flooding across urban areas is often a result of high intensity storm events which exceed the capacity of the sewers thus causing them to surcharge and flood. Poorly maintained sewer networks and blockages can also exacerbate the potential for sewer flooding.
- 7.2.2 The Agency's Surface Water Flood Risk Map (Figure 11) indicates that there is a very low surface water flooding risk (i.e. less than 1 in 1000 year chance) across the part of the site intended for the dwelling.
- 7.2.3 It is generally accepted that the low risk flood event (i.e. between 1 in 1000 years and 1 in 100 years) on the Agency's map is used as a substitute for the climate change 1 in 100 year event to provide a worst-case scenario.
- 7.2.4 Map 3 of the 2009 SFRA indicates that there have been no recorded historical incidents of surface water flooding at the site. Map 9 of the 2009 SFRA shows that the site is located across an area with a low surface water flooding risk. Appendix 7 of the SFRA 2017 shows that the site is located across an area with a very low surface water flooding risk.
- 7.2.5 Map 10 of the 2009 SFRA indicates that for the postcode CO7 there have been 18 properties affected by sewer flooding up to 2009 as confirmed by Anglian Water. Map 3 of the 2009 SFRA indicates that there have been no recorded historical incidents of sewer flooding at the site.

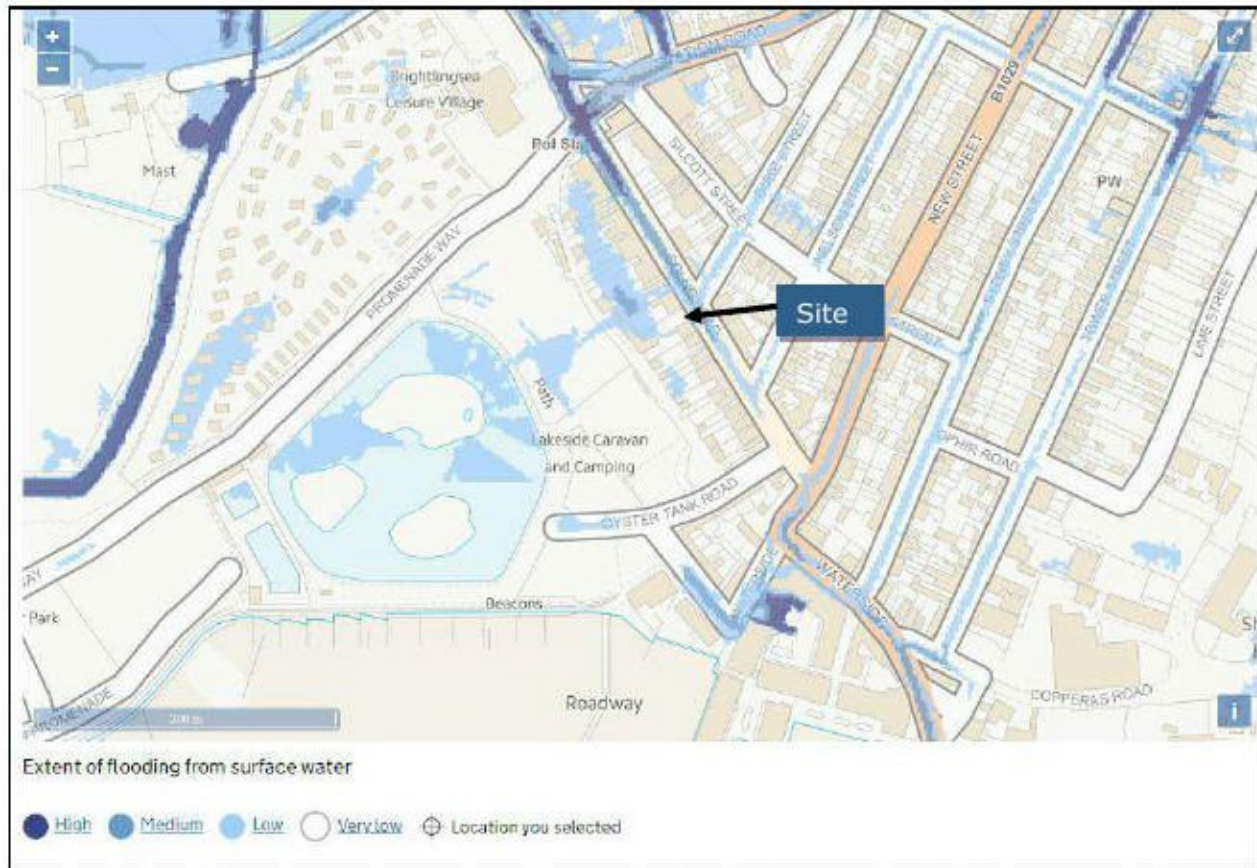


Figure 11: Environment Agency Surface Water Flooding Map (Source: Environment Agency, 2021)

7.3 Reservoirs, Canals And Other Artificial Sources

- 7.3.1 The failure of man-made infrastructure such as flood defences and other structures can result in unexpected flooding. Flooding from artificial sources such as reservoirs, canals and lakes can occur suddenly and without warning, leading to high depths and velocities of flood water which pose a safety risk to people and property.
- 7.3.2 The Environment Agency's "Risk of flooding from reservoirs" map suggests that the site is not at risk from reservoirs or other artificial sources.

8. CONCLUSIONS

- The site is located within the NPPF Flood Zone 3 from a tidal surge event within the River Colne/North Sea. The "actual risk" to the site from overtopping is high.
- Applying the Upper End climate change increase of 0.32m results in a defended 200yrCC flood level of 5.64m AOD and 1000yrCC flood level of 5.87m AOD.
- The proposed ground floor will be set at 3.90m AOD. The first floor level will be set at 6.60m AOD.
- A *Water Entry Strategy* should be adopted across the ground floor area of the building to reduce the differential depth to safe limits during the design and extreme event and to protect property.
- A warning and evacuation strategy has been developed within this assessment. It is proposed that the occupants register with the Agency's *Flood Warnings Direct* and prepare a *Family Flood Plan*.
- Safe access/egress cannot be achieved during the peak of the design event and extreme event, however, it is recommended that the occupants evacuate the site during the early warning stages. Safe refuge is available during the peak of the flood event across the upper floor.
- It is considered that there is a low risk of groundwater flooding at the site from underlying deposits. There is a very low surface water flooding risk.

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APPENDIX A – BREACH MAPPING

Breach Hazard Mapping - Colne & Blackwater Breaches



Environment Agency
Iceni House
Cobham Road
Ipswich
Suffolk
IP3 9JD



0 240 480 960
Metres
1:20,000

Legend

Main Rivers

Breach_Location



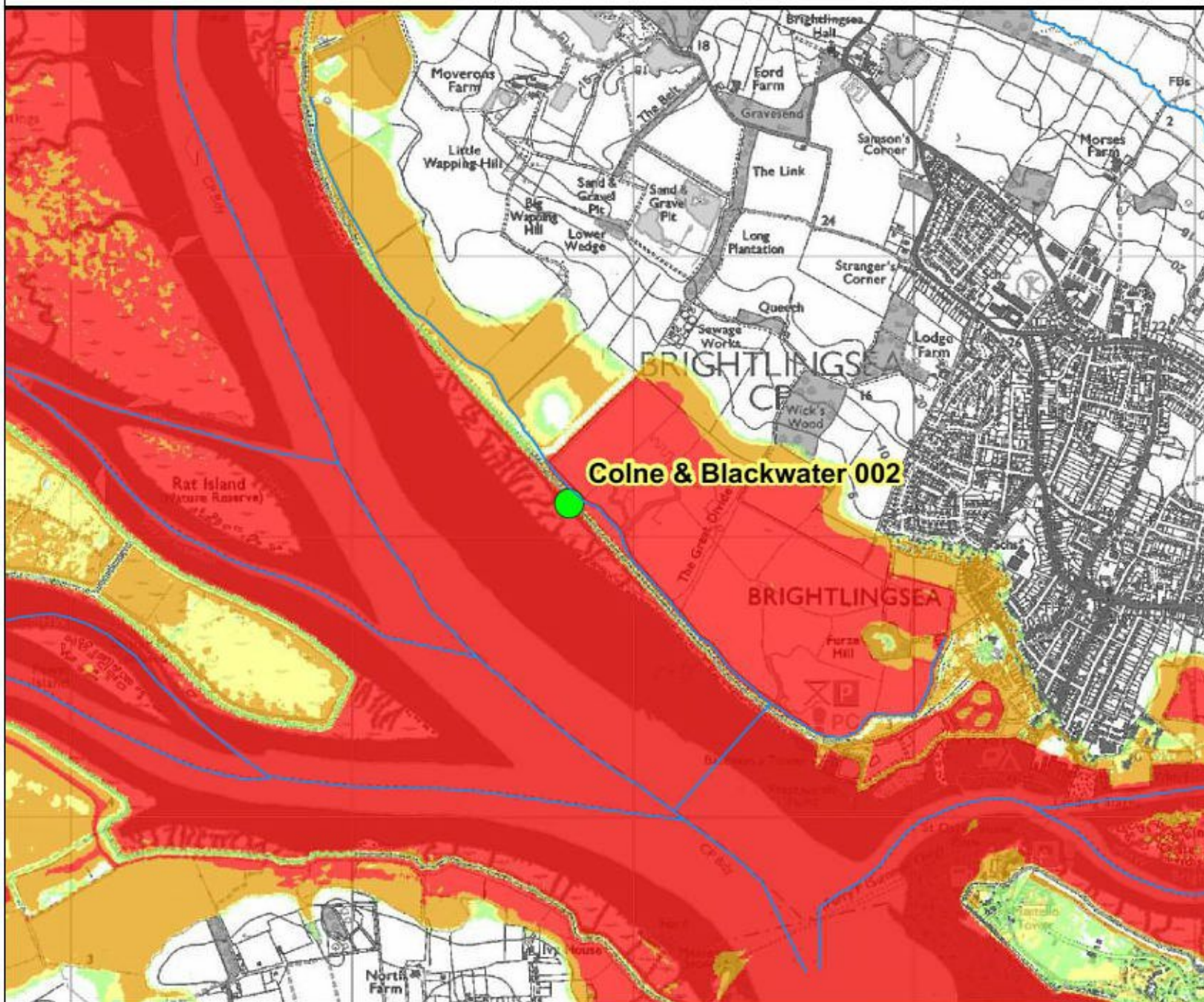
Max Hazard - 200 Year Present Day

- Less than 0.75 (Low Hazard)
- Between 0.75 and 1.25 (Danger for Some)
- Between 1.25 and 2.00 (Danger for Most)
- Greater than 2.00 (Danger for All)

This map shows the level of flood hazard to people (called a hazard rating) if our flood defences are breached at certain locations, for a range of scenarios. The hazard rating depends on the depth and velocity of the flood water, and the maximum values of these are also mapped.

The map is based on computer modelling of simulated breaches at specific locations. Each breach has been modelled individually and the results combined to create this map. Multiple breaches, other combinations of breaches, different sized tidal surges or flood flows may all give different results.

The map only considers the consequences of a breach, it does not make any assumptions about the likelihood of a breach occurring. The likelihood of a breach occurring will depend on a number of different factors, including the construction and condition of the defences in the area. A breach is less likely where defences are of a good standard, but a risk of breaching remains. Please contact the Environment Agency for further information on emergency planning associated with flood risk in this area.



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0 240 480 960
Metres
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Legend

Main Rivers

Breach_Location



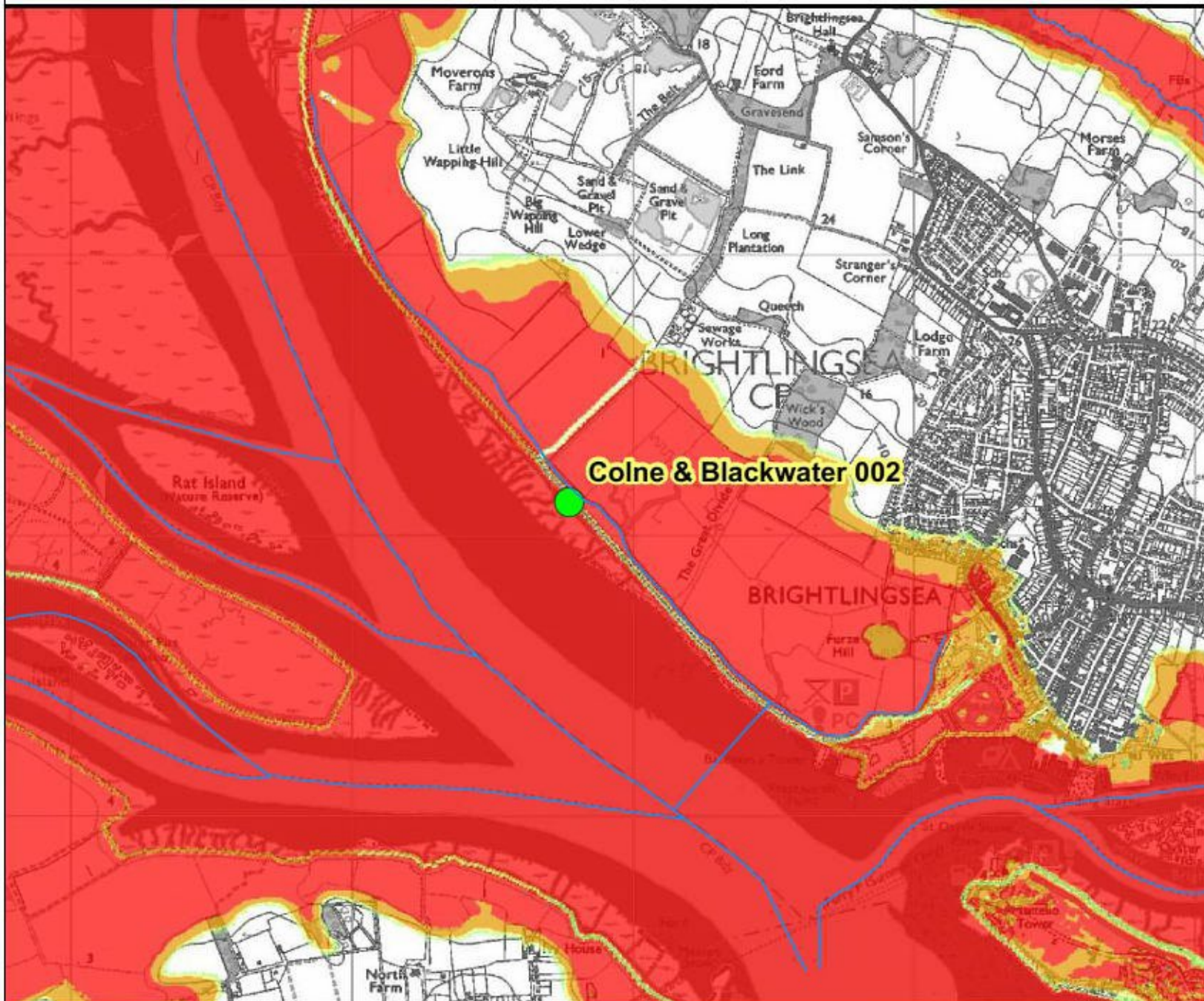
Max Hazard - 1000 Year Present Day

- Less than 0.75 (Low Hazard)
- Between 0.75 and 1.25 (Danger for Some)
- Between 1.25 and 2.00 (Danger for Most)
- Greater than 2.00 (Danger for All)

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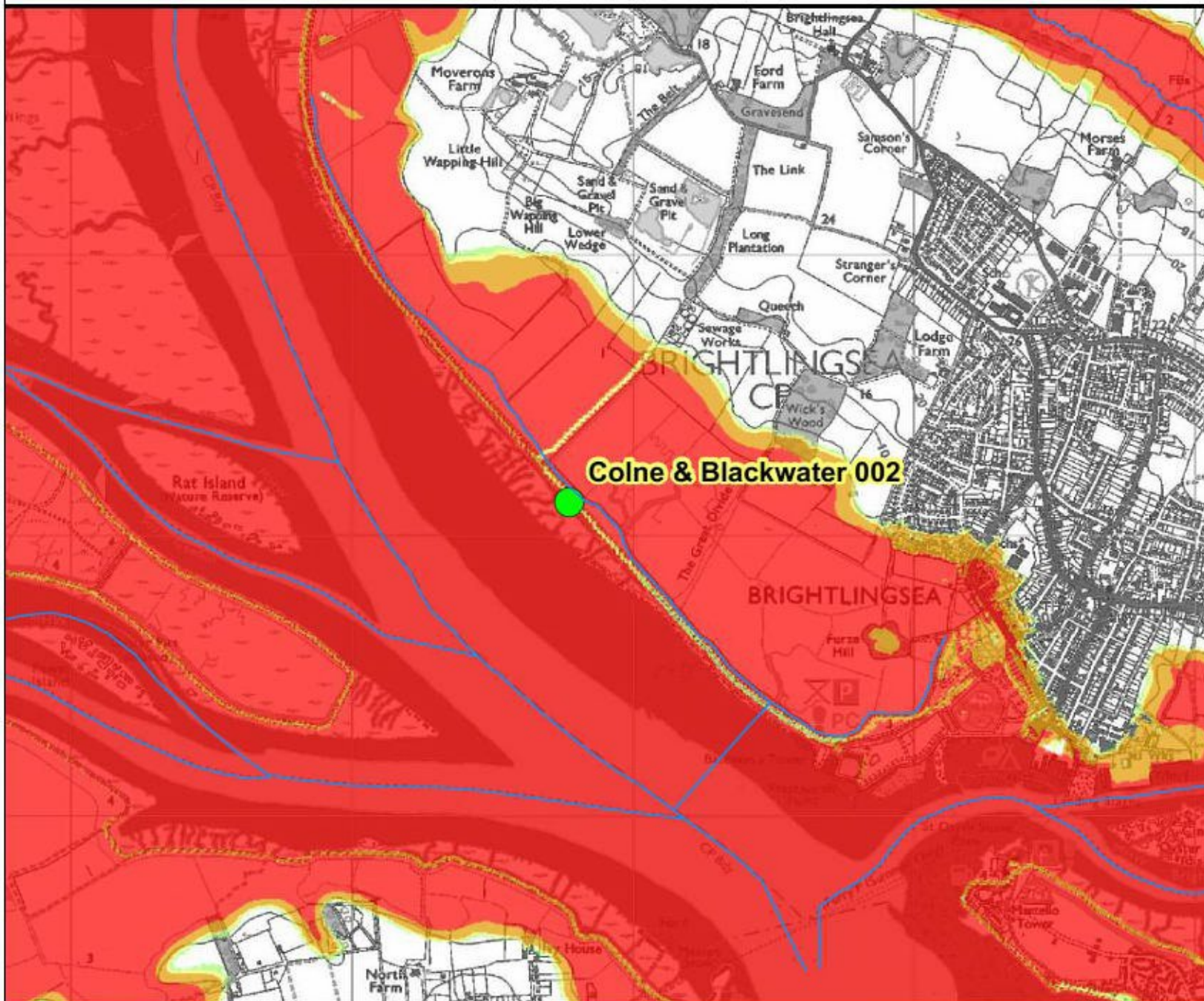
Max Hazard - 200 Year Climate Change

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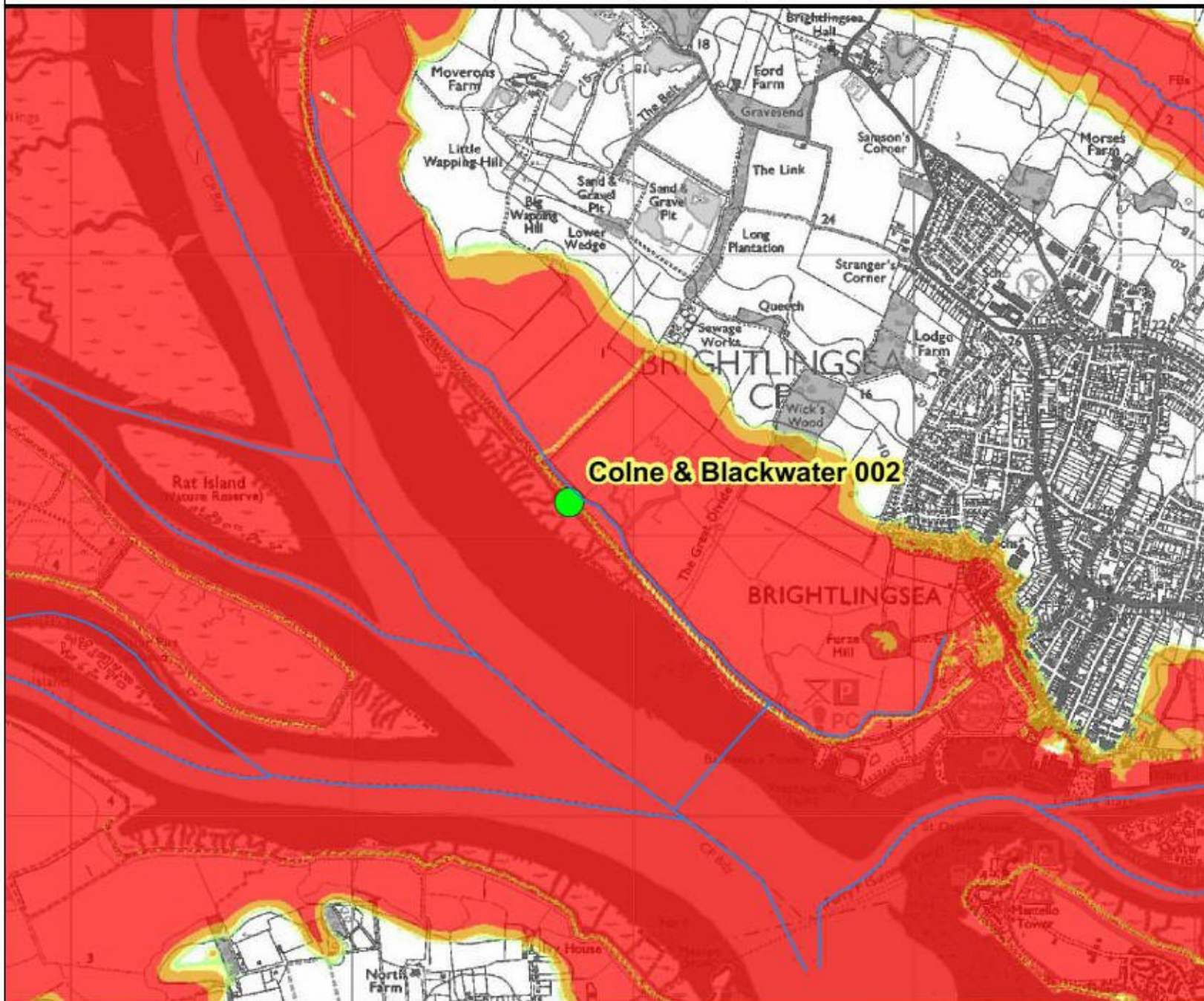
Max Hazard - 1000 Year Climate Change

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Breach Depth Mapping - Colne & Blackwater Breaches



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Ipswich
Suffolk
IP3 9JD



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Metres
1:20,000

Legend

Main Rivers



Breach_Location



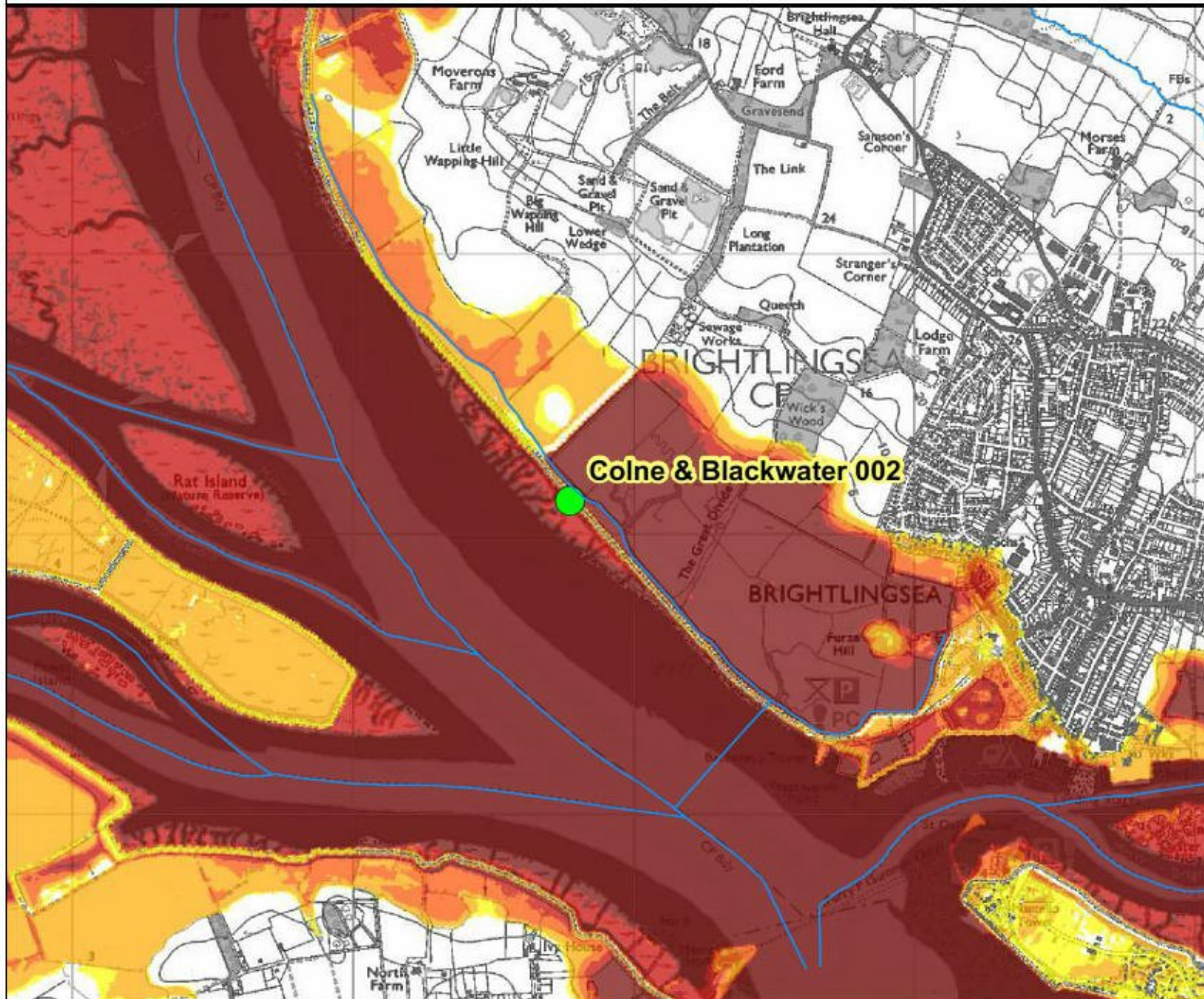
Max Depth (m) 200 Year Present Day

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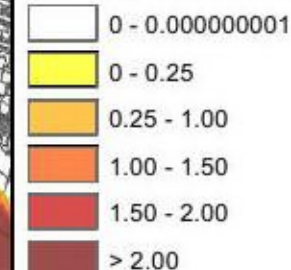
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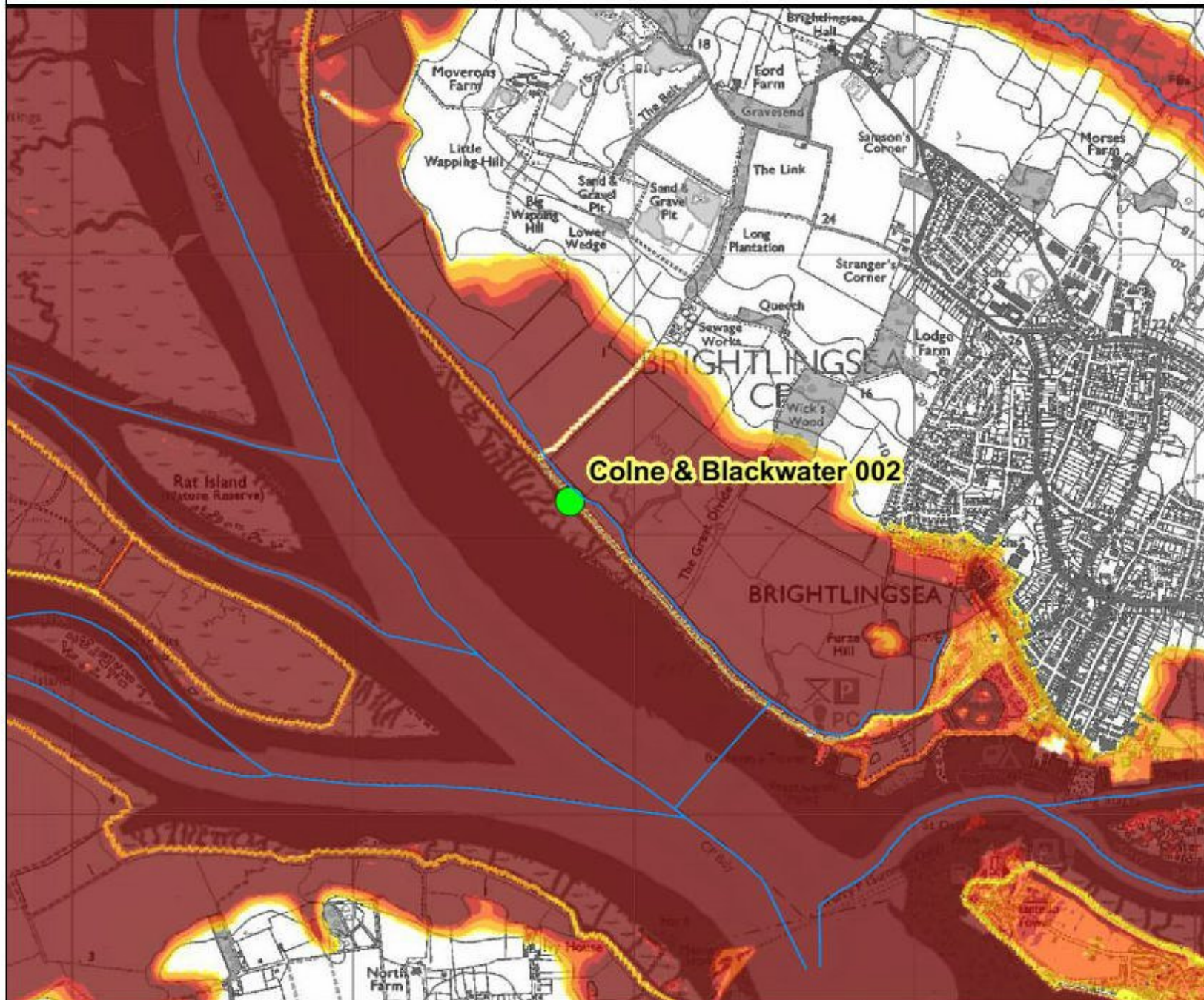
Max Depth (m) 1000 Year Present Day



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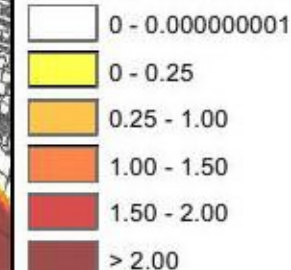
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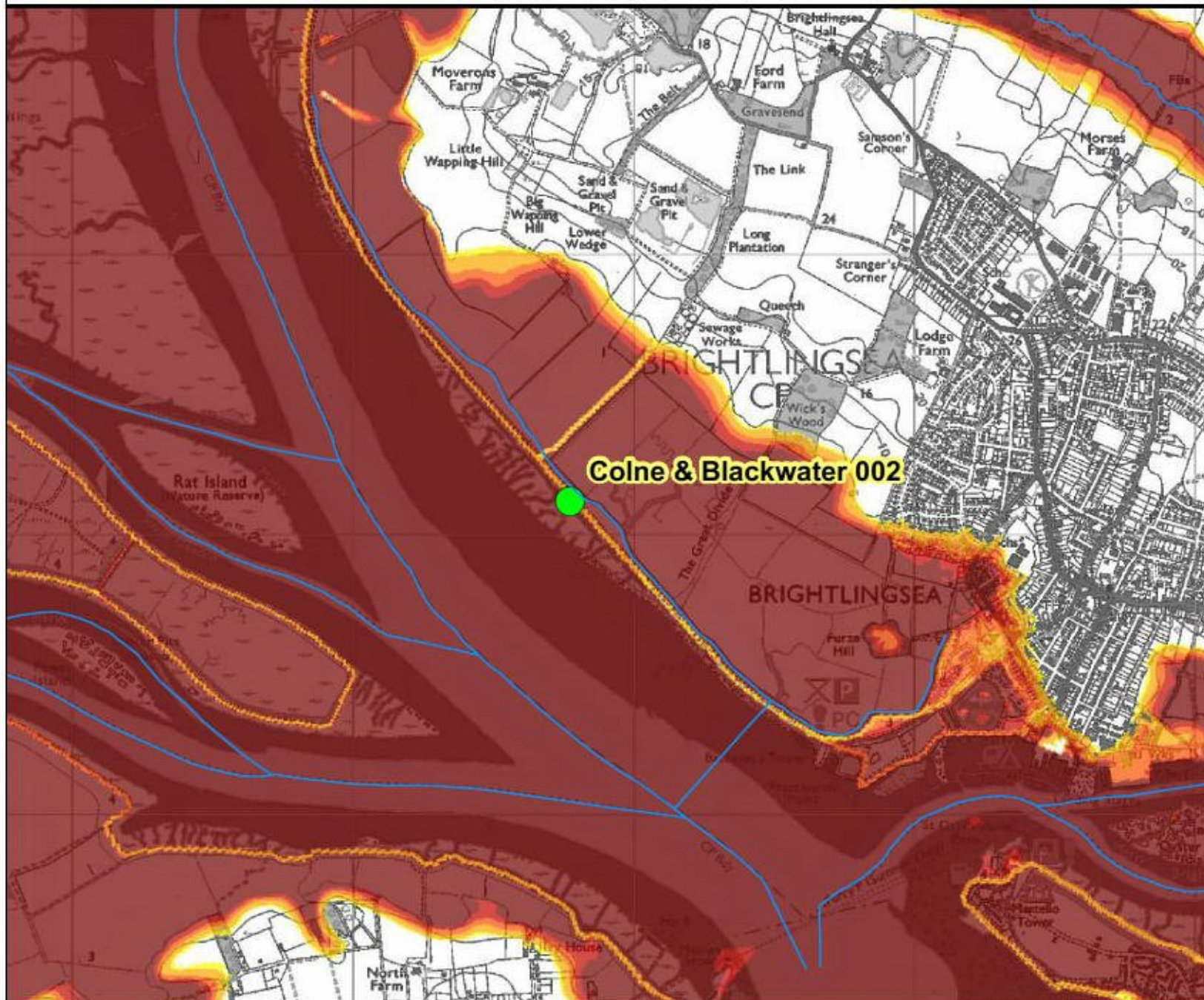
Max Depth (m) 200 Year Climate Change



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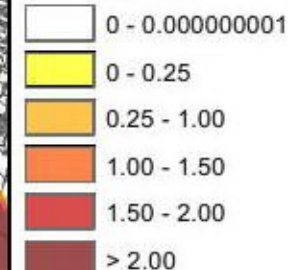
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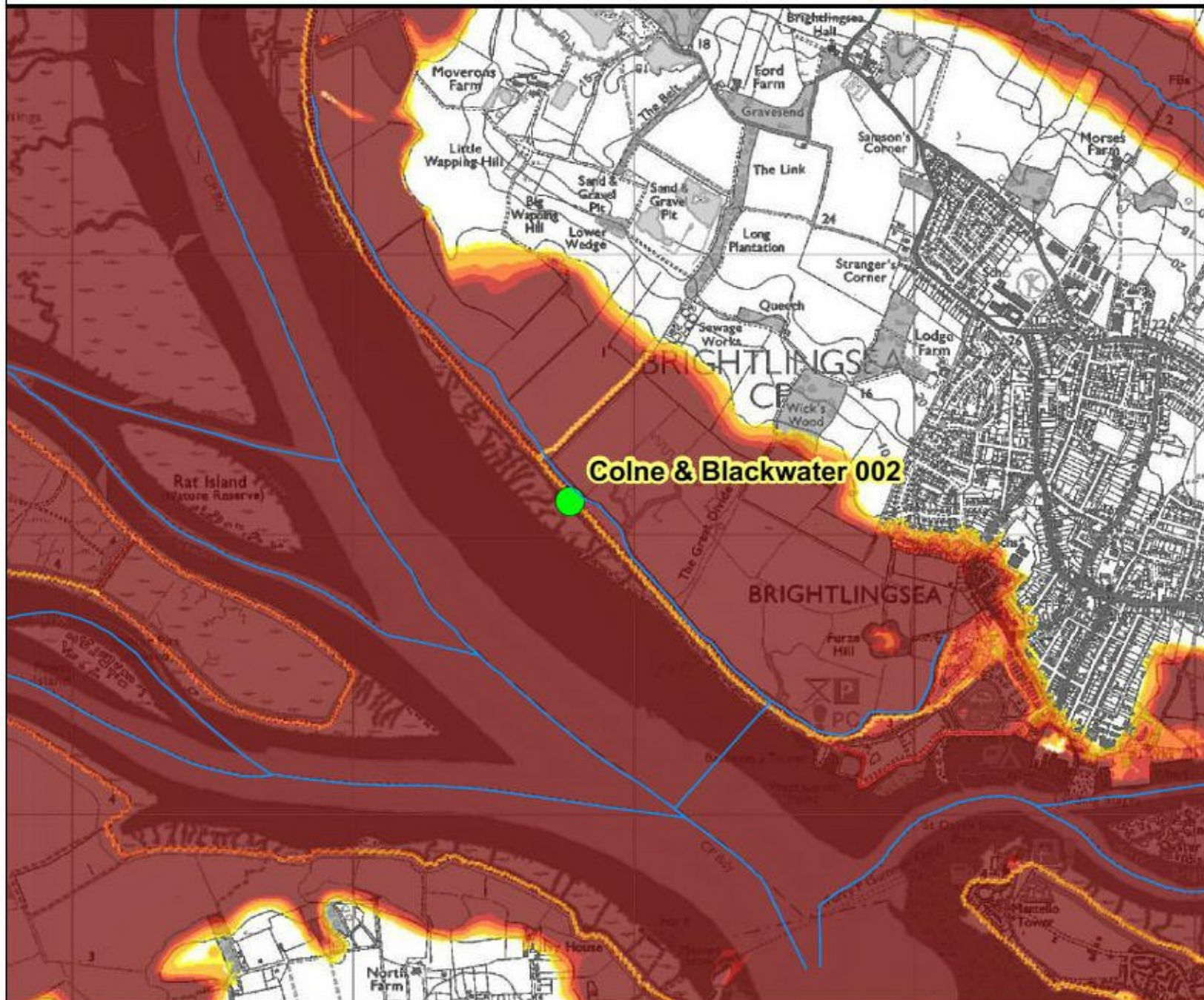
Max Depth (m) 1000 Year Climate Change



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DRAWINGS



LEGEND	
AV	Air valve
BB	Beisha beacon
BL	Boilard
BS	Bus stop
BT	British telecom
CATV	Cable TV
CCTV	Closed circuit TV
CL	Cover level
CB	Control box
ELP	Electricity lamp post
EP	Electricity pole
ER	Earth rod
FH	Fire hydrant
FP	Feeder post
FWS	Foul water sewer
G	Gully
GV	Gas valve
IC	Inspection cover
IL	Invert level
LB	Letter box
LP	Lamp post
KD	Kerb outlet
MH	Manhole
MP	Marker post
RE	Rodding eye
RNB	Road name board
RS	Road sign
RWP	Rain water pipe
SC	Stop cock
SP	Sign post
SV	Stop valve
SWS	Surface water sewer
SY	Stay
TCB	Telephone call box
TOW	Top of wall level
TP	Telephone pole
U/C	Unknown cover
UTL	Unable to lift
VP	Vent pipe
WB	Waste bin
WM	Water meter
WO	Wash out

NOTES:

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Drainage pipe sizes (where shown) have been determined from the surface and should be regarded as approximate only.

Drainage runs between inspection covers have not been investigated or proven and should be confirmed prior to any design or construction.

Tree species (where shown) should be treated with caution and expert identification is advised.

g = girth sp = spread
m/s = multistem c/l = crown level

MODIFIED NATIONAL GRID COORDINATES - SF=1.00				
STN	EASTING	NORTHING	LEVEL	REMARKS
1	608423.679	216496.049	4.021	NAIL
2	608406.257	216484.102	3.772	NAIL
3	608396.958	216442.888	3.498	NAIL
4	608375.593	216459.968	3.580	NAIL

Notes:

National Grid coordinates and levels have been derived using GPS techniques and transformed on to the OSGB36 Coordinate System using Leica Smartnet.

Stn2 has been held fixed at its true OS position and the traverse computed on a plane grid.



JOB

43 COLNE ROAD, BRIGHTLINGSEA,
ESSEX, CO7 0DU.

CLIENT

GAVIN HOCKEY

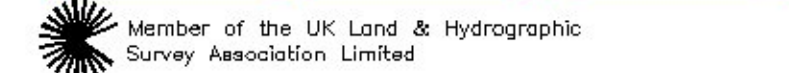
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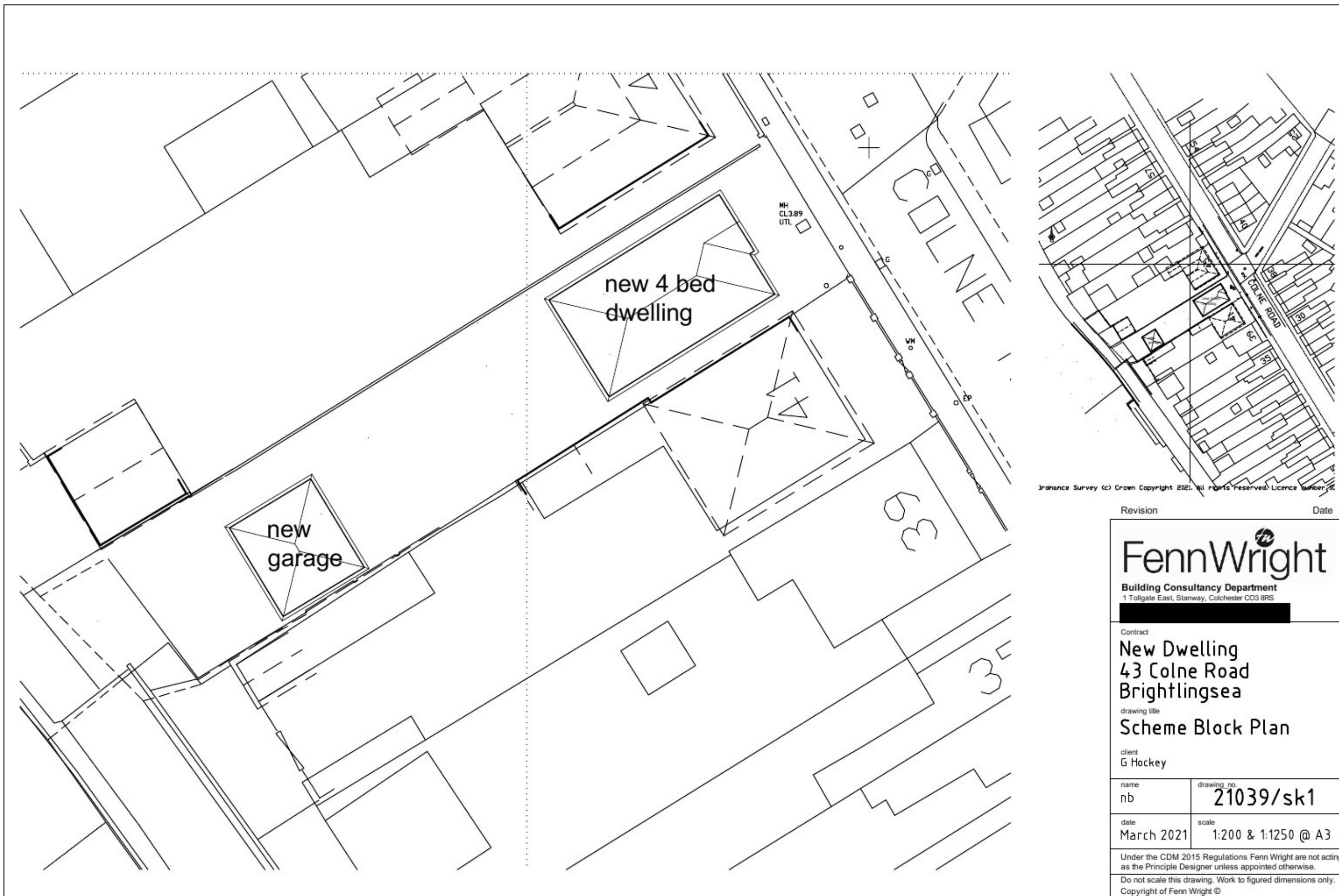
TOPOGRAPHICAL SURVEY

DRG. No.
LS5934/1

SCALE
1:200

DATE
MARCH 2021





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Revision
Date

FennWright

Building Consultancy Department
1 Tollgate East, Stanway, Colchester CO3 8RS

Contract

**New Dwelling
43 Colne Road
Brightlingsea**

drawing title

Scheme Block Plan

client

G Hockey

name

nb

drawing no.

21039/sk1

date

March 2021

scale

1:200 & 1:1250 @ A3

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