



FloodSmart Plus

Site address	Land at Sheering Lower Road Sawbridgeworth CM21 9LH
Site coordinates	549193, 214978
Report prepared for	Christine Watt, Marian Wills and Sheelagh Hedge Attention: C/O Sworders 3, The Gate House Hadham Hall Little Hadham Ware Hertfordshire SG11 2EB
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1. Executive summary

The National Planning Policy Framework (NPPF)(2012) and National Planning Practice Guidance (NPPG)(2014) requires that flood risk assessments review flooding from all potential sources. A review has been undertaken of national environmental data sets to assess the potential flood risk to the Site. The review is provided within this concise interpretative report written by an experienced GeoSmart flood risk consultant.

Site analysis

Source of Flood Risk	Baseline	After Mitigation
Rivers (fluvial) and the Sea (coastal)	Low	n/a
Surface water (pluvial) flooding	Very Low to High	Very Low to Low
Groundwater flooding	Negligible to Moderate	Negligible to Low
Other flood risk factors present	Yes	Low
Is any other further work recommended?	Yes	Yes (Please see below)

N/A = mitigation not required

The Site is currently a green field plot of grass land covering approximately 0.63 ha. A review of historical land uses indicates the Site was a former gravel pit. Proposals are to develop the Site with 14 residential properties, including associated access and landscaping. The layout of the proposed scheme has not been fixed.

Fluvial Flood Risk

According to the EA's Flood Map for Planning Purposes, the Site is located within Flood Zone 1 and is therefore classified as having a low probability of fluvial flooding from the River Stort. According to the Essex County Council Asset Register, the Site is not located within a Critical Drainage Area (CDA), but the Site is located within Epping Forest District Council's Flood Risk Assessment Zone (FRAZ).

Due to the Sites proximity to the EA's Flood Zones (30m to the west), modelled flood data was obtained from the EA to confirm the flood extents including climate change.

Analysis of this data confirms the whole Site would remain flood free in all fluvial events up to and including the 1 in 100 year plus a 70% allowance for climate change therefore no mitigation is required.

Pluvial Flood Risk

According to the EA's Risk of Flooding from Surface Water (pluvial) mapping, the majority of the Site is at low to very low risk of pluvial flooding. However, areas close to the western, north/western and northern site boundary are at high to moderate pluvial risk. Flood levels during the 1% annual probability (1 in 100 year) storm event (moderate risk) would be up to 0.3m depth in the west and north of the Site (where ground elevations are below 49.7 mAOD). During a 0.1% annual probability (1 in 1000 year) storm event (low risk), the western area of the Site becomes part of an overland flow route, which emerges from Lower Sheering Road; flood depths of up to 0.6m could occur within isolated depressions in this event.

Analysis of this data confirms that half of the Site would remain flood free in all pluvial events up so no mitigation is required. Half of the Site is at risk of pluvial flooding but can still be developed as long as suitable mitigation is provided for developments. It is advised that, even with mitigation, development in high risk areas is avoided.

Groundwater Flood Risk

Based on the GeoSmart Groundwater Flood Risk (GW5) Map, the majority of the Site is considered to be at negligible risk of groundwater flooding. Although an area in the west of the Site is at moderate risk, due to the presence of superficial deposits towards the west of the site (deposits of Head - Clay, Silt, Sand and Gravel). The Site may have been subject to historical mineral extraction therefore the presence of any resulting void, or infill material, may impact the likelihood of groundwater flooding locally.

Analysis of this data confirms that the majority of the Site is likely to remain flood free however the presence of any resulting void, or infill material, may impact the likelihood of groundwater flooding locally. Areas of the Site at risk of groundwater can still be developed as long as suitable mitigation is provided for developments.

Additional sources of Flood Risk

The Site is not at risk of Reservoir Flooding. The SFRA has not identified any specific drainage issues within the Site area but there are mapped incidences of flooding with an unknown origin located close to Station Road Bridge over the River Stort, therefore flood risk as a result of bridge structures cannot be fully discounted.

Recommendations / Next steps

Recommendations for mitigation are provided below, based upon the proposed development and the flood risk to the Site

Pluvial flood risk

- Potential development could be aimed away from the areas mapped at high to moderate pluvial flood risk.

Or

- Include suitable mitigation measures, including Sustainable urban Drainage Systems (SuDS) and flood resilient materials and designs for all development located within a pluvial flood risk area (see section 7 for further detail). Raising finished floor levels by 0.3m could also ensure internal flooding does not occur during a 1% annual probability (moderate risk) pluvial event. It is advised that, even with mitigation, development in high risk areas is avoided.

Groundwater flood risk

- If basement areas are proposed within the west of the Site, waterproofing measures such as tanking and sump and pump systems should be considered. Ground levels should slope away from any ground floor areas of buildings within this area.

Additional sources of Flood Risk and considerations

- The regular maintenance of any drains and culverts surrounding/on the Site should be undertaken to reduce the flood risk and potential for blockage

Providing the recommended mitigation measures are put in place (see previous sections) it is likely that flood risk to this Site should be reduced to an acceptable level and there should be no impediment to development.

2. Introduction

Background and purpose

This assessment has been undertaken by firstly compiling information concerning the Site and the surrounding area. The information gathered was then used to construct a 'conceptual site model', including an understanding of the appropriateness of the development as defined in the NPPF (2012) and the source(s) of any flood risk present. Finally, a preliminary assessment of the steps that can be taken to manage any flood risk to the development was undertaken.

This report has been prepared with reference to the National Planning Policy Framework (NPPF, 2012).

"The National Planning Policy Framework set out the Government's planning policies for England and how these are expected to be applied" (NPPF, 2012).

The National Planning Policy Framework promotes a sequential, risk based approach to the location of development.

"This general approach is designed to ensure that areas at little or no risk of flooding from any source are developed in preference to areas at higher risk. The aim should be to keep development out of medium and high risk flood areas (Flood Zones 2 and 3) and other areas affected by other sources of flooding where possible" (NPPG, 2014).

The purpose of this report is to provide clear and pragmatic advice regarding the nature and potential significance of flood hazards which may be present at the Site.

Report scope

A thorough review of a commercially available flood risk report and Environment Agency supplied data indicating potential sources of flood risk to the Site from rivers and coastal sources, surface run-off (pluvial), groundwater and reservoirs, including historical flood information and modelled flood extent. Appropriate measures are recommended to manage and mitigate the flood risk to the property.

Information obtained from the Environment Agency and a review of the Epping Forest District Council Strategic Flood Risk Assessment Update (SFRA)(2015) is used to ascertain local flooding issues and, where appropriate, identify information to support a Sequential and/or Exception test required as part of the National Planning Policy Framework (NPPF, 2012).

Using the available data the existing and future flood risks to and from the Site from all flood sources will be assessed in line with current best practice.

An indication of potential flood risk from the Site to downstream receptors is provided where the proposed development increases run-off from the Site.

Report limitations

It is noted that the findings presented in this report are based on a desk study of information supplied by third parties. Whilst we assume that all information is representative of past and present conditions we can offer no guarantee as to its validity and a proportionate programme of site investigations would be required to fully verify these findings.

This report excludes consideration of potential hazards arising from any activities at the Site other than normal use and occupancy for the intended land uses. Hazards associated with any other activities have not been assessed and must be subject to a specific risk assessment by the parties responsible for those activities.

Datasets

The following table shows the sources of information that have been consulted as part of this report:

Source of flooding	Datasets consulted				
	Commercial Flood Maps and GW5 Data (Appendix B)	SFRA*	Environment Agency (Appendix C)	Thames Water (Appendix D)	OS Data
Historical	X	X	X		
Fluvial/tidal	X	X	X		
Surface water (pluvial)	X	X	X		
Groundwater	X	X			
Sewer		X		X	
Culvert/bridges		X			X
Reservoir		X	X		

*Epping Forest District Council Strategic Flood Risk Assessment Update (SFRA)(2015)

*Supporting information on the datasets used is provided in the relevant appendix

3. Site analysis



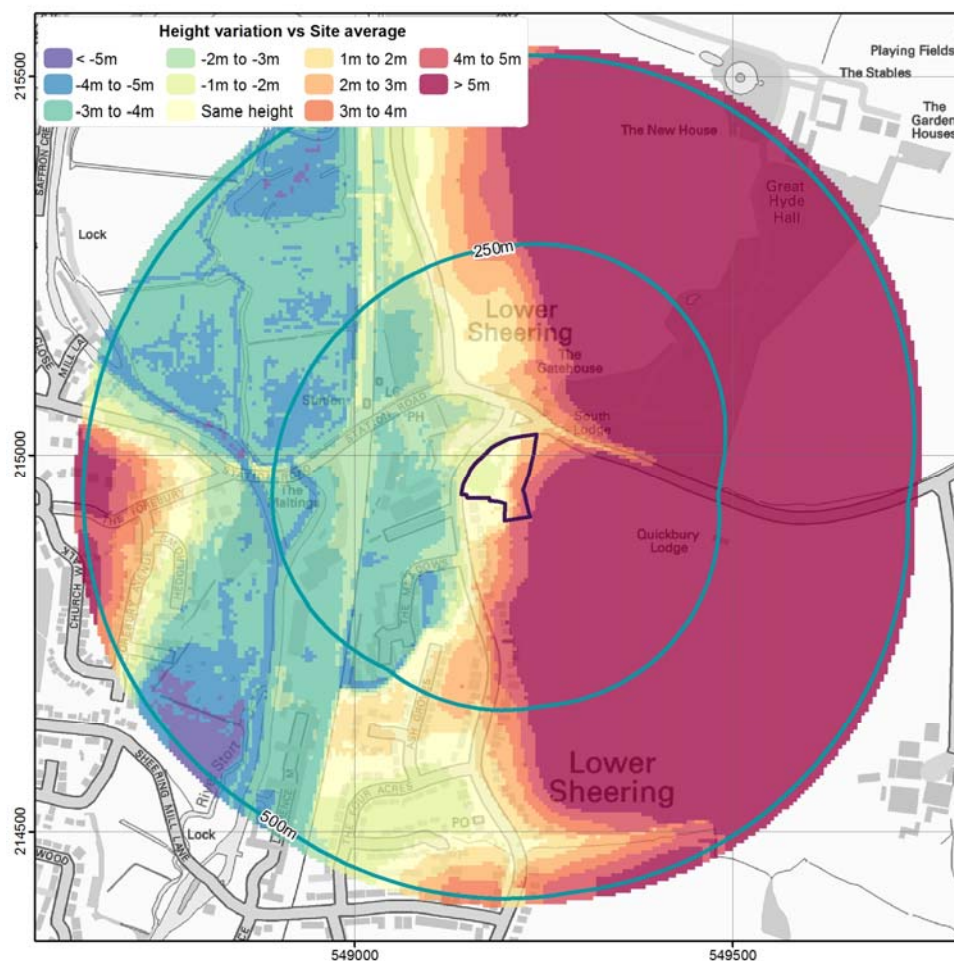
Site information

The Site is located on the outskirts of Sawbridgeworth/Lower Sheering in a setting of agricultural, residential and greenfield land use, National Grid Reference TL 49193 14978 (see Figure 1).

According to OS data the immediate area surrounding the Site is on a valley side between 45-65 mAOD. Using a 500m buffer around the Site, it is noted that to the north land remains c. 55 mAOD. To the east land rises to c. 70 mAOD and to the south remains c. 50 mAOD. To the west, land initially falls to below 45 mAOD before rising to c. 55 mAOD.

The general level of the Site is between 53.88 and 48.35 mAOD with the Site falling gradually in a westerly direction. This is based on a site specific topographic survey, undertaken for the site in October 2017 by Tripoint Surveys Ltd.

Figure 1 Site Location and Relative Elevations



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Development

The Site is currently a green field plot of grass land covering approximately 0.63 ha. A review of historical land uses indicate the site was a former gravel pit until 1920's (www.old-maps.co.uk, 2018). Proposals are to develop the Site with 14 residential properties, including associated access and landscaping. The layout of the proposed scheme has not been fixed.

The effect of the overall development will result in an increase in number of occupants and/or users of the Site and will result in the change of use, nature or times of occupation. The estimated lifespan of the proposed development is 100 years.

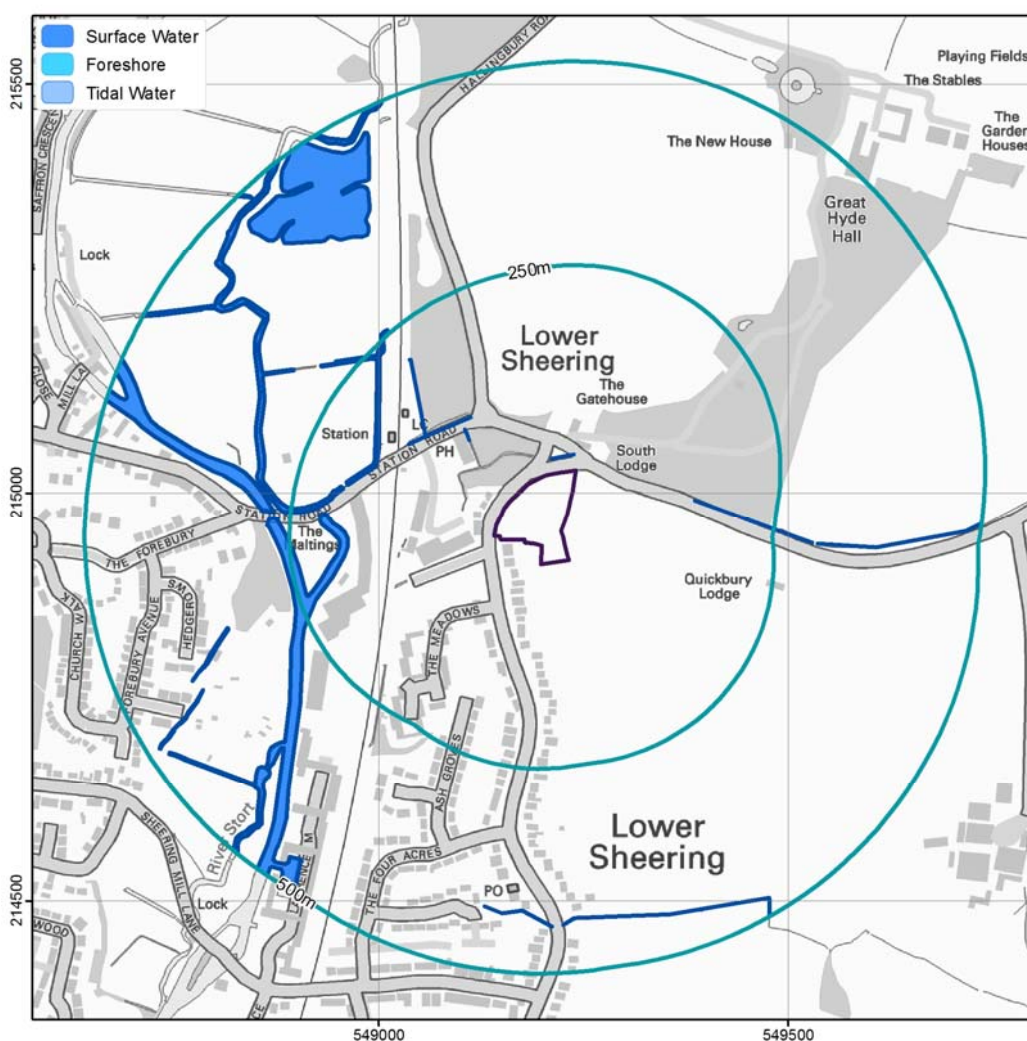


Hydrological features

Watercourses/surface water features within 1km of the Site:

There are a number of mapped surface water features within 1km of the Site, these are shown within Figure 2 below.

Figure 2 Surface water features



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Four open channel minor drainage channels are located within 300m of the site. The closest is approximately 18m north of the Site at its closest point and flows in a westerly direction.

An associated channel to the River Stort is located approximately 180m west of the site. According to the SFRA, the associated channel to the River Stort is classified as an Epping Forest District Council Critical Watercourse (Figure 13).

The River Stort is approximately 240 m west of the Site at its closest point.

Potential overland flow routes **to the Site** have been identified north and west of the Site and potential overland flow routes **from the Site** are most likely to emerge from the west and south.



Proximity to infrastructure:

The minor drainage channel which flows 18m north of the Site is culverted underneath Sheering Lower Road, approximately 19m north of the site (upstream). This channel is culverted again, underneath Sawbridgeworth Road, beginning approximately 250m east of the north-eastern site boundary (upstream).

Station Road Bridge over the larger drainage channel is located approximately 200m west of the Site.

Station Road Bridge over the River Stort is located approximately 260m west of the Site.



Hydrogeological features

Variable superficial and bedrock deposits have been identified across the Site. In addition, the local extraction of superficial deposits and subsequent infilling with worked or artificial ground may have occurred, due to the Sites previous historical use as a gravel pit.

Superficial Deposits

Western boundary of the Site:

British Geological Survey mapping indicates that the underlying superficial geology consists of the Head - Clay, Silt, Sand and Gravel (BGS, 2018) and is classified as a Secondary A Aquifer (EA, 2018)

Centre and east of the Site:

British Geological Survey mapping indicates that the underlying superficial geology consists of the Lowestoft Formation - Diamicton (BGS, 2018) and is classified as a Secondary Undifferentiated Aquifer (EA, 2018)

Bedrock

Northeast of the Site:

British Geological Survey mapping indicates that the underlying bedrock geology consists of the London Clay Formation - Clay, Silt and Sand (BGS, 2018) and is not classified as an aquifer (EA, 2018).

Centre and south of the Site:

British Geological Survey mapping indicates that the underlying bedrock geology consists of the Thanet Formation and Lambeth Group (undifferentiated) - Clay, Silt and Sand (BGS, 2018) and is classified as a Secondary A Aquifer (EA, 2018)

The Site is not located within a Source Protection Zone (EA, 2018).

Artificial ground

It is noted that the Site has historically been a gravel pit. Therefore it is anticipated that local extraction of superficial deposits has taken place and subsequent infilling with worked or artificial ground may have occurred. This could impact groundwater levels. Further assessment of historical land use is recommended.

4. Flood risk to the development

Historical flood events

According to EA records and Figure 5 of the SFRA, no historical fluvial flood events have been recorded at the Site (EA, 2018)(URS Ltd, 2015).

Guidance

The purpose of historic flood data is to provide information on where and why flooding may have occurred in the past. The absence of any recorded events does not mean that flooding has never occurred on Site or that flooding will never occur at the Site.

Fluvial/coastal flood risk

According to the Environment Agency's Flood Map for Planning Purposes (Figure 3, overleaf), the Site is located within Flood Zone 1 and is therefore classified as having a low probability of fluvial flooding from the River Stort and associated watercourses.

According to the Environment Agency's Risk of Flooding from Rivers and the Sea (RoFRAS) mapping, which considers the crest height, standard of protection and condition of defences, the flood risk from Rivers and the Sea is Very Low.

The Site lies approximately 30 m to the north east of the nearest land located within Flood Zone 2.

According to the Essex County Council Asset Register, the Site is not located within a Critical Drainage Area, but the Site is located within an Epping Forest District Council Flood Risk Assessment Zone (Figure 13)(ECC, 2016)(URS Ltd, 2015).

Guidance

As defined in the NPPF (2012):

Ignoring the presence of any defences, land located in a Flood Zone 1 is considered to be at low probability of flooding, with less than a 1 in 1000 annual probability of fluvial or coastal flooding in any one year.

Development of all uses of land is appropriate in this zone (see glossary for terminology).

Figure 3 Environment Agency (EA) Flood Map for Planning Purposes (EA, 2018)



Model data

As the Site is located within close proximity to the EA's modelled fluvial floodplain (approx. 30m northeast), flood elevation data was obtained from the EA, to assess the impacts of climate change.

A comparison of the EA's modelled flood data and data contained within the SFRA (URS Ltd, 2015), confirms the EA's modelled flood data is the most up to date and is therefore considered to be the best available. This data has been used to assess flood risk and to provide recommendations for mitigation for the proposed development.

Modelled flood data from the Upper & Middle Stort Flood Mapping Model (Halcrow, 2010) is provided in the table overleaf and is included within Appendix C.

The data shown below has been taken from the nearest/most relevant node point (SA002d - 180m to the west) to the Site and has been used to assess flood risk.

Ground levels at the Site (mAOD)	Modelled Flood Levels (mAOD)			
	1 in 100 year	1 in 100 year plus 20% climate change allowance	1 in 200 year	1 in 1000 year
48.35 to 53.88	47.09	47.14	47.12	47.22
Ground levels at the Site (mAOD)	Estimated Flood flow (m/s)			
	1 in 100 year	1 in 100 year plus 20% climate change allowance	1 in 200 year	1 in 1000 year
48.35 to 53.88	12.34	13.09	12.69	14.33

Climate Change factors

The EA's *Flood risk assessments: climate change allowances* guidance (February, 2017) has been used to inform a suitable increase in river flows for the proposed development.

As the Site is located within the Thames River Basin and the proposed development is classed as More Vulnerable, where the proposed lifespan is 100 years, the Higher Central (35%) and Upper End (70%) allowances have been used to determine a suitable climate change factor. The updated guidance confirms 'More Vulnerable' developments are required to undertake a Basic assessment approach.

A stage/discharge relationship graph (Appendix C) has been produced using the EA's modelled flood flow and level data. The climate change allowances have been derived as a proportion of the 100 year peak flow to the 1 in 1000 year event, using the Flood Studies Report.

For the Thames Region, the 1 in 1000 year event flow is approximately 60% greater than the 1 in 100 year flow, therefore the flood levels included within the table overleaf would apply.

Ground levels at the Site (mAOD)	Modelled Flood Levels (mAOD)	
	1 in 100 year plus 35% climate change allowance	1 in 100 year plus 70% climate change allowance
48.35 to 53.88	47.17	47.26
Ground levels at the Site (mAOD)	Estimated Flood flow (m/s)	
	1 in 100 year plus 35% climate change allowance	1 in 100 year plus 70% climate change allowance
48.35 to 53.88	13.65	14.96

Based on analysis of the EA's flood elevation data, flood levels are approximately 1.09 m below the lowest level on the Site, therefore the Site would remain flood free with the onset of climate change up to and including the 70% allowance

Flood defences

Guidance

Sites that are located close to flood defences are likely to be zones where rapid inundation will occur in the event of the flood defences being overtopped or breached. A Site located close to flood defences (within 250m) may require a more detailed FRA subject to local topography.

- There are no areas benefiting from flood defences within 25 m of the centre of the study site.
- There are flood defences within 250 m of the Site.
- There are no proposed flood defences within 250 m of the Site.

The fluvial flood risk identified in the "Fluvial and Coastal flooding" section represents a residual flood risk as the Site benefits from defences. The type and condition of the existing flood defences influence the actual risk of fluvial flooding to the Site.

Information from the EA relating to the defences along the River Stort and associated drainage channels is outlined below.

- According to the EA (2018a) the flood defence most applicable to the Site (located along the associated channel to the River Stort – Asset ID 131538) is located approximately 180m west of the site and provides a standard of protection up to the 1 in 20 year flood event.

- Defences are a Natural earth defence with a downstream crest level of 47.58 mAOD and an upstream crest level of 49.08 mAOD (Appendix C).
- The Environment Agency inspects the defences twice a year and classifies their current condition as “fair”.

Surface water (pluvial) flooding

According to the EA's Risk of Flooding from Surface Water (pluvial) mapping, the majority of the Site is at low to very low risk of pluvial flooding. However, areas close to the western, north/western and northern site boundary are at high to moderate pluvial risk (Figure 4).

Figure 5 of the SFRA does not indicate reported incidents of surface water flooding at the Site (URS, 2015).

Flood levels during the 1% annual probability (1 in 100 year) storm event (moderate risk) would be up to 0.3m depth in the west and north of the Site (where ground elevations are below 49.7 mAOD). The western area of the Site becomes part of an overland flow route, which emerges from Lower Sheering Road, resulting in the flood depths described above (Figure 5).

Figure 4 EA Risk of Flooding from Surface Water Map - Extent (EA, 2018)

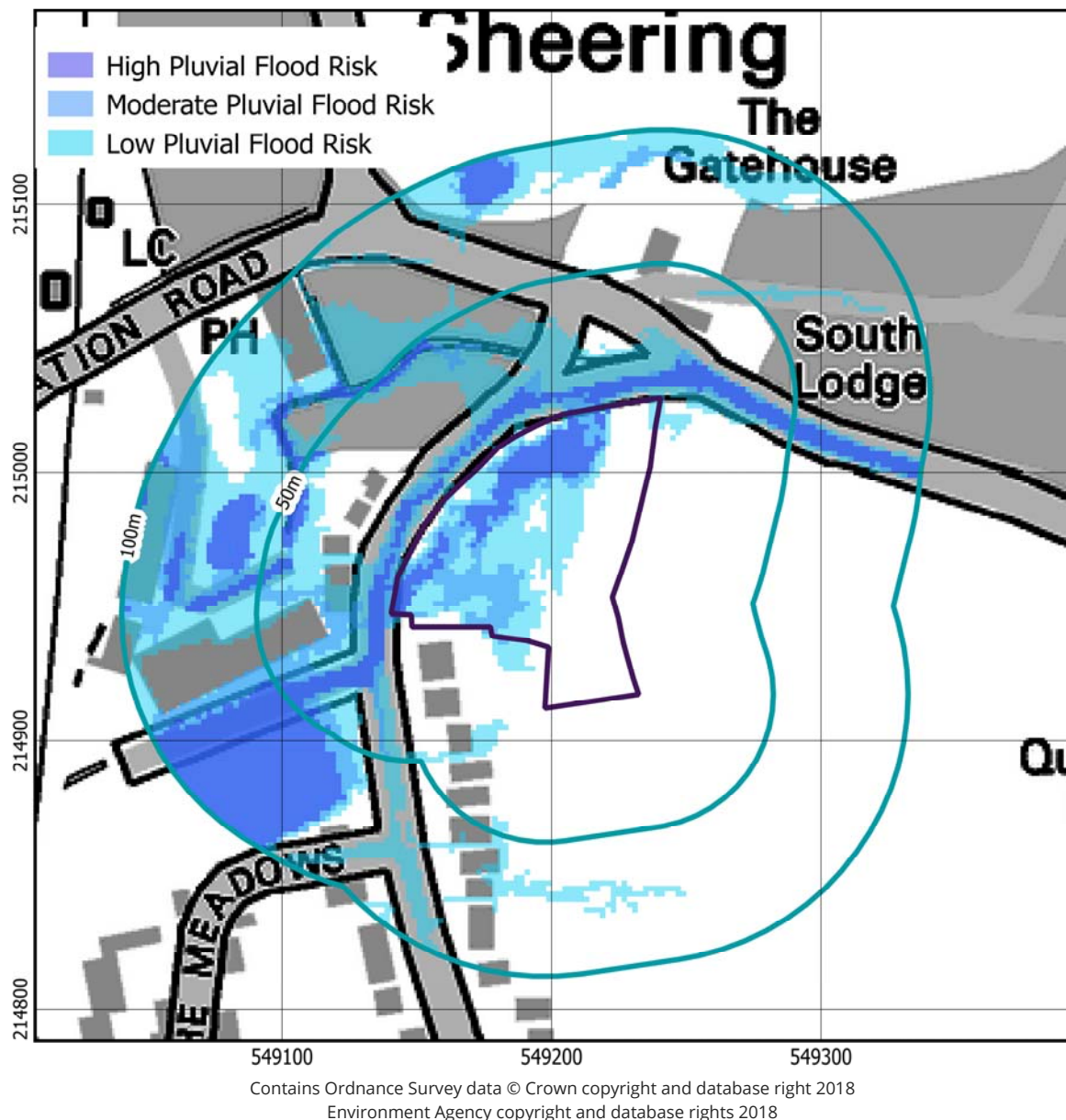
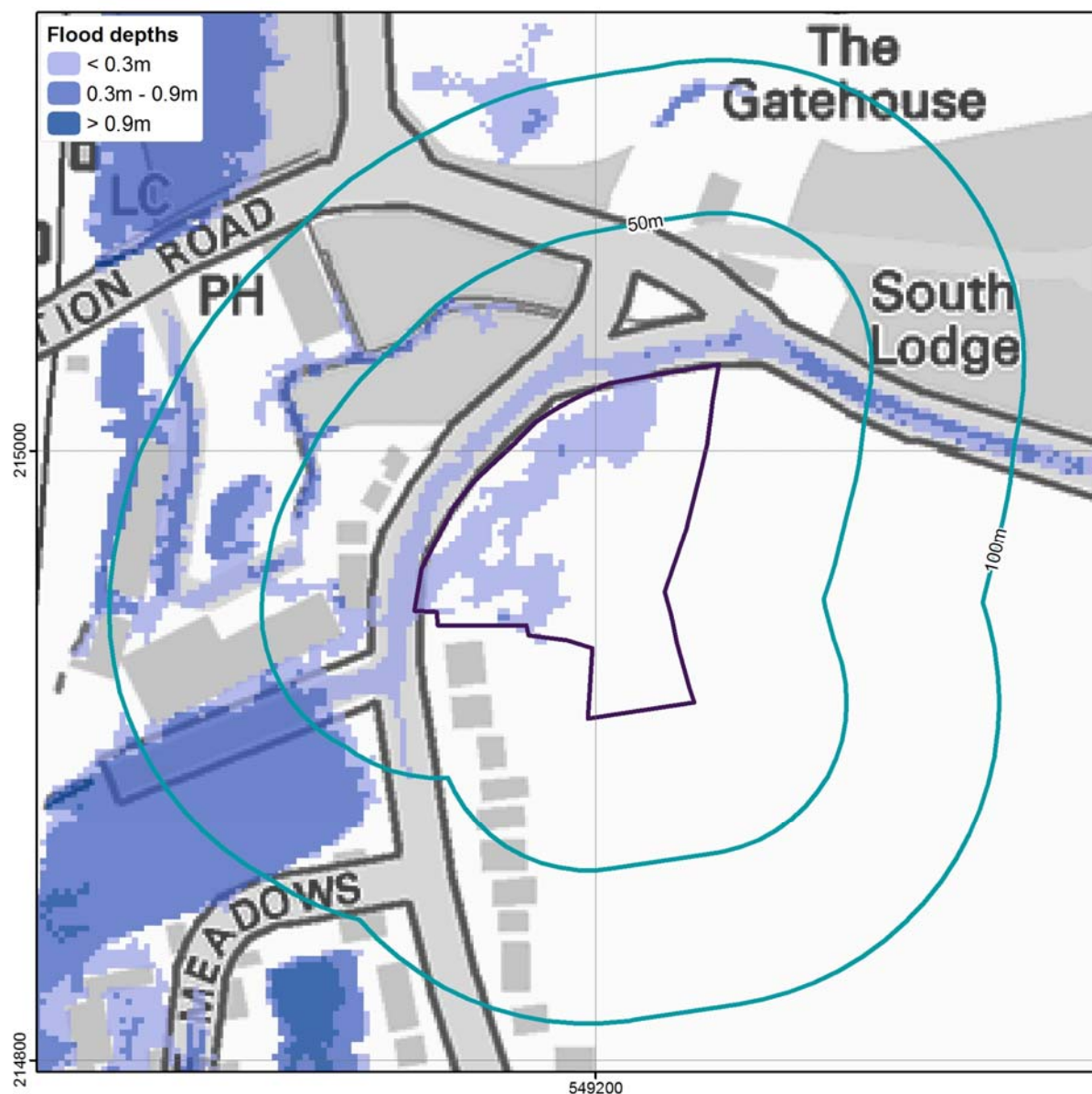


Figure 5 EA Risk of Flooding from Surface Water - depth (1% annual probability) Map (EA, 2018)



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During a 0.1% annual probability (1 in 1000 year) storm event (low risk), the western and central areas of the Site become part of the overland flow route, emerging from Lower Sheering Road; flood depths of up to 0.6m could occur within isolated depressions in this event.

It is likely any proposed development of the site, which will increase the area of impermeable cover, may increase the volume and rate of run-off, particularly within areas of lower topography including localised depressions if surface water is not controlled on the Site.

According to EA's surface water flood risk map, a site at very low risk has a chance of flooding of less than 1 in 1000 (0.1%), a site at low risk has a chance of flooding of between a 1 in 1000 and 1 in 100 (0.1% and 1%), a site at moderate risk has a chance of flooding of between a 1 in 100 and 1 in 30 (1% and 3.3%) and a site at high risk has a chance of flooding of greater than 1 in 30 (3.3%)

Groundwater flooding

Based on GeoSmart's Groundwater Flood Risk (GW5) Map (Figure 6) the majority of the Site is considered to be at negligible risk of groundwater flooding. Figure 5 of the SFRA does not indicate reported incidents of groundwater flooding at the Site (URS, 2015).

The main mechanisms of groundwater flooding at the Site are related to flooding via permeable Superficial Deposits potentially in response to river and tidal events. In this instance the western areas of the Site are at moderate risk of groundwater flooding due to the presence of superficial deposits towards the west of the site (deposits of Head - Clay, Silt, Sand and Gravel).

As noted in Section 3, the Site may have been subject to historical mineral extraction. The presence of the resulting void, or infill material, may impact the likelihood of groundwater flooding locally. The Site is unlikely to be at risk of Bedrock or Clearwater flooding relating to prolonged recharge and a rise in the water table.

According to GeoSmart (2018) there is a moderate risk of groundwater flooding in this area with a return period of 1 in 100 years.

Moderate Risk - There will be a significant possibility that incidence of groundwater flooding could lead to damage to property or harm to other sensitive receptors at, or near, this location.

18)



Sewer flooding

Figure 8 of the SFRA does not map any sewer flooding incidents at the site and does not map any Thames Water Utility Limited flood events within the CM21 9 postcode (URS Ltd, 2015).

Records held by Thames Water indicate that there have been no incidences of flooding related to the surcharging of public sewers at the Site (Thames Water, 2017; Appendix D).

According to the STL Regulated Drainage and Water sewer search (2017) (Appendix C), there are no underlying sewers located beneath the Site however the risk would rise with development of drainage networks underlying the Site.

Properties classified as “at risk” are those that have suffered, or are likely to suffer, internal flooding from public foul, combined or surface water sewers due to overloading of the sewerage system either once or twice in the ten year reference period. Records held by the sewage utility company provide information relating to reported incidents, the absence of any records does not mean that the Site is not at risk of flooding.

Culverts and bridges

Culverts and bridges have been identified within 1 km of the Site. The SFRA has not identified any specific drainage issues within the Site area but Figure 5 of the SFRA does map incidences of flooding with an unknown origin, located close to Station Road Bridge over the River Stort.

As the mapped incidences are adjacent to the Station Road Bridge, flooding and an associated increase in risk from the presence of bridges cannot be fully discounted in the future (URS Ltd, 2015).

Reservoir flooding

According to the Environment Agency's Risk of Flooding from Reservoir mapping the Site is not at risk of flooding from reservoirs (EA, 2018).

The risk of reservoir flooding is related to the failure of a large reservoir (holding over 25,000 m³ of water) and is based on the worst case scenario. Reservoir flooding is extremely unlikely to occur (Environment Agency, 2018c).

5. Flood risk from the development

Floodplain storage

As the development is located within Flood Zone 1, there would be no losses in floodplain storage as a result of the development. Therefore, compensation for any loss in flood plain storage will not be required.

Drainage and run-off

The proposed development will involve an increase of impermeable surfaces at the Site. An estimation of run-off is being undertaken separately through a SudSmart Pro report (GeoSmart (Ref: 65812R1) 2018) to permit effective site water management and prevent any increase in flood risk to off-site receptors from the Site.

Using FEH 2013 rainfall data from the online Flood Estimation Handbook (FEH), developed by NERC (2009) and CEH (2016), the potential surface water run-off generated from the Site during a 1 in 100 year return period will be calculated.

Guidance included within the National Planning Policy Framework (NPPF) recommends that the effects of climate change are incorporated into Flood Risk Assessments (Flood Risk Assessments: Climate Change Allowances Guidance, 2016). As the proposed development is being changed to residential, the lifespan of the development and requirements for climate change should allow up to the 2115 scenario.

Applies across all of England	Total potential change anticipated for 2010 to 2039	Total potential change anticipated for 2040 to 2059	Total potential change anticipated for 2060 to 2115
Upper end	10%	20%	40%
Central	5%	10%	20%

A method of investigating the run-off due to the proposed development can be calculated by multiplying the run-off per square metre by the impermeable area within the proposed development plan.

It is recommended that attenuation of run-off is undertaken on site to compensate for proposed increases in impermeable surface areas. Attenuation may comprise the provision of storage within a sustainable drainage system (SuDS).

Option	Description
Rainwater harvesting	Rain water harvesting can collect run-off from the roofs for use in non-potable situations, using water butts for example.
Green roof	<p>Having part/all of the roof as a green roof covered in vegetation can intercept and store a proportion of the rainfall to result in an overall reduction in the amount of surface water run-off generated from a building structure.</p> <p>They comprise a substrate (growth medium) layer which can be seeded with specially selected plants suitable for the local climatic conditions. Beneath the growth medium is a geotextile filter layer which filters out the substrate from entering the aggregate/geo-composite drainage layer below. At the very bottom of the green roofing, a waterproof membrane protects the roof structure below.</p>
Permeable paving	Permeable pavements can be used for driveways, footpaths and parking areas to increase the amount of permeable land cover. Suitable aggregate materials (angular gravels with suitable grading as per CIRIA, 2007) will improve water quality due to their filtration capacity. Plastic geocellular systems beneath these surfaces can increase the void space and therefore storage but do not allow filtration unless they are combined with aggregate material and/or permeable geotextiles.
Swales	Shallow, wide and vegetated channels that can store excess run-off whilst removing any pollutants.
Soakaways	An excavation filled with gravel within the Site. Surface water run-off is piped to the soakaway.
Attenuation basins/pond	Dry basin or a permanent pond that is designed to hold excess water during a rainfall event.

It is assumed that any changes to the existing drainage system will be undertaken in accordance with best practice and that care will be taken to ensure the new development does not overload/block any existing drainage or flow pathways to/from the Site.

Based on the topography and high to low surface water flood risk and moderate risk identified on the Site (particularly within the west), interference with overland flow paths is considered possible and the SuDS strategy will need to consider the risk when siting SuDS features.

GeoSmart have produced a separate outline drainage strategy through the SuDSmart Pro report range.



6. Suitability of the proposed development

The information below outlines the suitability of proposed development in relation to national and local planning policy.

National

The aims of the national planning policies are achieved through application of the Sequential Test and in some cases the Exception Test.

Guidance

Sequential test: The aim of this test is to steer new development towards areas with the lowest probability of flooding (NPPF, 2012). Reasonably available sites located in Flood Zone 1 should be considered before those in Flood Zone 2 and only when there are no reasonably available sites in Flood Zones 1 and 2 should development in Flood Zone 3 be considered.

Exception test: In some cases this may need to be applied once the sequential test has been considered. For the exception test to be passed it must be demonstrated that the development provides wider sustainability benefits to the community that outweigh flood risk and a site-specific FRA must demonstrate that the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.

Suitability of the proposed development, and whether an Exception Test is required, is based on the Flood Zone the Site is located within and the flood risk vulnerability classification of the development proposals.

Some developments may contain different elements of vulnerability and the highest vulnerability category should be used, unless the development is considered in its component parts.

This report has been produced to assess all development types, prior to any development. The vulnerability classification and Flood Zones are compared within the table overleaf (Table 3 of the Planning Practice Guidance).

As the Site is located within Flood Zone 1, all types of development listed within the Table overleaf are acceptable according to National Policy.

Table: Flood risk vulnerability and flood zone 'compatibility' (taken from NPPF, 2012)

Flood risk vulnerability classification		Essential infrastructure	Water compatible	Highly vulnerable	More vulnerable	Less vulnerable
Flood Zone	Zone 1 – low probability	✓	✓	✓	✓	✓
	Zone 2 – medium probability	✓	✓	Exception test required	✓	✓
	Zone 3a – high probability	Exception test required	✓	X	Exception test required	✓
	Zone 3b – functional flood plain	Exception test required	✓	X	X	X

Local

For this report, Epping Forest District Council SFRA has been consulted. SFRA's are carried out by local authorities, in consultation with the EA, to assess the flood risk to the area from all sources both now and in the future due to climate change. They are used to inform planning decisions to ensure inappropriate development is avoided (NPPF, 2012). The SFRA was undertaken by URS Ltd in August 2015. Relevant information contained in this report for the Site area is outlined below:

- The Planning Practice Guidance, which accompanies the NPPF, indicates that priority should be given to the use of Sustainable Drainage Systems (SuDS) in new developments. It is recognised that infiltration SuDS techniques may not always be appropriate, however SuDS should still be considered to provide treatment before water is discharged to a watercourse or sewer. The appropriate implementation of SuDS within a development can offer benefits in terms of reductions in flood risk, improvements to water quality, quicker replenishment of groundwater and improved visual amenity. If SuDS are not going to be used then sufficient evidence needs to be provided to explain why, and it should be shown that traditional drainage methods can provide benefits above those that can be provided by SuDS.
- SuDS techniques can be used to reduce the rate and volume and improve the water quality of surface water discharges from sites to the receiving environment (i.e. natural watercourse or public sewer etc.). Various SuDS techniques are available and operate on two main principles: Infiltration & Attenuation.

Epping Forest District Council Local Plan:

- The site is included within the Epping Forest District Council Local Plan under LSHR.R1 and has been designated as a Residential Site Allocation. Within the Local Plan, the Site has been identified as being at risk of surface water flooding. The design and layout of any development proposals should reduce the vulnerability and consequences of surface water flooding to the site and its surroundings. Development proposals should incorporate appropriate surface water drainage measures in order to achieve this.
- An existing feature in the landscape should be used as the new defensible boundary to the Green Belt. As part of the development proposals the existing feature along the eastern edge of the site will need to be strengthened.
- Policy SP 2 sets out the number of homes the Council will plan for in Coopersale, Fyfield, High Ongar, Lower Sheering, Moreton, Sheering and Stapleford Abbots over the Plan period.

7. Resilience and mitigation

Based on the available information mitigation measures outlined within this section of the report are likely to help protect the development from flooding. It should be noted that the residential scheme proposed for the Site does not have a fixed layout, although mitigation measures could be refined once proposals have been firmed up.

Fluvial/coastal mitigation measures

As the Site is located in Flood Zone 1 and would not be impacted during a 1 in 100 year plus 70% allowance for climate change, fluvial mitigation measures are not considered to required.

Surface water (pluvial) flooding

Analysis of this data confirms that half of the Site would remain flood free in all pluvial events up so no mitigation is required.

Half of the Site is at risk of pluvial flooding but can still be developed as long as suitable mitigation is provided for developments:

Mitigation scenario 1:

Potential development could be aimed away from the areas mapped at high pluvial flood risk.

Or

Mitigation scenario 2:

A SuDS strategy is being implemented separately for effective management of surface water runoff from the proposed development. SuDS features could also be oversized to intercept flows and reduce the risk of pluvial flooding downstream

Flood resilient materials and designs for all development located within a pluvial flood risk area:

Building materials

- Engineering bricks, cement-based materials including water retaining concrete and dense stone. denser materials such as concrete and engineering bricks were found to have good resilience characteristics.
- Concrete blocks used in foundations should be sealed with an impermeable material or encased in concrete to prevent water movement from the ground to the wall construction.

Floors

- Try to develop floors with small slabs (0.5m by 0.5m - least 150mm thickness) which can generally withstand flood forces without allowing water ingress.
- Damp Proof Membranes should be included in any design to minimise the passage of water through ground floors. Floor insulation should be of the closed-cell type to minimise the impact of flood water and should be placed above the floor slab.
- Suitable floor finishes include ceramic or concrete-based floor tiles, stone, and sand/cement screeds. All tiles should be bedded on a cement-based adhesive/bedding compound and water resistant grout should be used.

Raising finished floor levels by 0.3m could also ensure internal flooding does not occur during a 1% annual probability (moderate risk) pluvial event could also be considered.

Groundwater mitigation measures

It is likely that the mitigation measures put in place for fluvial and pluvial risk will be sufficient for the groundwater flood risk at the Site. However specific groundwater measures that should also be considered for developments located towards the western section of the site include:

- Waterproof tanking of the ground floor and basement;
- Interceptor drains;
- Automatic sump to extract flood water; and
- Non-return flap valves on the proposed foul and surface water sewer lines.

If basement areas are proposed within the west of the Site, waterproofing measures such as tanking and sump and pump systems should be considered. Ground levels should slope away from any ground floor areas of buildings within this area.

Other flood risk mitigation measures

As the Site may potentially be at further risk due to the presence of Station Road Bridge over the River Stort, it is considered that mitigation proposed for fluvial flood risk would suffice for any further additional risk. The regular maintenance of any drains and culverts surrounding/on the Site should be undertaken to reduce the flood risk and potential for blockage

8. Conclusions and recommendations

A **LOW** fluvial flood risk has been identified.

A **VARIABLE** surface water (pluvial) flood risk has been identified. According to the EA's Risk of Flooding from Surface Water (pluvial) mapping, the majority of the Site is at low to very low risk of pluvial flooding. However, areas close to the western, north/western and northern site boundary are at high to moderate pluvial risk. The western area of the Site becomes part of an overland flow route, which emerges from Lower Sheering Road.

A **VARIABLE** groundwater flood risk has been identified. The GeoSmart Groundwater Flood Risk (GW5) Map indicates the majority of the Site is considered to be at negligible risk of groundwater flooding. Although an area in the west of the Site is at moderate risk, due to the presence of superficial deposits towards the west of the site (deposits of Head - Clay, Silt, Sand and Gravel).

The Site may have been subject to historical mineral extraction therefore the presence of any resulting void, or infill material, may impact the likelihood of groundwater flooding locally.

The Site is not located in an area classified as being at risk of flooding from reservoir failure. As the Site is located within Flood Zone 1, all types of development listed within the Table 2 of the NPPF are acceptable according to National Policy.

The table below provides a summary of where the responses to key questions are discussed in this report.

Key sources of flood risks identified	Pluvial and Groundwater (see Section 3).
Are standard mitigation measures likely to provide protection from flooding to/from the Site?	Yes, see Section 7.
Is any further work recommended?	<u>Pluvial flood risk</u> <ul style="list-style-type: none">• Potential development could be aimed away from the areas mapped at high pluvial flood risk. <u>Or</u> <ul style="list-style-type: none">• Include suitable mitigation measures, including Sustainable urban Drainage Systems (SuDS) and flood resilient materials and designs for all development located within a pluvial flood risk area (see section 7 for further detail). Raising finished floor levels by 0.3m could also ensure internal flooding does not occur during a 1%

	<p>annual probability (moderate risk) pluvial event.</p> <p><u>Groundwater flood risk</u></p> <ul style="list-style-type: none"> • If basement areas are proposed within the west of the Site, waterproofing measures such as tanking and sump and pump systems should be considered. Ground levels should slope away from any ground floor areas of buildings within this area. <p><u>Additional sources of Flood Risk and considerations</u></p> <ul style="list-style-type: none"> • The regular maintenance of any drains and culverts surrounding/on the Site should be undertaken to reduce the flood risk and potential for blockage
--	---

Providing the recommended mitigation measures are put in place (see previous sections) it is likely that flood risk to this Site will be reduced to an acceptable level and there should be no impediment to development.

9. References and glossary

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URS Ltd (2015). Epping Forest District Council Strategic Flood Risk Assessment. Accessed on 15/01/2018. Accessed from: <http://www.eppingforestdc.gov.uk/index.php/home/file-store/category/133-strategic-flood-risk-assessment-level-1-update>

Glossary

General terms

BGS	British Geological Survey
EA	Environment Agency
GeoSmart groundwater flood risk model	GeoSmart's national groundwater flood risk model takes advantage of all the available data and provides a preliminary indication of groundwater flood risk on a 50m grid covering England and Wales. The model indicates the risk of the water table coming within 1 m of the ground surface for an indicative 1 in 200 year return period scenario.
Dry-Island	An area considered at low risk of flooding (eg. In a Flood Zone 1) that is entirely surrounded by areas at higher risk of flooding (eg. Flood Zone 2 and 3)
Flood resilience	Flood resilience of wet-proofing accepts that water will enter the building, but through careful design will minimise damage and allow the re-occupancy of the building quickly. Mitigation measures that reduce the damage to a property caused by flooding can include water entry strategies, raising electrical sockets off the floor, hard flooring.
Flood resistance	Flood resistance, or dry-proofing, stops water entering a building. Mitigation measures that prevent or reduce the likelihood of water entering a property can include raising flood levels or installation of sandbags.
Flood Zone 1	This zone has less than a 0.1% annual probability of river flooding
Flood Zone 2	This zone has between 0.1 and 1% annual probability of river flooding and between 0.1% and 0.5 % annual probability sea flooding
Flood Zone 3	This zone has more than a 1% annual probability of river flooding and 0.5% annual probability of sea flooding
Functional Flood Plain	An area of land where water has to flow or be stored in times of flood.
Hydrologic model	A computer model that simulates surface run-off or fluvial flow. The typical accuracy of hydrologic models such as this is $\pm 0.25\text{m}$ for estimating flood levels at particular locations.
OS	Ordnance Survey
Residual Flood Risk	The flood risk remaining after taking mitigating actions.
SFRA	Strategic Flood Risk Assessment. This is a brief flood risk assessment provided by the local council
SuDS	A Sustainable drainage system (SuDS) is designed to replicate, as closely as possible, the natural drainage from the Site (before development) to ensure that the flood risk downstream of the Site does not increase as a result of the land being developed. SuDS also significantly improve the quality of water leaving the Site and can also improve the amenity and biodiversity that a site has to offer. There are a range of SuDS options available to provide effective surface water management that intercept and store excess run-off. Sites over 1 Ha will usually require a sustainable drainage assessment if planning permission is required. The current proposal is that from April 2014 for more than a single dwelling the drainage system will require approval from the SuDs Approval Board (SABs).

Aquifer Types

Principal aquifer

These are layers of rock or drift deposits that have high intergranular and/or fracture permeability - meaning they usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale. In most cases, principal aquifers are aquifers previously designated as major aquifer.

Secondary A aquifer

Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers.

Secondary B aquifer

Predominantly lower permeability layers which may store and yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering. These are generally the water-bearing parts of the former non-aquifers.

Secondary undifferentiated

Has been assigned in cases where it has not been possible to attribute either category A or B to a rock type. In most cases, this means that the layer in question has previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type.

Unproductive Strata

These are rock layers or drift deposits with low permeability that has negligible significance for water supply or river base flow.

NPPF (2012) terms

Exception test

Applied once the sequential test has been passed. For the exception test to be passed it must be demonstrated that the development provides wider sustainability benefits to the community that outweigh flood risk and a site-specific FRA must demonstrate that the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.

Sequential test

Aims to steer new development to areas with the lowest probability of flooding.

Essential infrastructure

Essential infrastructure includes essential transport infrastructure, essential utility infrastructure and wind turbines.

Water compatible

Water compatible land uses include flood control infrastructure, water-based recreation and lifeguard/coastal stations.

Less vulnerable

Less vulnerable land uses include police/ambulance/fire stations which are not required to be operational during flooding and buildings used for shops/financial/professional/other services.

More vulnerable

More vulnerable land uses include hospitals, residential institutions, buildings used for dwelling houses/student halls/drinking establishments/hotels and sites used for holiday or short-let caravans and camping.

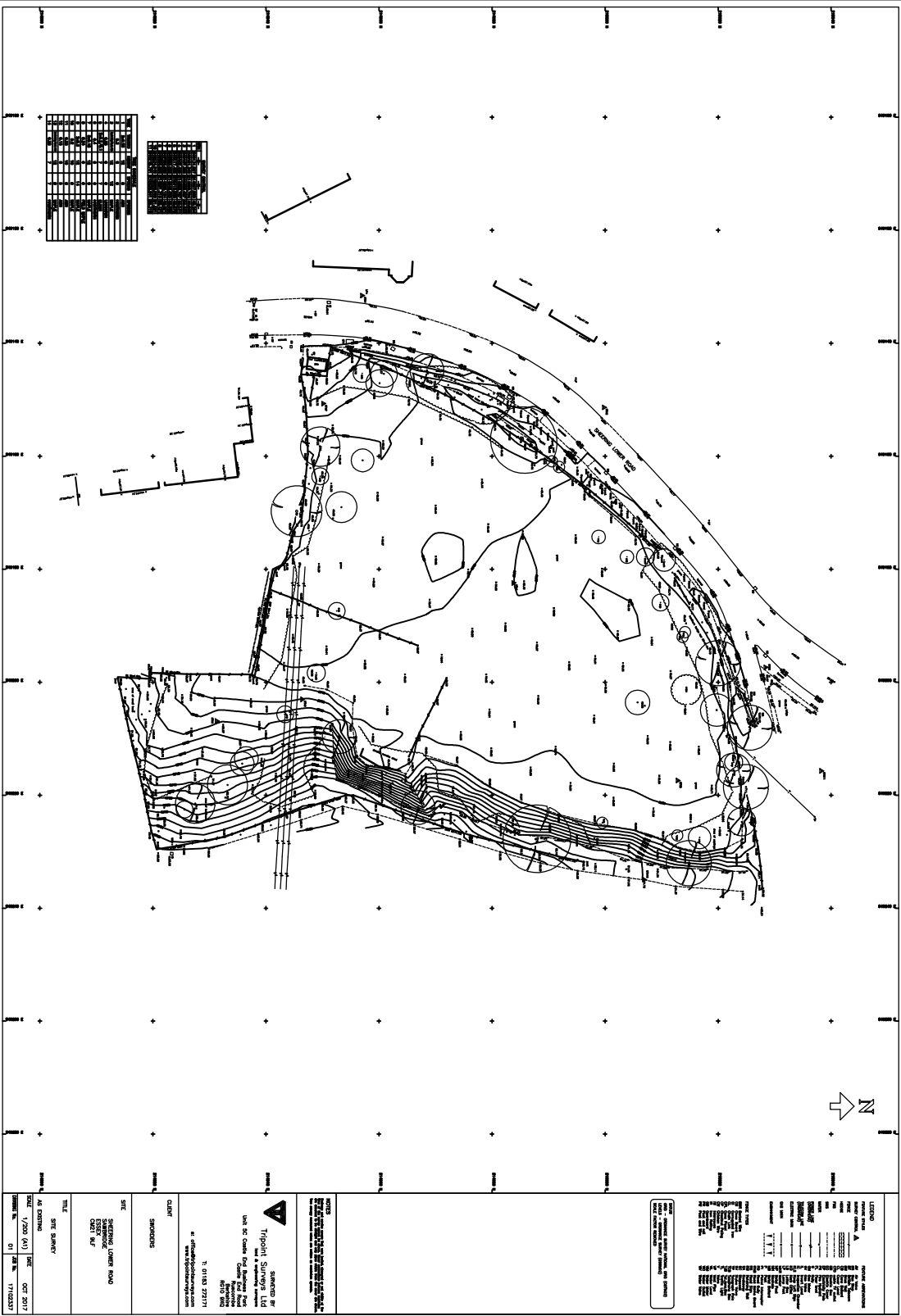
Highly vulnerable

Highly vulnerable land uses include police/ambulance/fire stations which are required to be operational during flooding, basement dwellings and caravans/mobile homes/park homes intended for permanent residential use.

Appendices

Appendix A

Current and proposed development plans

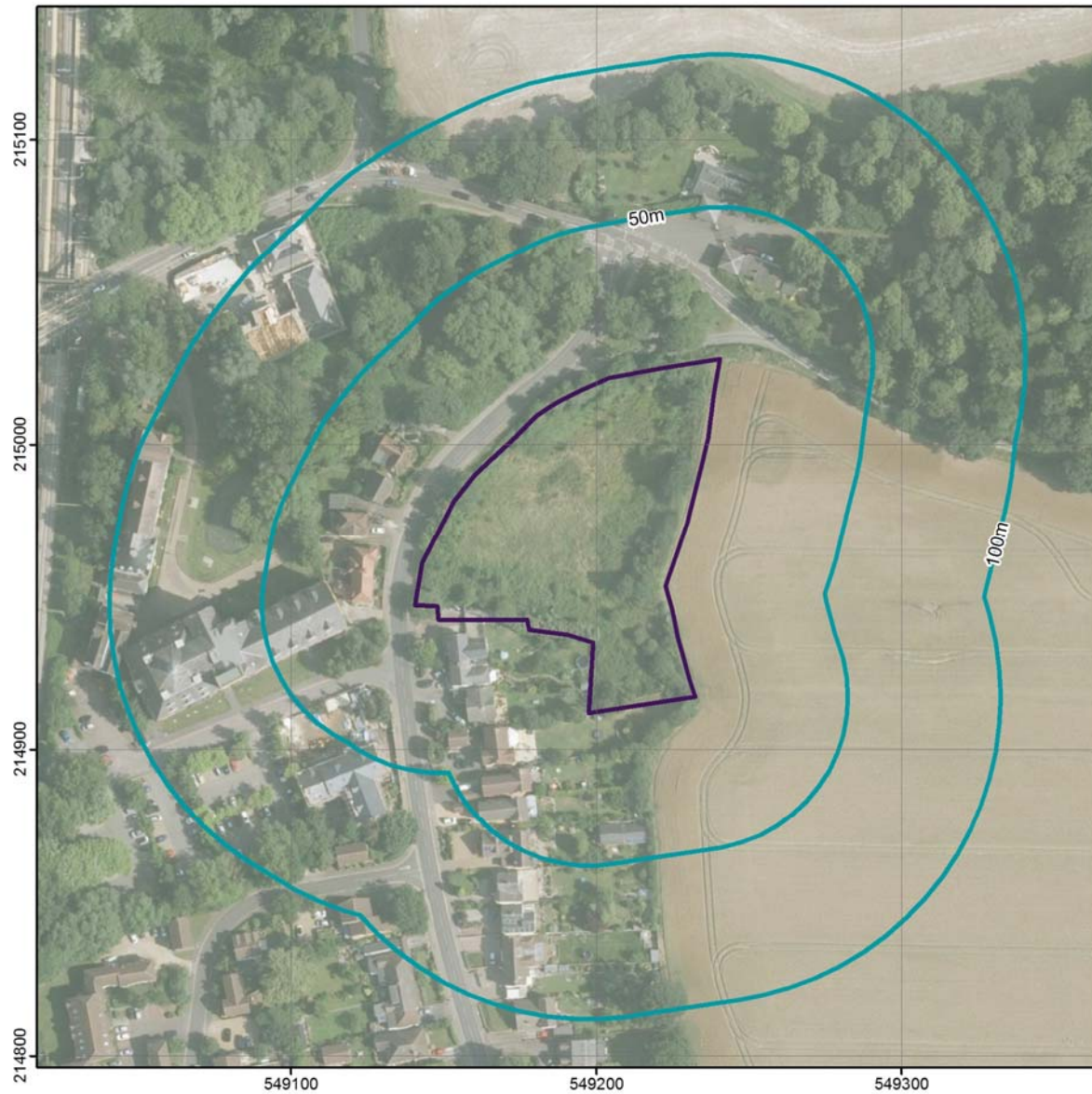


SWORDERS			
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SCHEME: LAND AT LOWER SHEERING ROAD			
<div style="font-size: 36pt; font-weight: bold; margin: 0;">SITE PLAN</div>			
TITLE:			
PAPER SIZE: A4/L	SCALE 1:1250	DRAWING NO.: 207420D/WG003	REVISION A
CLIENT NO: WAT953	DRAWN BY: CAK	CHECKED BY: RJP	10/10/12
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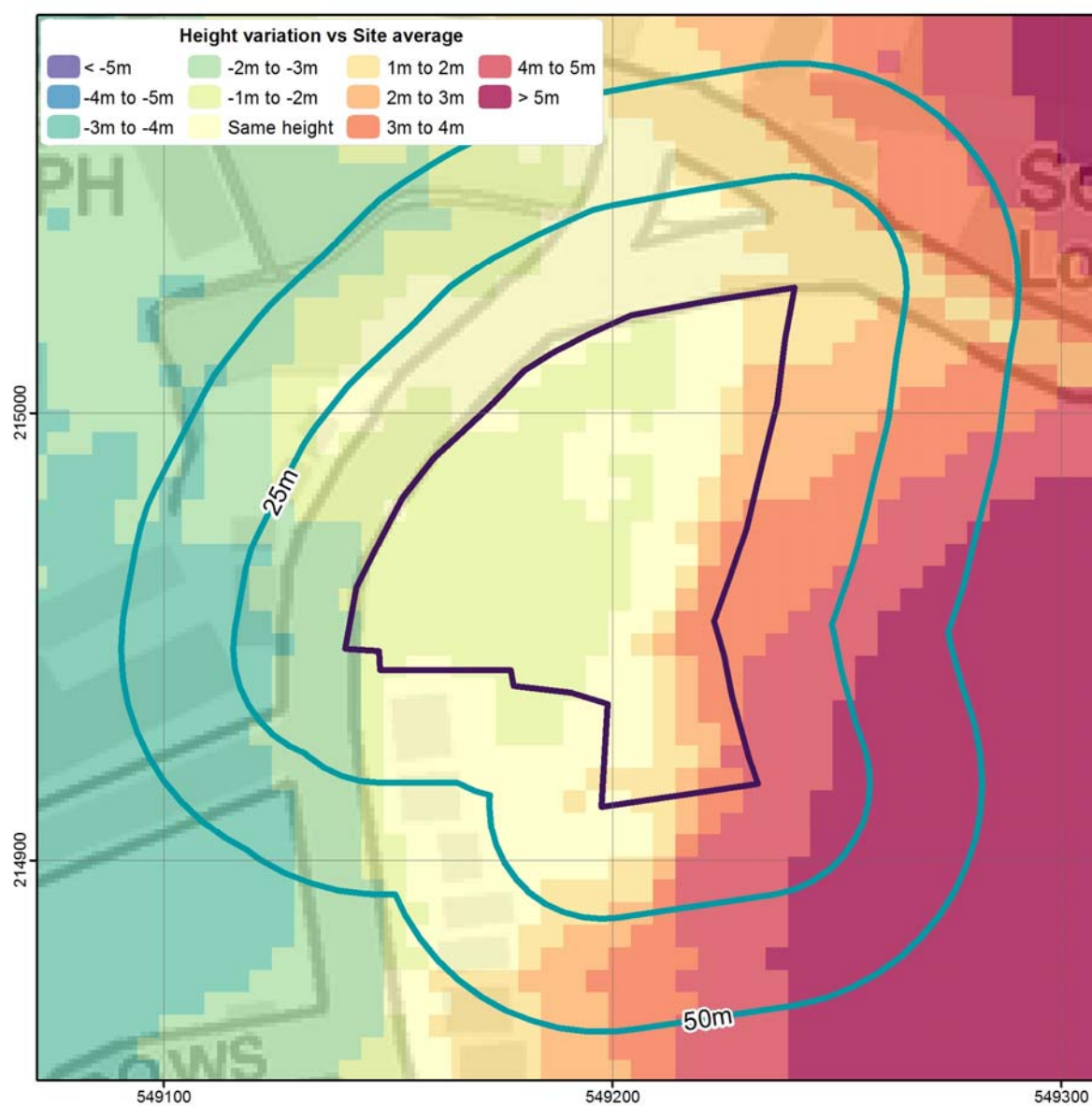
Appendix B

Commercial flood mapping

Aerial Photograph (BlueSky, 2017)



GeoSmart DTM5 (5m) map (EA, 2017)



Ordnance Survey Surface Water Feature Vector Map (OS, 2017)



Environment Agency's Flood Map for Planning Purposes (EA, 2017)



UKFloodMap4TM 1 in 100 year Fluvial/Tidal Flood Depth Map (Ambiental, 2017)



GeoSmart Groundwater Flood Risk (GW5, v2.1) Map (GeoSmart, 2017)



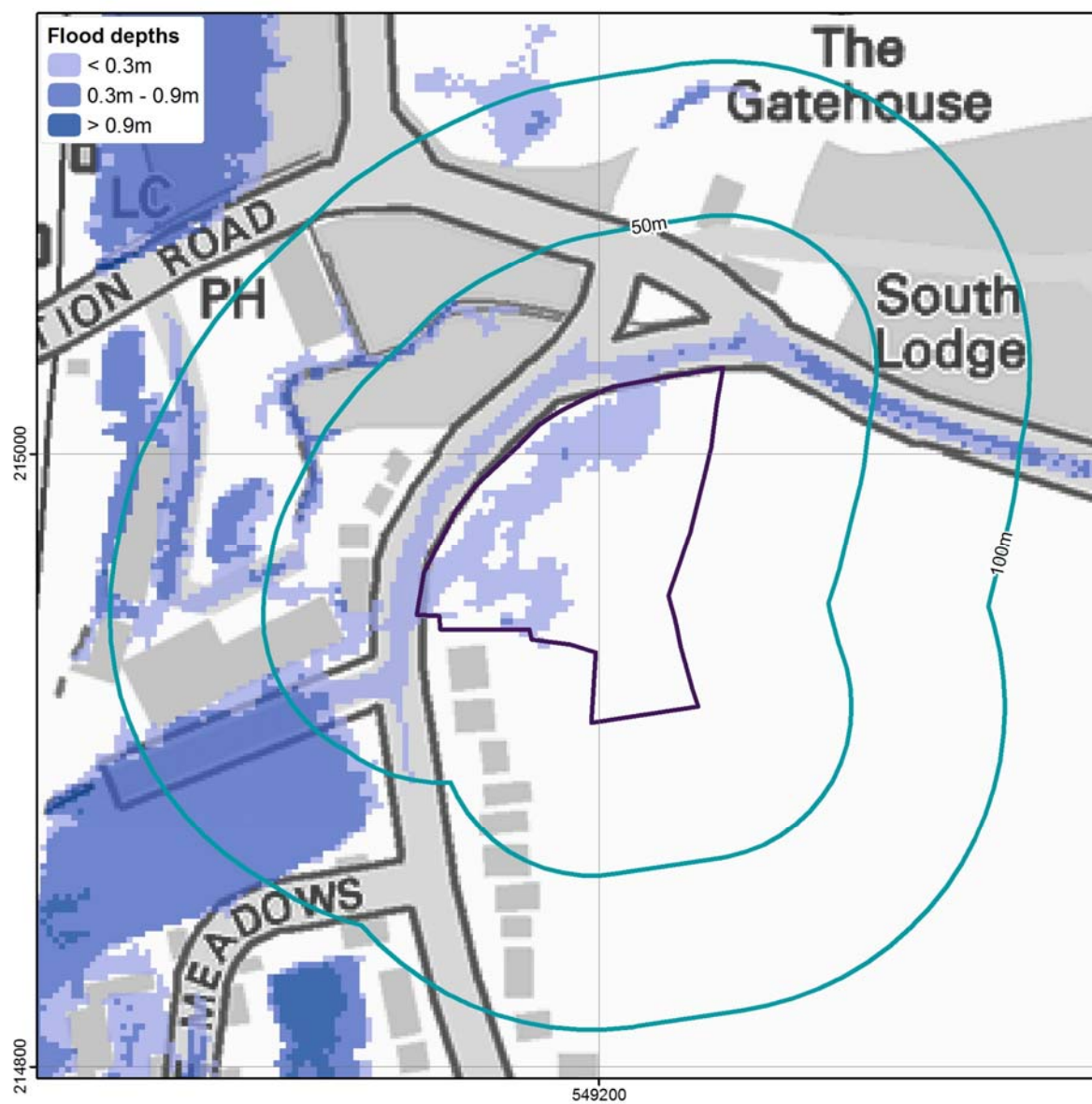
UKFloodMap4™ Pluvial 1 in 75 year Pluvial Flood Depth Map (Ambiental, 2017)



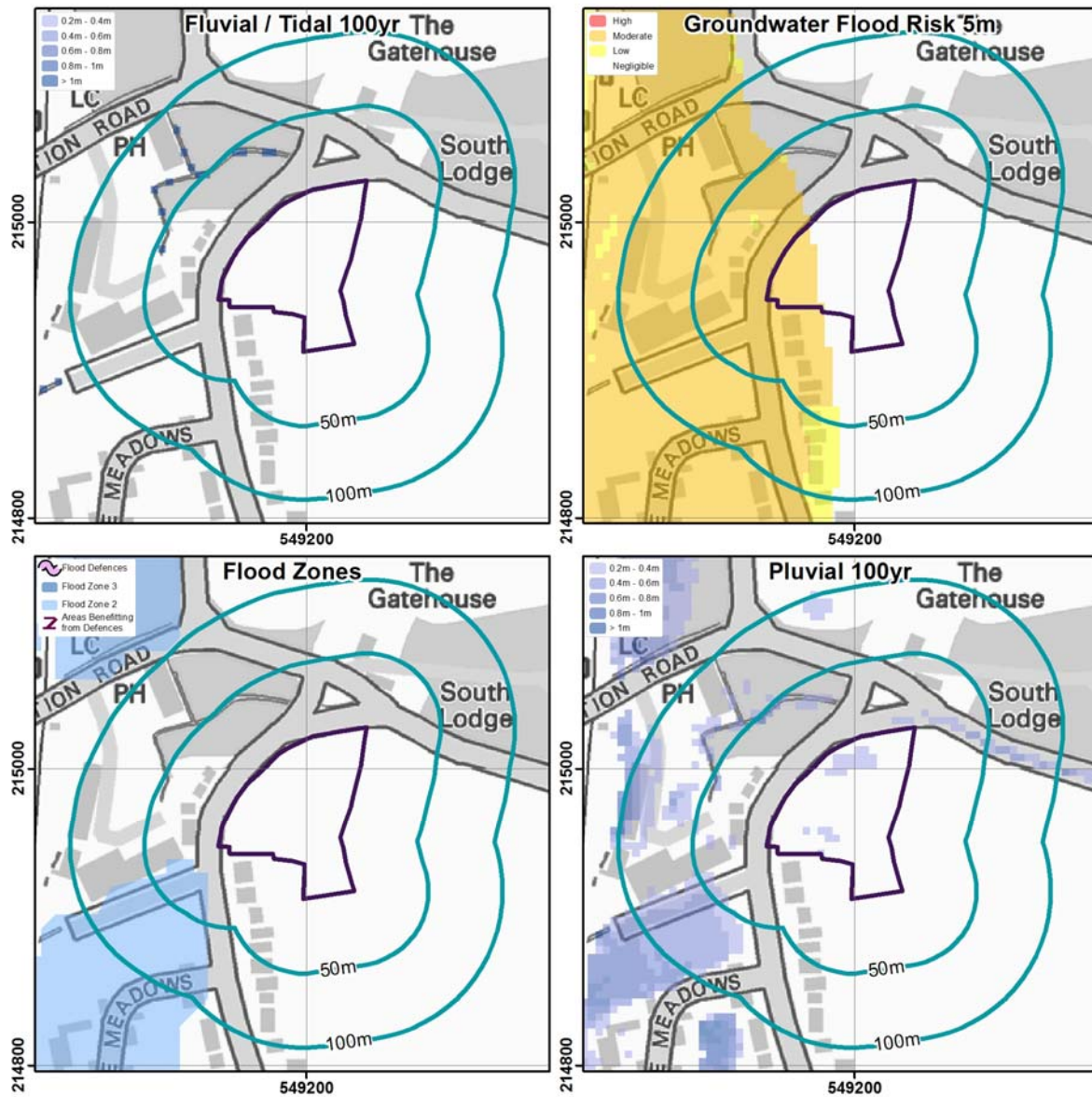
UKFloodMap4TM Pluvial 1 in 100 year Pluvial Flood Depth Map (Ambiental, 2017)

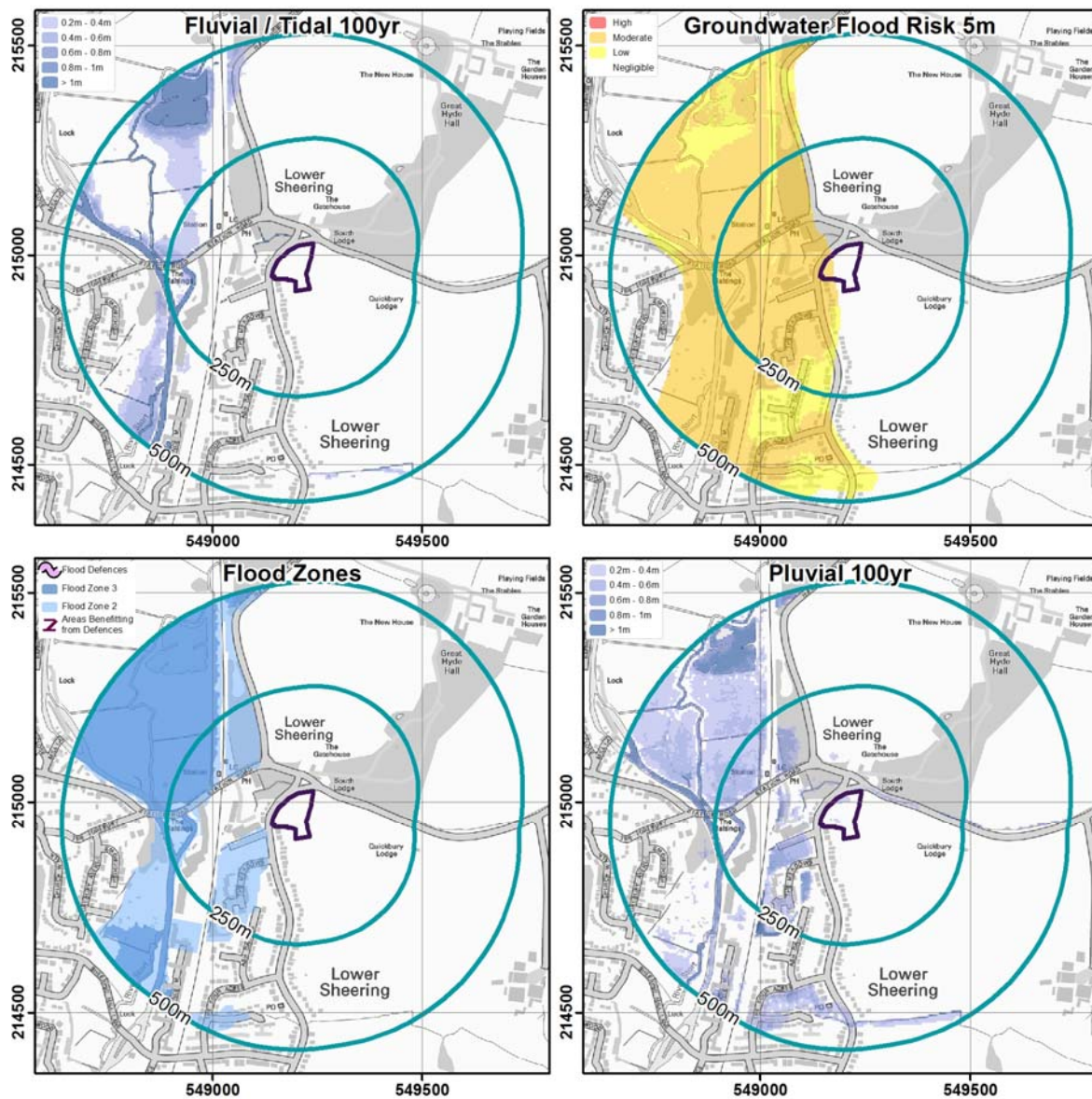


Environment Agency Risk of Flooding Surface Water (pluvial) Depth map 1 in 100 year
(EA, 2017)



Quad Map (EA and Ambiantal Data, 2017)



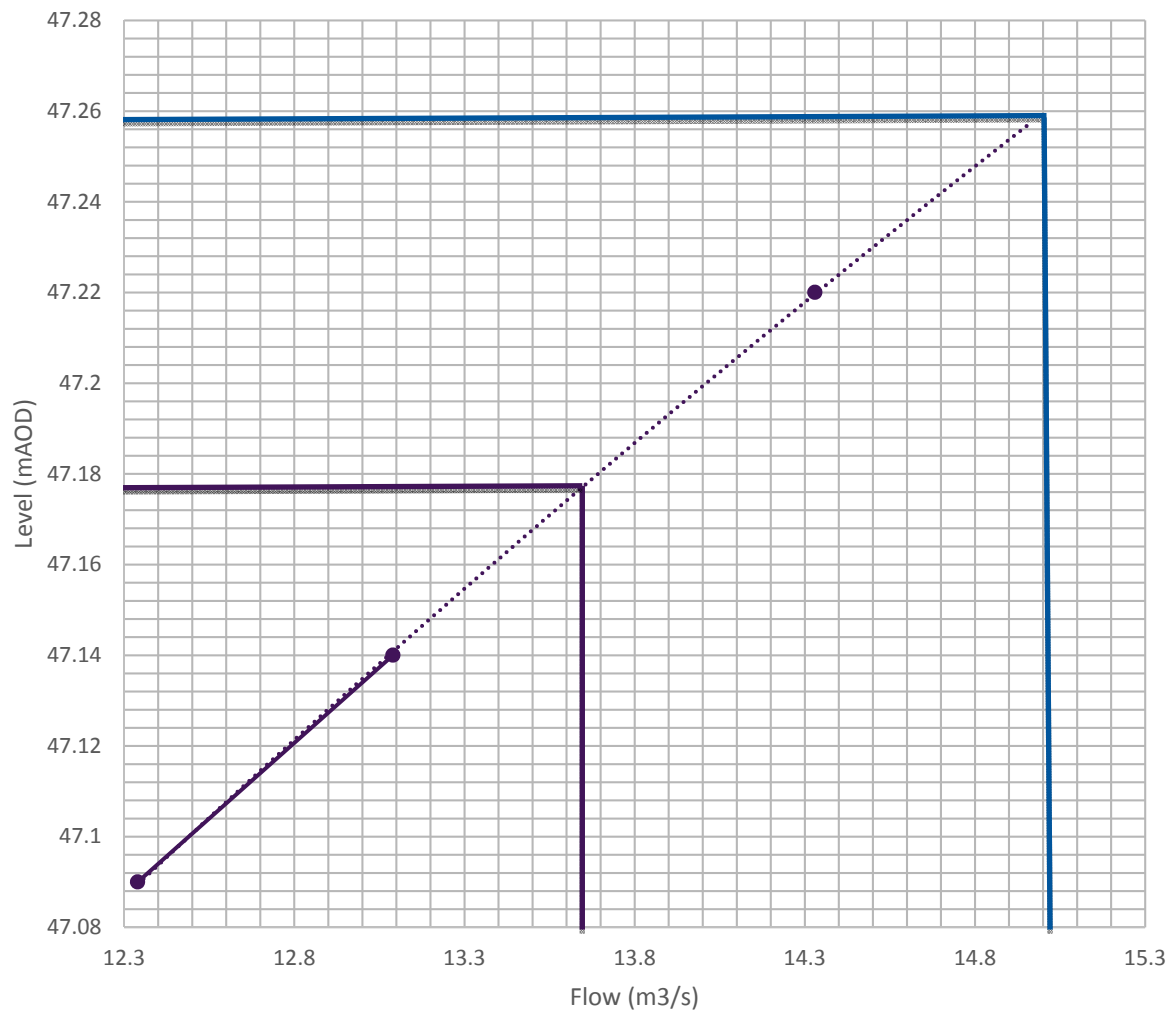


Appendix C

Environment Agency data

Return period	Flood Flow (m ³ /s)	Flood Level (mAOD)
1% (1 in 100 year event)	12.34	47.09
1.20% (1 in 100 year event plus 20% climate change)	13.09	47.14
1.35% (1 in 100 year event plus 35% climate change)	13.65	47.17
1.60% (1 in 1000 year event)	14.33	47.22
1.70% (1 in 100 year event plus 70% climate change)	14.97	47.26

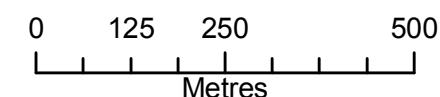
Stage Discharge Relationship Curve



Flood Map for Planning centred on land at Sheering Lower Road, CM21 9LH - 5/1/2018 - HNL71528AS



Environment Agency
Alchemy,
Bessemer Road,
Welwyn Garden City,
Hertfordshire,
AL7 1HE



Legend

— Main Rivers

Flood Map for Planning

- Flood Storage Area
- Areas Benefiting from Flood Defences
- Flood Zone 3
- Flood Zone 2

Flood Map for Planning (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.

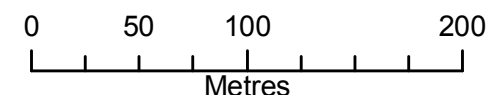
Flood Zone 2 shows the extent of an extreme flood from rivers or the sea with up to a 1 in 1000 chance of occurring each year.

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AL7 1HE



Legend

— Main Rivers

Defended Flood Outlines

- 1 in 5 (20%) Defended
- 1 in 20 (5%) Defended
- 1 in 100 (1%) Defended
- 1 in 100+20% (*CC) Defended
- 1 in 1000 (0.1%) Defended

The data in this map has been extracted from the Upper & Middle Stort Flood Mapping Model (Halcrow, 2010). This model has been designed for catchment wide flood risk mapping. It should be noted that it was not created to produce flood levels for specific development sites within the catchment. Modelled outlines take into account catchment wide defences.

Flood risk data requests including an allowance for climate change will be based on the 1 in 100 flood plus 20% allowance for climate change, unless otherwise stated. You should refer to 'Flood risk assessments: climate change allowances' to check if this allowance is still appropriate for the type of development you are proposing and its location. You may need to undertake further assessment of future flood risk using different allowances to ensure your assessment of future flood risk is based on best available evidence.
<https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>

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Lower Sheering

The Gatehouse

South Lodge

Quickbury Lodge

Issues

LC

PH

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Issues

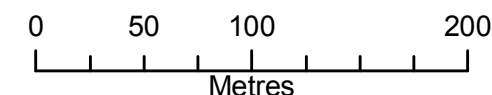
THE MEADOWS

ROVES

Detailed FRA centred on land at Sheering Lower Road, CM21 9LH - 5/1/2018 - HNL71528AS



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Legend

— Main Rivers

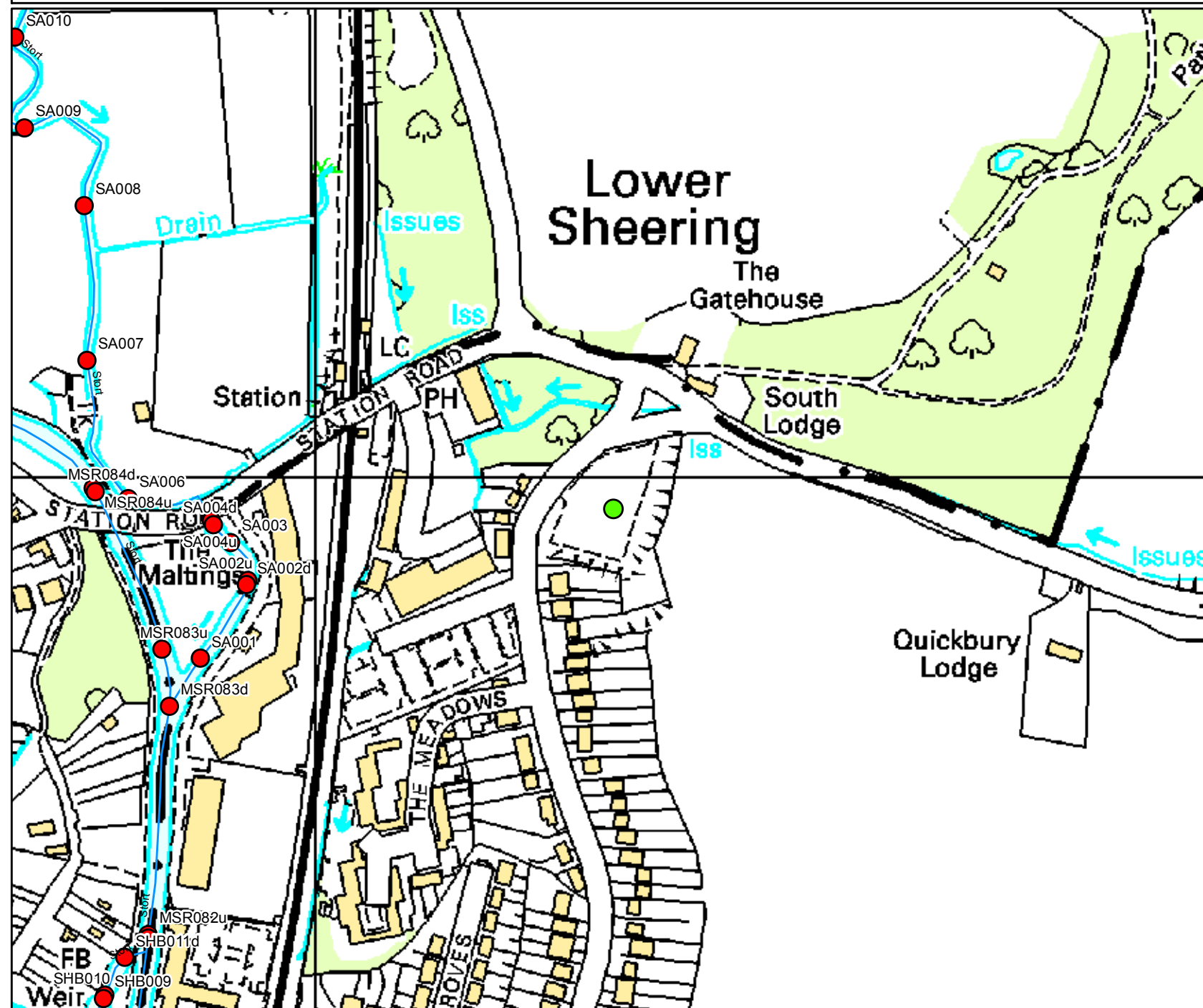
1D Node Results

● Node Results

The data in this map has been extracted from the Upper & Middle Stort Flood Mapping Model (Halcrow, 2010). This model has been designed for catchment wide flood risk mapping. It should be noted that it was not created to produce flood levels for specific development sites within the catchment. Modelled outlines take into account catchment wide defences.

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

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Environment Agency ref: **HNL71528AS**

The following information has been extracted from the Upper & Middle Stort Flood Mapping Model (Halcrow, 2010)

Flood risk data requests including an allowance for climate change will be based on the 1 in 100 flood plus 20% allowance for climate change, unless otherwise stated. You should refer to 'Flood risk assessments: climate change allowances' to check if this allowance is still appropriate for the type of development you are proposing and its location. You may need to undertake further assessment of future flood risk using different allowances to ensure your assessment of future flood risk is based on best available evidence.

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

Caution:

Although this is a detailed model, please be aware that it was not originally created to assess flood levels at particular development sites.

All flood levels are given in metres Above Ordnance Datum (mAOD)

All flows are given in cubic metres per second (cumecs)

MODELLLED FLOOD LEVEL

					Return Period					
Node Label	Easting	Northing	5 yr	10 yr	20yr	50yr	100yr	100yr +20%	200yr	1000yr
MSR084u	548857	214992	46.89	46.94	46.99	47.04	47.08	47.14	47.11	47.23
MSR084d	548858	214989	46.89	46.94	46.99	47.04	47.08	47.14	47.11	47.22
MSR083u	548901	214887	46.89	46.93	46.98	47.03	47.08	47.13	47.11	47.21
MSR083d	548906	214851	46.89	46.93	46.98	47.03	47.08	47.13	47.11	47.21
MSR082u	548892	214703	46.85	46.89	46.93	46.97	47.00	47.03	47.02	47.06
MSR082d	548892	214701	46.85	46.89	46.93	46.97	47.00	47.03	47.02	47.06
SA010	548806	215283	47.12	47.18	47.25	47.32	47.36	47.41	47.38	47.49
SA009	548812	215225	47.10	47.17	47.25	47.31	47.35	47.41	47.38	47.49
SA008	548851	215174	47.09	47.17	47.25	47.32	47.36	47.41	47.38	47.49
SA007	548853	215074	47.09	47.17	47.24	47.30	47.34	47.39	47.36	47.47
SA006	548879	214985	46.98	47.05	47.13	47.20	47.26	47.32	47.29	47.42
SA004u	548933	214970	46.89	46.94	46.99	47.05	47.09	47.15	47.12	47.24
SA004d	548934	214968	46.89	46.94	46.99	47.05	47.09	47.15	47.12	47.23
SA003	548945	214956	46.93	46.98	47.04	47.11	47.15	47.21	47.19	47.30
SA002u	548956	214932	46.89	46.94	46.99	47.05	47.09	47.15	47.12	47.24
SA002d	548956	214929	46.89	46.94	46.99	47.04	47.09	47.14	47.12	47.22
SA001	548926	214882	46.89	46.93	46.98	47.03	47.08	47.13	47.11	47.21
SHB011d	548877	214688	46.85	46.89	46.93	46.97	47.00	47.03	47.02	47.06
SHB010	548864	214664	46.86	46.91	46.96	47.01	47.05	47.12	47.09	47.26
SHB009	548863	214662	45.67	45.73	45.78	45.83	45.88	45.95	45.91	46.08

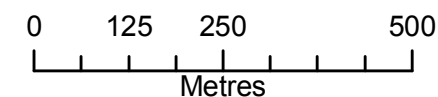
MODELLED FLOWS

Node Label	Easting	Northing			Return Period					
			5 yr	10 yr	20yr	50yr	100yr	100yr +20%	200yr	1000yr
MSR084u	548856.76	214991.56	7.19	8.00	9.16	10.80	12.99	16.27	14.78	22.28
MSR084d	548858.00	214989.37	7.19	8.00	9.16	10.80	12.99	16.27	14.78	22.28
MSR083u	548900.89	214887.37	7.19	7.99	9.15	10.80	12.99	16.27	14.78	22.28
MSR083d	548905.91	214850.68	14.66	16.79	19.45	22.47	25.32	29.33	27.46	36.61
MSR082u	548892.28	214703.04	14.66	16.79	19.45	22.47	25.32	29.33	27.46	36.61
MSR082d	548892.07	214700.92	6.85	7.84	9.08	10.39	11.38	12.24	11.91	12.49
SA010	548805.90	215283.31	7.46	7.85	8.17	8.45	8.64	8.82	8.80	9.15
SA009	548812.19	215224.73	6.28	6.40	6.48	6.59	6.62	6.67	6.67	6.69
SA008	548850.92	215174.46	6.06	6.12	6.18	6.23	6.25	6.29	6.30	6.39
SA007	548852.57	215074.46	5.31	5.38	5.42	5.41	5.43	5.45	5.43	5.48
SA006	548879.37	214985.11	7.79	8.97	10.41	11.69	12.08	12.49	12.27	13.48
SA004u	548932.99	214970.45	7.79	8.97	10.41	11.77	12.34	13.09	12.69	14.33
SA004d	548934.36	214968.05	7.79	8.97	10.41	11.77	12.34	13.09	12.69	14.33
SA003	548945.47	214956.47	7.79	8.97	10.41	11.77	12.34	13.09	12.69	14.33
SA002u	548956.48	214931.98	7.79	8.98	10.41	11.77	12.34	13.09	12.69	14.33
SA002d	548955.60	214929.17	7.79	8.98	10.41	11.77	12.34	13.09	12.69	14.33
SA001	548926.10	214881.66	7.79	8.98	10.41	11.77	12.34	13.09	12.69	14.33
SHB011d	548876.93	214688.12	7.81	8.95	10.37	12.08	13.94	17.09	15.55	24.65
SHB010	548864.26	214663.81	7.20	7.76	8.37	9.03	9.63	10.50	10.09	12.41
SHB009	548863.23	214661.67	7.20	7.76	8.37	9.03	9.63	10.50	10.09	12.41

Historic Flood Map centred on land at Sheering Lower Road, CM21 9LH - 5/1/2018 - HNL71528AS



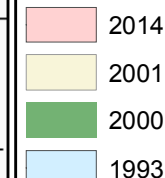
Environment Agency
Alchemy,
Bessemer Road,
Welwyn Garden City,
Hertfordshire,
AL7 1HE



Legend

— Main Rivers

Flood Event Outlines



The historic flood event outlines are based on a combination of anecdotal evidence, Environment Agency staff observations and survey.

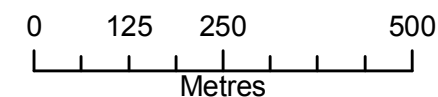
Our historic flood event outlines do not provide a definitive record of flooding. It is possible that there will be an absence of data in places where we have not been able to record the extent of flooding. It is also possible for errors occur in the digitisation of historic records of flooding.

Produced by:
Partnerships & Strategic Overview,
Hertfordshire & North London

Historic Flood Map centred on land at Sheering Lower Road, CM21 9LH - 5/1/2018 - HNL71528AS



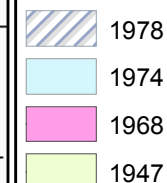
Environment Agency
Alchemy,
Bessemer Road,
Welwyn Garden City,
Hertfordshire,
AL7 1HE



Legend

— Main Rivers

Flood Event Outlines



The historic flood event outlines are based on a combination of anecdotal evidence, Environment Agency staff observations and survey.

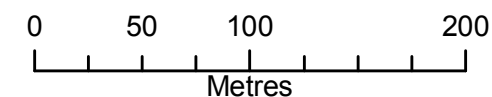
Our historic flood event outlines do not provide a definitive record of flooding. It is possible that there will be an absence of data in places where we have not been able to record the extent of flooding. It is also possible for errors occur in the digitisation of historic records of flooding.

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Partnerships & Strategic Overview,
Hertfordshire & North London

Structures and Defences centred on land at Sheering Lower Road, CM21 9LH - 5/1/2018 - HNL71528AS



Environment Agency
Alchemy,
Bessemer Road,
Welwyn Garden City,
Hertfordshire,
AL7 1HE



Legend

— Main Rivers

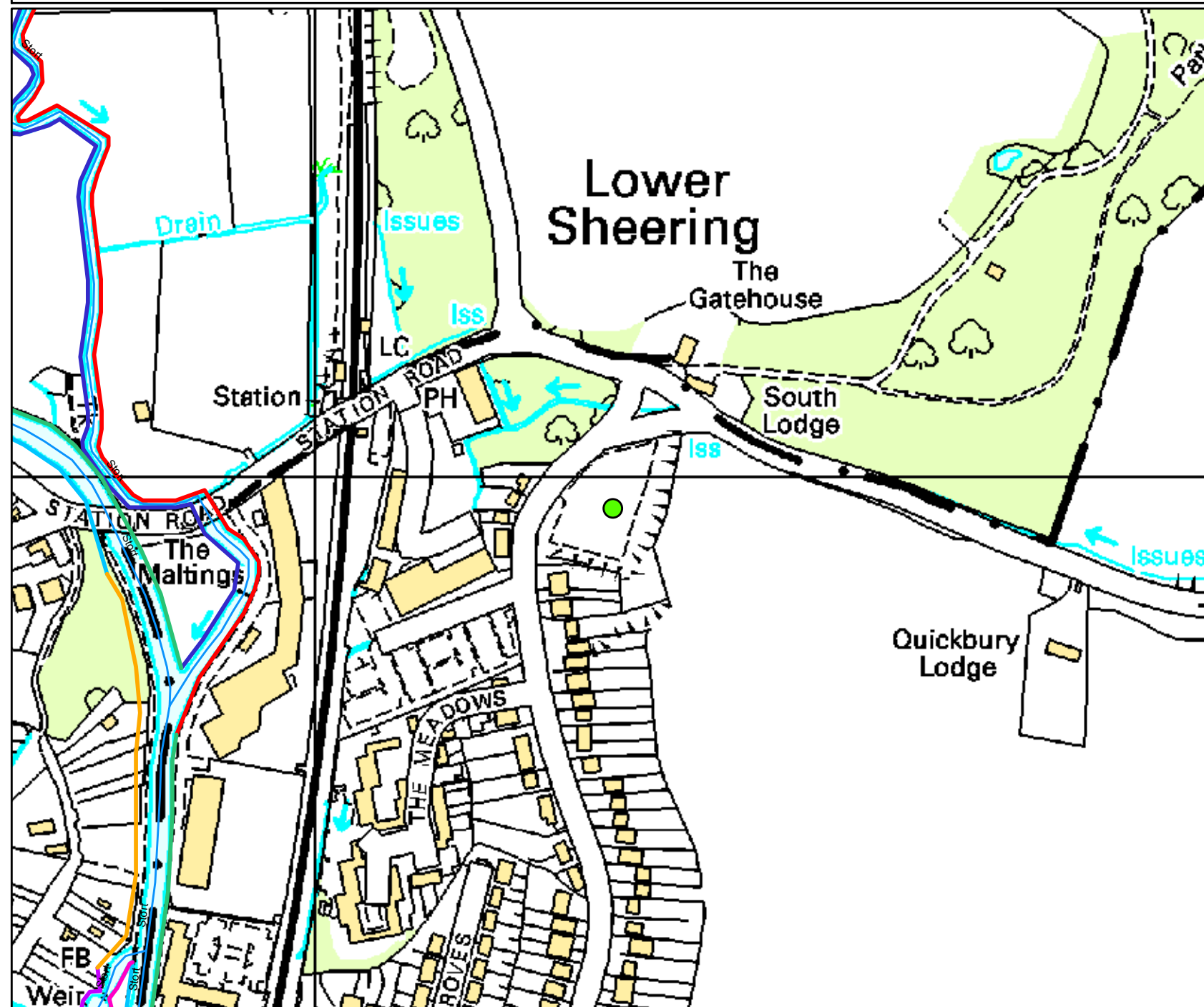
NAFRA DEFENCE

ASSET_ID

— 12736
— 115683
— 115684
— 131538
— 131821
— 131822
— 133043

The following information on defences has been extracted from the Asset Information Management System (AIMS)

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Hertfordshire & North London



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Environment Agency ref: [HNL71528AS](#)

The following information on defences has been extracted from the Asset Information Management System (AIMS)

Defences

Asset ID	Asset Type	Asset Protection	Asset Comment	Asset Description	Design Standard of protection (years)	Downstream Crest Level	Upstream Crest Level	Condition of Defences (1=Good, 5 = Poor)
131538	high_ground	fluvial	Natural earth defence.	Natural Bank.	2	47.58	49.08	2
133043	high_ground	fluvial	Natural earth defence.	Natural Bank.	2	46.96	46.96	2
115684	high_ground	fluvial	Natural earth defence.	Natural Bank.	20	46.75	48.02	3
115683	high_ground	fluvial	Natural earth defence.	Natural Bank.	2	46.8	47.6	3
131821	high_ground	fluvial	steel sheet piling lines almost entire length of channel through past Lawrence moorings development	Steel sheet piles form channel side along entire length of development	2	45.6	46.7	2
131822	high_ground	fluvial	Natural earth defence.	Natural Bank.	2	45.54	47.26	3
12736	high_ground	fluvial	Earth embankment with self set vegetation. Towpath to crest. Mobile dwellings live in estate in protected area. Bank most easily seen within said Mobile Home estate. 13-01-10 AP Changed to NFDS, TC 9 - agreed ASG	Embankment 3. SOP est. by Ian Davis.	100	47.31	47.32	3

Jessica Bayliff
Geosmart
11a Bellstone
Shrewsbury
Shropshire
SY1 1HU

Our ref: NE/2018/127990/01-L01

Date: 18 January 2018

Dear Jessica,

Preliminary opinion regarding Land at Sheering, Lower road, ESSEX, CM21 9LH.

Thank you for the above pre-application enquiry. The proposal as submitted raises no environmental concerns for the Environment Agency. If a planning application was submitted for this development as proposed, we would likely have no objections.

Note to applicant

Please note that the view expressed in this letter by the Environment Agency is a response to a pre application enquiry only and does not represent our final view in relation to any future planning application made in relation to this site.

We reserve the right to change our position in relation to any such application. You should seek your own expert advice in relation to technical matters relevant to any planning application before submission.

This opinion is based on the information submitted and current planning policy and guidance.

If you have any questions please contact me on 0208 474 5017 or email me at HNL.SustainablePlaces@environment-agency.gov.uk, quoting the reference at the beginning of this letter.

Yours sincerely

Stuart Cook
Sustainable Places Planning Advisor

Telephone: 0208 474 5017

E-mail: HNL.SustainablePlaces@environment-agency.gov.uk

End



INVESTOR IN PEOPLE





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Further context, best practice and guidance can be found in the [UK Government Licensing Framework section](#) on The National Archives website.



Appendix D

Thames Water sewer flooding report

Sewer Flooding

History Enquiry



Property
Searches

GeoSmart

Search address supplied land at Sheering Lower Road
CM21 9LH

Your reference 65812.01

Our reference SFH/SFH Standard/2018_3714013

Received date 2 January 2018

Search date 2 January 2018



Thames Water Utilities Ltd
Property Searches, PO Box 3189, Slough SL1 4WW
DX 151280 Slough 13



searches@thameswater.co.uk
www.thameswater-propertysearches.co.uk



0845 070 9148

Sewer Flooding

History Enquiry



Property
Searches

Search address supplied: land at Sheering Lower Road, CM21 9LH

This search is recommended to check for any sewer flooding in a specific address or area

TWUL, trading as Property Searches, are responsible in respect of the following:-

- (i) any negligent or incorrect entry in the records searched;
- (ii) any negligent or incorrect interpretation of the records searched;
- (iii) and any negligent or incorrect recording of that interpretation in the search report
- (iv) compensation payments



Thames Water Utilities Ltd
Property Searches, PO Box 3189, Slough SL1 4WW
DX 151280 Slough 13



searches@thameswater.co.uk
www.thameswater-propertysearches.co.uk



0845 070 9148

History of Sewer Flooding

Is the requested address or area at risk of flooding due to overloaded public sewers?

The flooding records held by Thames Water indicate that there have been no incidents of flooding in the requested area as a result of surcharging public sewers.

For your guidance:

- A sewer is “overloaded” when the flow from a storm is unable to pass through it due to a permanent problem (e.g. flat gradient, small diameter). Flooding as a result of temporary problems such as blockages, siltation, collapses and equipment or operational failures are excluded.
- “Internal flooding” from public sewers is defined as flooding, which enters a building or passes below a suspended floor. For reporting purposes, buildings are restricted to those normally occupied and used for residential, public, commercial, business or industrial purposes.
- “At Risk” properties are those that the water company is required to include in the Regulatory Register that is presented annually to the Director General of Water Services. These are defined as properties that have suffered, or are likely to suffer, internal flooding from public foul, combined or surface water sewers due to overloading of the sewerage system more frequently than the relevant reference period (either once or twice in ten years) as determined by the Company’s reporting procedure.
- Flooding as a result of storm events proven to be exceptional and beyond the reference period of one in ten years are not included on the At Risk Register.
- Properties may be at risk of flooding but not included on the Register where flooding incidents have not been reported to the Company.
- Public Sewers are defined as those for which the Company holds statutory responsibility under the Water Industry Act 1991.
- It should be noted that flooding can occur from private sewers and drains which are not the responsibility of the Company. This report excludes flooding from private sewers and drains and the Company makes no comment upon this matter.
- For further information please contact Thames Water on Tel: 0800 316 9800 or website www.thameswater.co.uk



Thames Water Utilities Ltd
Property Searches, PO Box 3189, Slough SL1 4WW
DX 151280 Slough 13



searches@thameswater.co.uk
www.thameswater-propertysearches.co.uk



0845 070 9148

Disclaimer

This report has been prepared by GeoSmart in its professional capacity as soil, groundwater, flood risk and drainage specialists, with reasonable skill, care and diligence within the agreed scope and terms of contract and taking account of the manpower and resources devoted to it by agreement with its client, and is provided by GeoSmart solely for the internal use of its client.

The advice and opinions in this report should be read and relied on only in the context of the report as a whole, taking account of the terms of reference agreed with the client. The findings are based on the information made available to GeoSmart at the date of the report (and will have been assumed to be correct) and on current UK standards, codes, technology and practices as at that time. They do not purport to include any manner of legal advice or opinion. New information or changes in conditions and regulatory requirements may occur in future, which will change the conclusions presented here.

This report is confidential to the client. The client may submit the report to regulatory bodies, where appropriate. Should the client wish to release this report to any other third party for that party's reliance, GeoSmart may, by prior written agreement, agree to such release, provided that it is acknowledged that GeoSmart accepts no responsibility of any nature to any third party to whom this report or any part thereof is made known. GeoSmart accepts no responsibility for any loss or damage incurred as a result, and the third party does not acquire any rights whatsoever, contractual or otherwise, against GeoSmart except as expressly agreed with GeoSmart in writing.

For full T&Cs see <http://geosmartinfo.co.uk/terms-conditions>

Important consumer protection information

This search has been produced by GeoSmart Information Limited, Suite 9-11, 1st Floor, Old Bank Buildings, Bellstone, Shrewsbury, SY1 1HU.

Tel: 01743 298 100

Email: info@geosmartinfo.co.uk

GeoSmart Information Limited is registered with the Property Codes Compliance Board (PCCB) as a subscriber to the Search Code. The PCCB independently monitors how registered search firms maintain compliance with the Code.

The Search Code:

- provides protection for homebuyers, sellers, estate agents, conveyancers and mortgage lenders who rely on the information included in property search reports undertaken by subscribers on residential and commercial property within the United Kingdom
- sets out minimum standards which firms compiling and selling search reports have to meet
- promotes the best practice and quality standards within the industry for the benefit of consumers and property professionals
- enables consumers and property professionals to have confidence in firms which subscribe to the code, their products and services.
- By giving you this information, the search firm is confirming that they keep to the principles of the Code. This provides important protection for you.

The Code's core principles

Firms which subscribe to the Search Code will:

- display the Search Code logo prominently on their search reports
- act with integrity and carry out work with due skill, care and diligence
- at all times maintain adequate and appropriate insurance to protect consumers
- conduct business in an honest, fair and professional manner
- handle complaints speedily and fairly
- ensure that products and services comply with industry registration rules and standards and relevant laws
- monitor their compliance with the Code

Complaints

If you have a query or complaint about your search, you should raise it directly with the search firm, and if appropriate ask for any complaint to be considered under their formal internal complaints procedure. If you remain dissatisfied with the firm's final response, after your complaint has been formally considered, or if the firm has exceeded the response timescales, you may refer your complaint for consideration under The Property Ombudsman scheme (TPOs). The Ombudsman can award compensation of up to £5,000 to you if he finds that you have suffered actual loss as a result of your search provider failing to keep to the Code.

Please note that all queries or complaints regarding your search should be directed to your search provider in the first instance, not to TPOs or to the PCCB.

TPOs contact details:

The Property Ombudsman scheme
Milford House
43-55 Milford Street
Salisbury
Wiltshire SP1 2BP
Tel: 01722 333306
Fax: 01722 332296
Email: admin@tpos.co.uk

You can get more information about the PCCB from www.propertycodes.org.uk.

Please ask your search provider if you would like a copy of the search code

Complaints procedure

GeoSmart Information Limited is registered with the Property Codes Compliance Board as a subscriber to the Search Code. A key commitment under the Code is that firms will handle any complaints both speedily and fairly.

If you want to make a complaint, we will:

- Acknowledge it within 5 working days of receipt.
- Normally deal with it fully and provide a final response, in writing, within 20 working days of receipt.
- Keep you informed by letter, telephone or e-mail, as you prefer, if we need more time.
- Provide a final response, in writing, at the latest within 40 working days of receipt.
- Liaise, at your request, with anyone acting formally on your behalf.

If you are not satisfied with our final response, or if we exceed the response timescales, you may refer the complaint to The Property Ombudsman scheme (TPOs): Tel: 01722 333306, E-mail: admin@tpos.co.uk.

We will co-operate fully with the Ombudsman during an investigation and comply with his final decision.

Complaints should be sent to:

Jemma Prydderch
Operations Manager

GeoSmart Information Limited
Suite 9-11, 1st Floor,
Old Bank Buildings,
Bellstone,
Shrewsbury,
SY1 1HU
Tel: 01743 298 100
jemmaprydderch@geosmartinfo.co.uk

Terms and Conditions

GEOSMART INFORMATION LIMITED

Conditions of contract for environmental reports

June 2016, Version 1.2

Definitions:

The following words shall have the following meaning:

- a) "Client" means the person for whom the Report has been procured either directly or through an Intermediary;
- b) "Conditions" means these terms and conditions of sale, the User Guide and the Order;
- c) "GEOSMART" means GeoSmart Information Ltd of Suite 9-11, Old Bank Buildings, Bellstone, Shrewsbury, SY1 1HU, registered in England and Wales with company registration number 05475394.
- d) "Information" means environmental data, including other third party sources of information;
- e) "Intermediary" means the party that places the Order acting on behalf of the Beneficiary, who might be a lawyer, consultant or other party;
- f) "Order" means the order for Services sent by a Client or an Intermediary to GEOSMART;
- g) "Report" or "Reports" means a report which relates to environmental information (as distinct from opinion) and which is prepared by GEOSMART in respect of a Site;
- h) "Services" means the preparation and provision of Report(s) by GEOSMART from the Information;
- i) "Site" shall mean the site specified in the Order;
- j) "User Guide" means the document (if any) which may be produced from time to time by GEOSMART entitled 'GeoSmart User Guide', which may be requested with the Report by writing to GEOSMART at the above address and will be provided if applicable.

1. Conditions

1.1 Subject to receipt of a valid Order, GEOSMART agrees to supply to the Client or the Intermediary (if the Client has appointed one) the Services subject to these Conditions and the Client or the Intermediary agrees that by placing an Order for the Services it accepts these Conditions. The User Guide applicable to each Report should be read in conjunction with the Report and is incorporated into these Conditions as if it were repeated herein. A Report is sold subject to all information contained in such User Guide

1.2 GEOSMART acknowledges that in the provision of the Report and Services it owes a duty of care to the Intermediary and to the Client.

1.3 In providing search reports and services GEOSMART will comply with Search Code and will take into account the requirements of the Alternative Dispute Resolution for Consumer Disputes (Amendment) Regulations 2015. Further details are provided in the PCCB Bulletin which accompanies GEOSMART Reports.

2. Report

GEOSMART shall use reasonable care, skill and diligence in carrying out the Services and providing the Report to the Intermediary (and the Client). However the Report is provided to the Intermediary (and the Client) on the express basis that the Intermediary (and the Client) acknowledge and agree to the following:

2.1 information and data supplied in Report(s) is derived from the Information and GEOSMART does not warrant the accuracy or completeness of such Information;

2.2 the sources of information and data supplied in Report(s) are specifically cited in the Report and the User Guide; however GEOSMART does not claim that these sources represent an exhaustive or comprehensive list of all sources that could or might be consulted; and

2.3 GEOSMART does not guarantee that all environmental risks that are or might be associated with the Site will be identified in the Report; and

2.4 Reports and other services provided by GEOSMART are generally professional business to business services and intended as such for use or interpretation by professional persons skilled in the use of environmental information; and

2.5 GEOSMART shall not be responsible for any error or corruption in a Report resulting from inaccuracy or omission of third party information and data provided by the Intermediary or the Client (as applicable), inaccurate processing of information and data by third parties, computer malfunction or corruption of data whilst in the course of conversion, coding, processing by computer or electronic means, or in the course of transmission by telephone or other communication link.

3. Liability

3.1 As some of the data and information which GEOSMART interprets in Reports is obtained by GEOSMART from third parties, GEOSMART cannot control the accuracy or completeness of such data and information, nor is it within the scope of the Services to verify the data or information by a physical inspection of the Site. Save as provided in Conditions 3.5 and 3.11 GEOSMART will only be liable to the Client or to the Intermediary in respect of the Services:

3.1.1 for loss or damage caused by breach by GEOSMART of these Conditions accordingly save as provided in Condition 3.5 GEOSMART shall not be liable in any other circumstances for any errors, inaccuracies, faults or omissions in the Services;

3.1.2 for any obvious errors or obvious inaccuracies in any information obtained by it where GEOSMART should reasonably have been alerted to such error or inaccuracy;

3.2 GEOSMART has no liability whatsoever for, under or in respect of any insurance policy purchased by the Client or the Intermediary where insurance is made available to the Client or Intermediary following the provision of a Report by GEOSMART issued in accordance with these Conditions. Where such a policy has been purchased, all liability arising from or relating to the Site shall remain exclusively with the insurers. Moreover, GEOSMART is not endorsing any policy recommended by insurers and the Client or the Intermediary is entirely responsible for ensuring the insurance policy offered is suitable for its needs and should seek independent advice.

3.3 GEOSMART does not guarantee that an insurance policy will be available for the environmental risks that may be associated with the Site specified in the Report and the provision of a Report does not constitute any indication by GEOSMART that insurance will be available for the Site.

3.4 GEOSMART has undertaken the Services for use by the Client or the Intermediary and those persons referred to at condition 5.1 and 5.2 and for no other purpose whatsoever and the Services should not be relied upon by any other third party. GEOSMART cannot accept responsibility and will not be liable to any other party for any loss caused as a result of reliance upon the Services. Any other party relying on the Services does so entirely at its own risk, including without limitation, any insurers. Recipients of the Services are to rely on their own skill and judgment in determining the suitability of the Services for their own purpose and use.

3.5 Nothing in these Conditions shall exclude or restrict GEOSMART's liability for death or personal injury resulting from the negligence of GEOSMART or their employees while acting in the course of their employment or arising from a breach of its statutory duty or fraud.

3.6 GEOSMART shall not be liable to any recipient of the Service for loss of profits, loss of contracts, (or other indirect or consequential loss or damage) resulting from any event or default by GEOSMART in the provision of the Services to the fullest extent permitted by law.

3.7 GEOSMART shall make reasonable endeavors to supply the Report on the date agreed with the Intermediary or the Client (as applicable). This date will be taken as a guideline for time planning purposes only. Time shall not be of the essence with respect to the provision of the Services except where it has agreed in writing to a deadline with the Client or Intermediary in which it is stated that time is of the essence.

3.8 GEOSMART shall not be liable for any delay, interruption or failure in performance of its obligations hereunder which is caused by war, flood, riot, Act of God, strike or other labour dispute (including those affecting Government officials), suspension or delay of service at public registries, lack of power, telecommunications failure or overload, or computer malfunction caused by any event beyond the reasonable control of GEOSMART.

3.9 The Client or the Intermediary (as appropriate) shall on receipt of the Services make a reasonable inspection of the Site to satisfy itself that there are no apparent defects or failures with respect to the description of the Site.

3.10 GEOSMART's liability under the Conditions shall cease upon the expiry of six (6) years from the date when the Client, Intermediary or any person making use of the Report in accordance with Condition 5.2 became aware that it may have a claim in respect of a particular Report provided always that there shall be no liability at the expiration of six (6) years from the date of the Report. For the avoidance of doubt, any claims in respect of which proceedings are notified to GEOSMART prior to the expiry of the time periods referred to in this Condition shall survive the expiry of those time periods.

3.11 Subject as otherwise provided in these Conditions, GEOSMART's aggregate liability arising out of the provision or use of the Services, in contract, negligence or in any other way, for damages or loss sustained or incurred by the Intermediary shall be limited to an aggregate amount not exceeding £5,000,000 pounds. For the avoidance of doubt, if multiple parties make use of the Report, the limit referred to above applies to all users of that Report in aggregate.

3.12 GEOSMART undertakes for the duration of the six (6) year period of liability provided for by Condition 3.11 to maintain and renew annually Professional Indemnity Insurance in respect of the Services with a liability limit of not less than £5,000,000 provided that such insurance is available at commercially reasonable rates (and in such case then at the next highest limit which is available in the market at commercially reasonable rates). Details of Professional Indemnity Insurance shall be made available to the Client or Intermediary (as applicable) on request.

3.13 Where GEOSMART procures for the Intermediary, otherwise than as part of a Report, any third party service, including but not limited to, environmental reports, risk models, risk assessments, professional opinions, or any other service, GEOSMART accepts no liability whatsoever for the information contained therein.

3.14 The Client and the Intermediary warrant that they shall: (i) comply with all applicable laws, statutes and regulations relating to anti-bribery and anti-corruption including but not limited to the

Bribery Act 2010; (ii) comply with such of GEOSMART'S anti-bribery and anti-corruption policies as are notified to them from time to time; and (iii) promptly report to GEOSMART any request or demand for any undue financial or other advantage of any kind received by the or on their behalf in connection with these Conditions. Breach of this clause shall be deemed a material breach of these Conditions.

4. Copyright

4.1 The Intermediary, the Client and any recipient of the Report pursuant to the provisions of condition 5.2 acknowledge that the proprietary rights subsisting in copyright, design rights and any other intellectual property rights in respect of the data and information in the Report are and shall remain the property of GEOSMART and these Conditions do not purport to grant, assign, or transfer any such rights in respect thereof.

4.2 Reports may be stored on the Intermediary's server and used on up to ten (10) units (where a "Unit" means a single client personal computer or workstation) on the Intermediary's network and any network of a recipient of the Report pursuant to the provisions of Condition 5.2. Data in Reports is deemed to be in use when it is loaded into the temporary memory (i.e. RAM) or installed onto the permanent memory (i.e. memory chip, hard disc, CDROM) of that computer.

4.3 The Intermediary, the Client and all recipients of the Report pursuant to the provisions of Condition 5.2 are all entitled to make up to five printed copies only of any Report. Copies of the Report may be provided for information purposes for proper and lawful use only to a person who is considering whether to acquire or hold an interest in the Site or to provide funding in relation to the Site. Further copies may not be made in whole or in part without the written permission of GEOSMART who shall be entitled to make a charge for each additional copy.

4.4 The Intermediary and the Client (as applicable) shall (and shall procure that all recipients of the Report pursuant to the provisions of Condition 5.2 shall):

4.4.1 not remove, suppress or modify any trademark, copyright or other proprietary marking belonging to GEOSMART from the Services;

4.4.2 not create any product which is derived directly or indirectly from the data contained in the

Services; save for products documents and advice provided by those acting in a professional or commercial capacity in accordance with 5.2.3;

4.4.3 not combine the Services with or incorporate such Services into any other information data or service;

4.4.4 not re-format or otherwise change (whether by modification, addition or enhancement) data contained in the Services save for those modifications made by those acting in a professional or commercial capacity in accordance with 5.2.3;

4.5 The mapping (if any) contained in any Services is protected by Crown Copyright and must not be used for any purpose outside the context of the Services.

5. Confidentiality and reliance

5.1 Subject to (i) full payment of all relevant Fees and (ii) compliance with this Contract, the Client or the Intermediary is entitled to rely on the report and information provided.

5.2 Subject to Condition 5.3, the Client or the Intermediary (as applicable) may without further charge make the Report available to:

5.2.1 Up to a maximum of three (3) persons who acquire or hold an interest in the Site or an interest in the Client or the entity which holds or acquires an interest in the Site save that nothing shall hereby entitle any such person to recover twice (whether directly or indirectly) in respect of the same loss nor seek recovery in respect of any loss relating to any period after such entity ceases to hold its interest or to have potential liability for the Site (whichever is the later) (unless otherwise agreed by the parties);

5.2.2 Up to a maximum of three (3) persons who provide funding to the Client or to a person at condition 5.2.3;

5.2.3 Up to a maximum of three (3) persons acting in a professional or commercial capacity for the Client in relation to the Site.

5.3 GEOSMART shall have the same duties and obligations to those persons referred to in Conditions 5.2.1, 5.2.2, 5.2.3 in respect of the Services as it has to the Client and the Intermediary, and such persons shall be entitled to rely on the

relevant Report as if it was addressed to them and any such person shall be entitled to enforce each of these Conditions as if they were named as joint Client in the Order, provided always that the person to whom the Report is made available accepts these Conditions by writing accordingly to GEOSMART citing the Report and the Site.

5.3 The Report is to be used solely for the benefit of such persons as are set out in Condition 5.1 and 5.2, and GEOSMART exclude all liability to all other persons unless GEOSMART has expressly agreed in writing to a third party taking the benefit of the Report and has been paid reasonable fees for so doing.

5.4 Any information provided by the Intermediary or the Client to GEOSMART in contemplation of the Services to be provided together with the Report will be treated as confidential information.

5.5 GEOSMART agrees not to disclose or publish any statement relating to such confidential information (in whole or in part) to any third party without the prior written consent of the Intermediary save for its provision to GEOSMART's employees who require access to the confidential information in order to perform their duties to GEOSMART.

5.6 GEOSMART will procure that its employees will maintain the confidential information in strict confidence.

6. GEOSMART's charges

6.1 The Client or the Intermediary (as applicable) shall pay GEOSMART's charges for the Services at the rate set out in the Order.

6.2. Unless otherwise stated all prices are exclusive of Value Added Tax which shall, where applicable, be payable in addition to any sum payable for the Services at the relevant rate in force from time to time, against delivery of an appropriate tax invoice.

6.3 The Client or the Intermediary (as applicable) shall pay the price referred to in Condition 6.1 above for the Services:

6.3.1 without any set off, deduction or counterclaim;

6.3.2 GEOSMART requests upfront payment by debit or credit card (No surcharges for credit cards) or by bank transfer. A credit agreement can be set

up for repeat clients with terms based on 14 days from the date of GEOSMART's invoice.

6.4 GEOSMART shall not be obliged to invoice any party other than the Client or the Intermediary (as applicable) for the provision of Services, but where GEOSMART does so invoice any third party at the written request of the Client Intermediary, and such invoice is not accepted or remains unpaid, GEOSMART shall have the right at any time to cancel such invoice and invoice the Client or the Intermediary (as applicable) direct for such Services. Where the Intermediary's order comprises a number of Services or separate elements within any one or more Services, any failure by GEOSMART to provide an element or elements of the Services shall not prejudice GEOSMART's ability to require payment in respect of the other Services delivered to the Intermediary or the Client (as applicable).

6.5 If the Intermediary or the Client (as applicable) fails to make any payment on the due date GEOSMART shall be entitled to cancel or suspend any further orders or delivery. In addition, GEOSMART may charge the Intermediary or the Client (as applicable) interest on overdue amounts at 4% over the NatWest plc base rate (as varied from time to time) from the due date until payment in full is made (whether before or after judgment).

7. General

7.1 These Conditions constitute the entire agreement between the parties and no statement given orally or in writing should be deemed incorporated herein unless executed in writing by a director of GEOSMART and countersigned by the Intermediary or the Client (as applicable). Each of the Conditions and Sub-conditions of these Conditions is distinct and severable. If any provision of these Conditions shall be determined to be invalid, illegal or unenforceable, the remainder of these Conditions shall continue to be valid, legal and enforceable to the fullest extent of the law.

7.2 Any time or indulgence granted by GEOSMART or the Client or the Intermediary or delay in

exercising any of its rights under these Conditions shall not prejudice or affect GEOSMART's or the Client's or the Intermediary's rights or operate as a waiver of the same.

7.3 GEOSMART, the Client and the Intermediary shall not be entitled to assign their respective rights or obligations pursuant to these Conditions without the prior written approval of the other parties.

7.4 GEOSMART may suspend or terminate the provision of the Services if the Client or the Intermediary (as applicable) is bankrupt or insolvent or makes any voluntary arrangements with its creditors or become subject to an administration order or has an administrative receiver appointed over any of its assets or GEOSMART has reason to believe that any of foregoing circumstances may come into existence or any amount owing to GEOSMART that is overdue or where the Client or Intermediary (as applicable) has exceeded any credit limit.

7.5 These Conditions shall at all times be governed construed and enforced in accordance with English Law which shall be the proper law of these Conditions, and both parties thereby submit to the exclusive jurisdiction of the English courts.

7.6 Except as otherwise provided in these Conditions a person who is not a party to any contract made pursuant to these Conditions shall have no right under the Contracts (Rights of Third Parties) Act 1999 to enforce any terms of such contract and GEOSMART shall not be liable to any such third party in respect of the Products.