

Preliminary Flood Risk Assessment

CLIENT	General Estates Park Homes
SITE ADDRESS	Fishers Caravan Parks, 31 Fishery Lane, Hayling Island PO11 9NU
REPORT REFERENCE	GWPR3294. Ground and Water Limited has prepared this report following the principles of the National Planning Policy Framework (NPPF) and Technical Guidance-Flooding, published March 2012, and Planning Policy Statement Note 25, Development and Flood Risk (PPS25), published in December 2006. Details on the legislative background are provided in Appendix A.
ENGINEER	Sam Greene, Ground and Water Limited
SITE LOCATION	The site comprised a 13,345m ² rectangular-shaped plot of land, orientated in an east to west direction. The site was located on the northern side of Fishery Lane, in the Selsmore area of Hayling Island, east of Portsmouth, southern Hampshire. The approximate O.S National Grid reference for the centre of the site is SZ 73535 98913. A site location plan is given within Figure 1. A plan showing the site development area is given within Figure 2.
SITE DESCRIPTION	The site was occupied by an active caravan park, with access roads/hardstanding paths running across the site and a caravan site office situated within the south-west portion of the site. Small areas of soft landscaping were present between each of the caravans and surrounding the caravan site office. An aerial view showing an approximate site boundary is given within Figure 3.
SITE TOPOGRAPHY	The site topography was identified using FreeMapTool Elevation Finder. The site was noted to be sloping gradually to the south-west of the site. The north-east of the site was noted to be at an elevation of 4.0m AOD, and the south-west of the site was at an elevation at 2.0m AOD. The site was situated in a fairly flat and level area, noted to be sloping gently downwards to the east.
PROPOSED DEVELOPMENT	At the time of reporting, September 2019, it was understood that the proposed development for the site will comprise the extension of the occupancy of the caravan park from 10 months to 11 months and fourteen days, allowing the park to be used between 1 st March and 14 th February inclusive.
GEOLOGY	The BGS Geological Map (Solid and Drift) for the Selsmore area (Portsmouth Sheet No. 331) revealed the site was located on superficial deposits of River Terrace Deposits (undifferentiated), and bedrock deposits of the Portsmouth Sand Member and Whitecliff Sand Member. No areas of Made Ground or Worked Ground were noted in close proximity to the site. <i>River Terrace Deposits (undifferentiated)</i> Sand and gravel, locally with lenses of silty, clay or peat. <i>Portsmouth Sand and Gravel Member</i> The Portsmouth Sand and Gravel Member of the London Clay Formation generally comprises pale yellow, cross-bedded fine to medium grained sand with thin partings of grey clay and ferruginous concretions. <i>Whitecliff Sand Member</i> The Whitecliff Sand Member of the London Clay Formation generally comprises pale yellow, cross-bedded fine to

	medium grained sand with thin partings of grey clay and ferruginous concretions.
HYDROGEOLOGY & HYDROLOGY	A study of the aquifer maps on the DEFRA website revealed the site was underlain by Secondary A Aquifers associated with superficial River Terrace Deposits (undifferentiated) and bedrock deposits of the Portsmouth Sand and Gravel Member and Whitecliff Sand Member. Superficial drift deposits are described as permeable unconsolidated (loose) deposits e.g. sands and gravels. The bedrock is described as solid permeable formations e.g. sandstone, chalk and limestone. Unproductive Strata are rock layers with low permeability that have negligible significance for water supply or river base flow. These were formerly classified as non-aquifers. Secondary aquifers include a wide range of drift deposits with an equally wide range of water permeability and storage capacities. Secondary (A) Aquifers consist of deposits with 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. Examination of the Environment Agency records showed that the site was not located within a Groundwater Source Protection Zone (SPZ) as classified in the Policy and Practice for the Protection of Groundwater. The nearest significant watercourse was the easterly flowing Mengham Rithe ~493m north of the site. In addition, the English Channel was noted ~782m south of the site. From the analysis of hydrogeological and topographical maps groundwater was anticipated to be encountered at shallow to moderate depth (1 – 3.5m bgl) and it was considered that the groundwater was flowing in an easterly direction in line with local topography. Examination of the Environment Agency records showed that the northern two thirds of the site fell within a Flood Zone 1 (an area with a low probability of river or sea flooding). In addition, the records showed that approximately the southern third of the site fell within a Flood Zone 2 and Flood Zone 3. Environment Agency Flood Zone 2, defined as; land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding; or land having between a 1 in 200 and 1 in 1,000 annual probability of sea flooding. Environment Agency Flood Zone 3 shows the extent of a river flood with a 1 in 100 (1% or greater chance of occurring in any year or a sea flood with a 1 in 200 (0.5%) or greater chance of occurring in any year.
FLOOD DEFENCE STRUCTURES	An analysis of the flood defences centred on Fishery Lane was undertaken based upon information provided by the Environment Agency. Twelve individual defences were identified, and the assessment of each can be seen tabulated overleaf. A map showing the locations of these defences in relation to the site can be viewed within Figure 4.

Existing Flood Defences in Proximity to the Site					
Asset ID	Asset Sub-type	Length (m)	Asset Maintainer	Actual Condition	Last Inspection Date
177059	Embankment	51.64	Environment Agency	Good	21/11/2018
177060	Embankment	33.21	Environment Agency	Good	21/11/2018
177061	Embankment	560.42	Environment Agency	Fair	21/11/2018
177062	Embankment	80.16	Environment Agency	Poor	21/11/2018
184313	Wall	120.76	Environment Agency	Fair	21/11/2018
185388	Wall	119.94	Environment Agency	Fair	21/11/2018
185389	Wall	51.93	Environment Agency	Fair	21/11/2018
185390	Embankment	246.53	Environment Agency	Fair	21/11/2018
185391	Embankment	255.81	Environment Agency	Good	21/11/2018
185392	Wall	80.66	Environment Agency	Good	21/11/2018
1850015	Embankment	666.03	Private	Good	21/11/2018
180016	Embankment	464.76	Private	Fair	21/11/2018

VULNERABILITY CLASSIFICATION

Table D.2 of PPS25 defines the 'Flood Risk Vulnerability Classification' of a particular land use. This classification was based partly on Defra/Environment Agency research on flood risk to people and also the need of some uses to keep functioning during flooding.

The site's vulnerability classification was '**More Vulnerable**' as the existing land-use was for short-let caravans (i.e. non-permanent residence). The site will likely remain '**More Vulnerable**' given the proposed development, as although an extension of occupancy is planned, it would not be extended across the entire year.

GROUNDSURE FLOODINSIGHT DATASHEET

GroundSure FloodInsight Datasheets were obtained for the site. A copy of the datasheets is presented in Appendix B and a summary is given in the table below.

Table 2: Environmental Significance Of Data Search	
Source	Nearest Distance from Site/Dated/Type
Environmental Agency Flood Zones	
Environmental Agency Zone 2 Floodplains	One record on-site
Environmental Agency Zone 3 Floodplains	One record on-site
River and Coastal Flood Defences	None within a 250m radius.
Areas Benefiting from Flood Defences	Yes, ~75m north-west of the site.
Proposed Flood Defences	One record within 250m radius of the site: 1 x Sea Flooding Defence (79.0m north of the site)
Flood Water Storage Areas	None within a 250m radius.
Environment Agency Risk of Flooding from Rivers and the Sea (RoFRaS)	
Risk of Flooding from Rivers and the Sea (RoFRaS)	Low to High – on site. RoFRaS data for the study site indicated the property is in an area with a High (1 in 30 or greater) chance of flooding in any given year. 5 records of Flood Risk on-site: 2 x records of High-Risk Flooding (south-west corner) 1 x records of Medium-Risk Flooding (south of site) 2 x records of Low-Risk Flooding (south-east corner) 6 records of Flood Risk off-site: 3 x records of High-Risk Flooding (10 – 50m south, 49m east) 2 x records of Medium-Risk Flooding (13m west, 17m south) 1 record of Low-Risk Flooding (23m south-west)
Environment Agency Historic Flooding Events	
Historic Flooding recorded by the Environment Agency	None within a 250m radius.

JBA Surface Water (Pluvial) Flooding	
JBA Records of Surface Water (Pluvial) Flooding	Thirty-one off-site records within a 50m radius of the site: 1 x High Risk: 11m south 15 x Low to Moderate: 9m south, 10m south (x3), 17m south, 21m south-east, 27m south, 28m south, 31m south, 35m south (x2), 36m south, 45m south, 46m south, 50m south. 18 x Low: 0m on-site, 3m south, 8m south (x3), 10m south, 12m south-west, 31m south, 35m south (x2), 37m south-east, 42m south, 46m south, 47m south, 50m south 30x Low Risk: 14m south-east, 15m south-east, 17m south-east, 21m south, 22m east, 24m south-east, 26m south-west, 28m south-west, 28m east, 28m south-east, 31m south, 33m south, 34m south-west, 35m south-east, 36m south, 37m
	south, 39m south-west (x2), 40m south-west, 41m south, 42m south-east, 43m south, 44m east, 45m south-west, 46m south, 49m south-east, 50m south-east (x3), 50m south-west. 11 x Low to Moderate Risk: 27m south, 31m south, 36m south, 37m south-east, 37m south, 39m east, 42m east, 42m south, 45m south-west, 46m south-east, 48m south-east. 2 x Moderate Risk: 31m south, 36m south. 4 x High Risk: 21m south-west, 24m south-east, 30m south-east, 47m south-east. 2 x Significant Risk: 28m south-east, 37m south-west.
The definition of each risk category is given below	
Negligible.	Less than 0.1m in a 1 in 1000 year rainfall event
Low.	Greater than 0.1m in a 1 in 1000 year rainfall event
Low to Moderate.	Between 0.1m and 0.3m in a 1 in 200 year rainfall event
Moderate.	Between 0.3m and 1m in a 1 in 200 year rainfall event
Moderate to High.	Greater than 1m in a 1 in 200 year rainfall event
High.	Between 0.1m and 0.3m in a 1 in 75 year rainfall event
Significant.	Between 0.3m to 1m in a 1 in 75 year rainfall event
Highly Significant.	Greater than 1m in a 1 in 75 year rainfall event
Surface Water Features	
Surface Water Features	None within a 250m radius.
BGS Groundwater Flooding	
Are there any British Geological Survey groundwater flooding susceptibility areas within 50m of the boundary of study site?	Yes.
What is the highest susceptibility to groundwater flooding in the search area based on the underlying geological conditions?	Potential for groundwater flooding of property below ground level.
What is the British Geological Survey confidence rating in this result?	Low.
BGS Geological Indicators of Flooding	
Geological Indicators of Flooding	One on-site and three off-site records within a 250m radius: 1 x records on-site – Lower flood potential from rivers: areas

	affected by secondary flooding in extreme cases as a result of a prolonged flood event. 2 x records 144m east and 193m north-west - Lower flood potential from the sea: areas affected in extreme cases due to combined factors e.g. very high tides/high wind speeds/large storm surge. 1 x 180m south-east - Higher flood potential from the sea: the first areas to experience the effects of coastal flooding.
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Table 2: Environmental Significance of Data Search

Source	Nearest Distance from Site/Dated/Type
JBA Reservoir and Canal Data	
JBA Reservoir Failure Modelling	None required.
JBA Canal Break Modelling	No record within a 500m radius

FLOOD MAP REVIEW

A review of the online Environment Agency's Maps for Long Term Flood Risk, associated with flooding from rivers or the seas, revealed that the south-western corner of the site was at **High Risk**, the southern middle portion was at **Medium Risk**, and the south-eastern corner was at **Low Risk** of flooding.

High risk means that each year this area has a chance of flooding of greater than 3.3%. This takes into account the effect of any flood defences in the area. These defences reduce but do not completely stop the chance of flooding as they can be overtopped, or fail.

Medium risk means that each year this area has a chance of flooding of between 1% and 3.3%. This takes into account the effect of any flood defences in the area. These defences reduce but do not completely stop the chance of flooding as they can be overtopped, or fail.

Low risk means that each year this area has a chance of flooding of between 0.1% and 1%. This takes into account the effect of any flood defences in the area. These defences reduce but do not completely stop the chance of flooding as they can be overtopped, or fail.

A review of the online Environment Agency's Maps for Long Term Flood Risk, associated with surface water flooding, revealed that the site was not at risk of surface water flooding.

A small area approximately 5 – 25m south of the site, towards the eastern end of Fishery Lane and adjacent to the boating lake, was noted to be at medium risk of flooding with below 300mm of flood depth and with a velocity of over 0.25m/s.

The Flood Risk from Rivers or Sea Map can be seen within Figure 5. The Surface Flood Risk Maps, together with the associated velocity and flood depth maps can be seen within Figures 6 – 12.

EXISTING DRAINAGE AND PROPOSED SYSTEM

It has been assumed that there was existing formal foul and surface water drainage systems on-site.

At the time of reporting, September 2019, it was understood that the proposed development for the site will comprise the extension of the occupancy of the caravan park from 10 months to 11 months and fourteen days, allowing the park to be used between 1st March and 14th February inclusive.

Given the proposed extension of the time that the caravans will be occupied, the total area of hardstanding or surface run-off is not expected to change.

Surface water run-off is a major consideration for Flood Risk Assessments because a sudden influx of surface water can easily flood the site. This could either result from known groundwater levels reaching the surface or inadequate highways drainage in the area.

Methods of keeping the flood risk to a minimum can be applied by the correct implementation of Sustainable Urban Drainage Systems (SUDS). The principles of SUDS should be applied throughout the site and wherever possible.

To account for climate change, surface water drainage on the site needs to allow for the recommended national precautionary sensitivity range for peak rainfall intensities in accordance with Table B.2 of PPS25. The development must take into account the potential for surface water flooding and a suitable drainage strategy must be implemented.

EA MODELLED FLOOD LEVELS

The table below shows the past and modelled flood levels for the site, for 0.5% and 0.1% annual exceedance probabilities. These levels have been taken from the East Solent Coastal Model that was carried out by JBL Consulting in 2018.

Flood Levels		
Year	Tide Level (mAOD)*	
	0.5% annual exceedance probability/1 in 200 Year (Flood Zone 3)	0.5% annual exceedance probability/1 in 1000 Year (Flood Zone 2)
2015	3.40	3.57
2065	3.72	3.90
2115	4.17	4.34

* Levels in metres above Ordnance Datum Newlyn

CONCLUSIONS

The information provided by the Environment Agency and GroundSure Insights indicated that the southern portion of the site was at risk of flooding from rivers and sea (namely the boating lake located approximately 10m south of the site).

According to Table 3.4 within the EA 'Accounting for residual uncertainty – updating the freeboard guide', for a 'medium' (likely to be locally reliable' confidence rating) a minimum freeboard depth of 600mm was proposed.

Based on Flood Zone 2 the design would be 4.94m and for Flood Zone 3 it would be 4.77m bgl based on 600mm being added to the 2115 annual exceedance which we have assumed contains a factor for climate change.

In reality, increasing the capacity of occupancy from 10 months to 11 months and 14 days isn't going to increase the flood risk significantly.

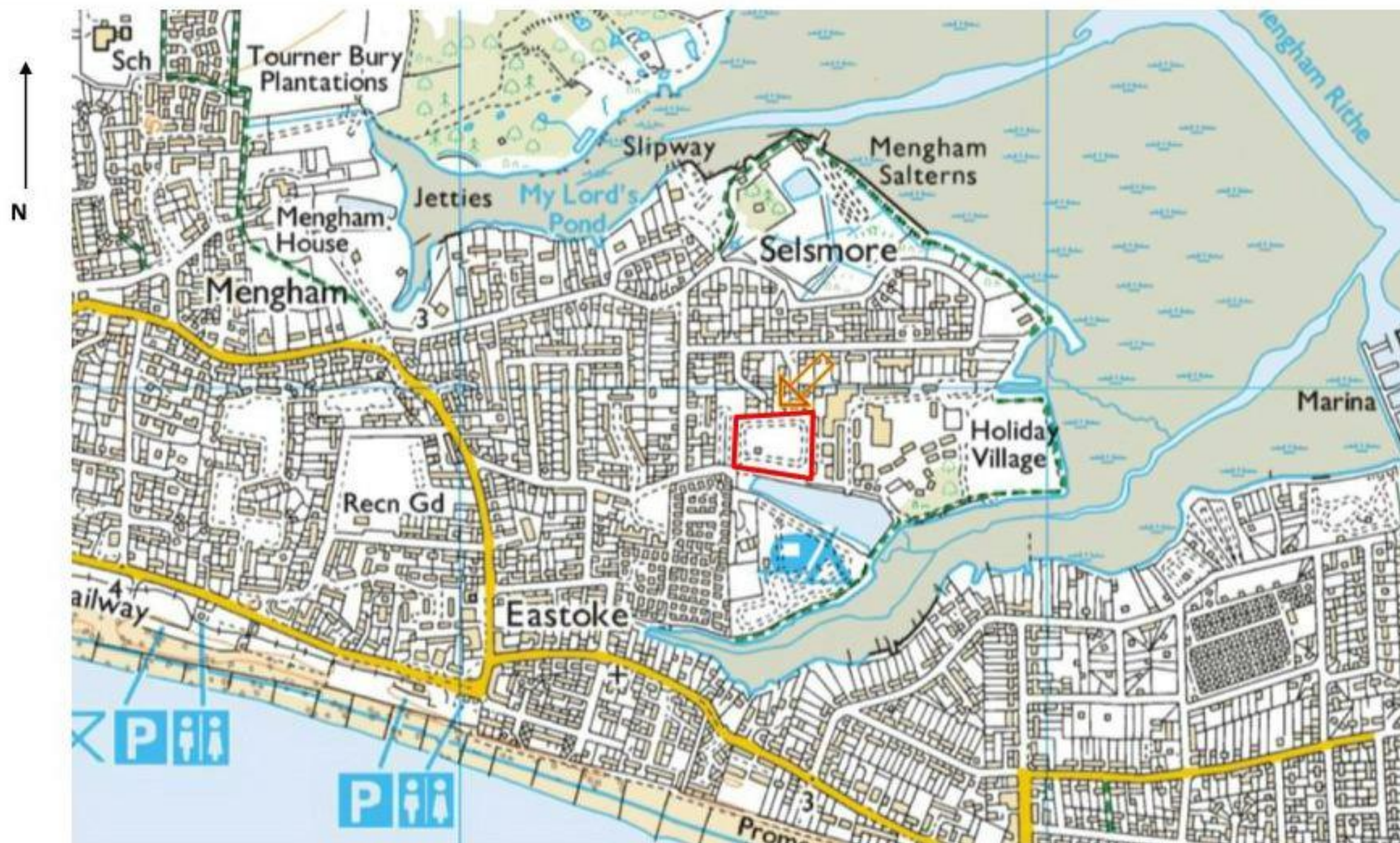
A flood evacuation plan is required to ensure that, in the event of a major flooding event, caravan park residents gather in an emergency evacuation point to the north-west corner of the site, inside its boundaries but out of the Flood Zones. This plan should be implemented along with enrolment in the Environment Agency warning scheme.

The following figures and appendices complete this report:

Figure 1	Site Location Plan
Figure 2	Site Development Area
Figure 3	Aerial View of Site
Figure 4	Locations of Existing Flood Defences
Figure 5	Flood Risk from Rivers or Sea Map
Figures 6 – 12	Surface Flood Risk Maps

Appendix A Legislative Background, Conditions and Limitations

Appendix B GroundSure FloodInsight Datasheet



APPROXIMATE SITE BOUNDARY

NOT TO SCALE

Project: Fishers Caravans Park, 31 Fishery Lane, Hayling Island PO11 9NN

Client: General Estates Park Homes

Date: September 2019

Site Location Plan

Ref: GWPR3294

Figure 1

ground&water



APPROXIMATE SITE BOUNDARY

NOT TO SCALE

Project: Fishers Caravans Park, 31 Fishery Lane, Hayling Island PO11 9NN

Client: General Estates Park Homes

Date: September 2019

Site Development Area

Ref: GWPR3294

Figure 2

ground&water



APPROXIMATE SITE BOUNDARY

NOT TO SCALE

Project:

Fishers Caravans Park, 31 Fishery Lane, Hayling Island PO11 9NN

Client:

General Estates Park Homes

Date:

September 2019

Ref:

GWPR3294

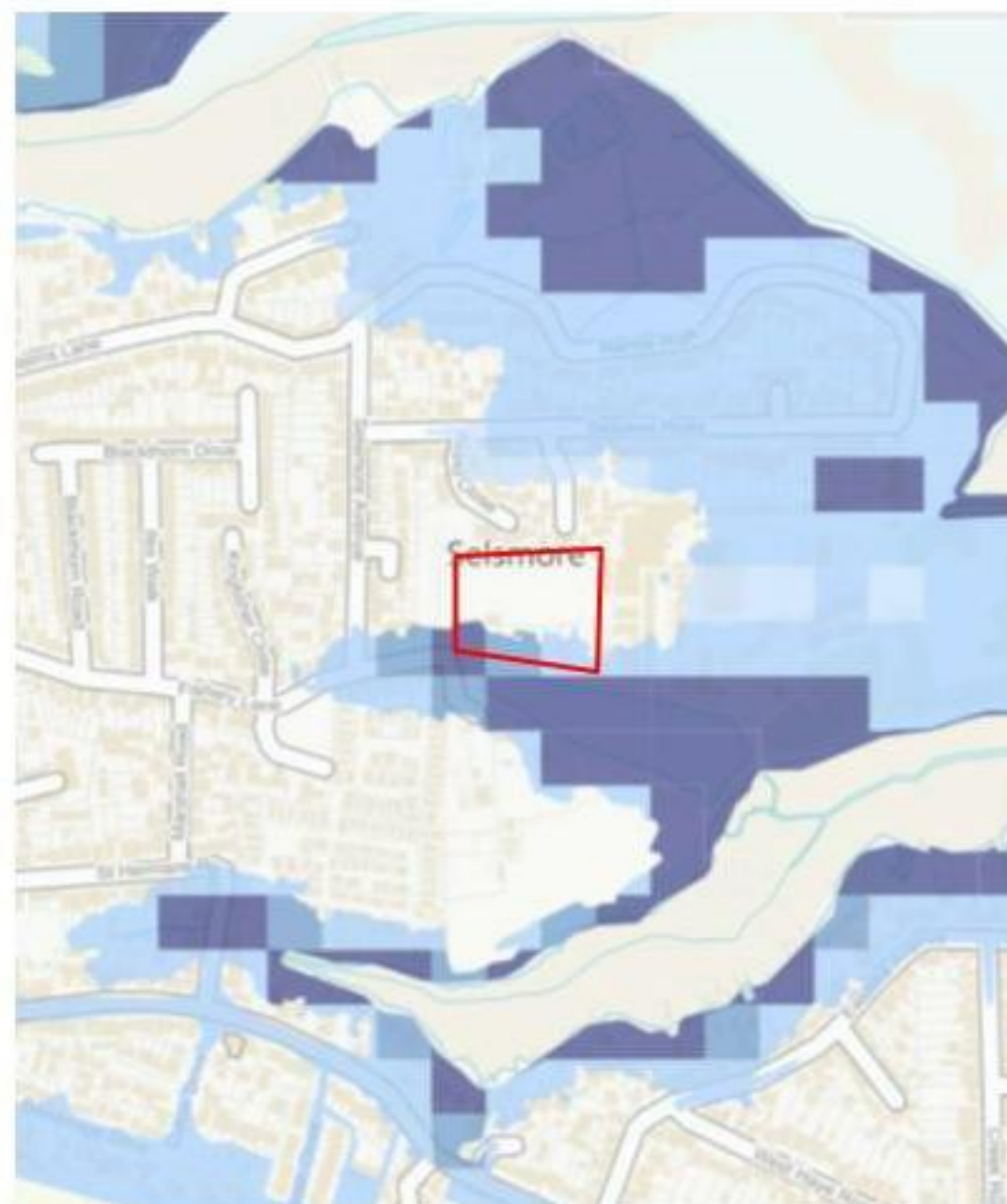
Aerial View of the Site

Figure 3

ground&water



NOTE: NOT TO SCALE



Flood risk



High



Medium



Low



Very low



Location you
selected

— APPROXIMATE SITE BOUNDARY

Project:

Fishers Caravan Park, 31 Fishery Lane, Hayling Island PO11 9NN

Client:

General Estates Park Homes

Date:

September 2019

Ref:

GWPR3294

EA Extent of Rivers and Sea Flooding

Figure 5

ground&water



NOTE: NOT TO SCALE



Flood risk



High



Medium



Low



Very low



Location you
selected



APPROXIMATE SITE BOUNDARY

Project:

Fishers Caravan Park, 31 Fishery Lane, Hayling Island PO11 9NN

Client:

General Estates Park Homes

Date:

September 2019

Ref:

GWPR3294

EA Extent of Surface Water Flooding

Figure 6

ground&water



**High risk
scenario**
Flood depth
(millimetres)

Over 900mm

300 to 900mm

Below 300mm

Location you
selected

NOTE: NOT TO SCALE

APPROXIMATE SITE BOUNDARY

Project: Fishers Caravan Park, 31 Fishery Lane, Hayling Island PO11 9NN

Client: General Estates Park Homes

Date: September 2019

EA Surface Water Flood Map – High Risk Depth

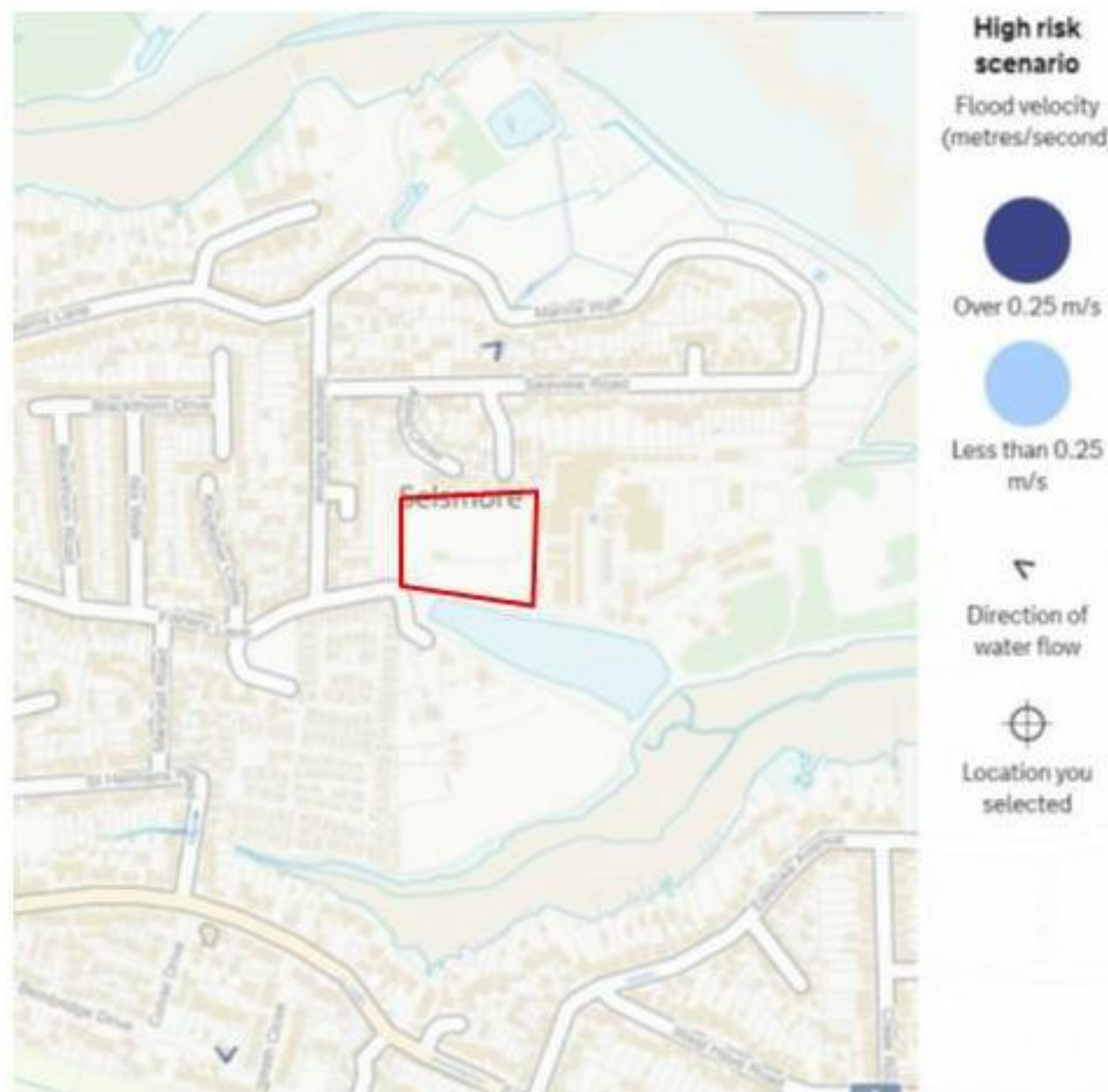
Ref: GWPR3294

Figure 7

ground&water



NOTE: NOT TO SCALE



— APPROXIMATE SITE BOUNDARY

Project: Fishers Caravan Park, 31 Fishery Lane, Hayling Island PO11 9NN

Client: General Estates Park Homes

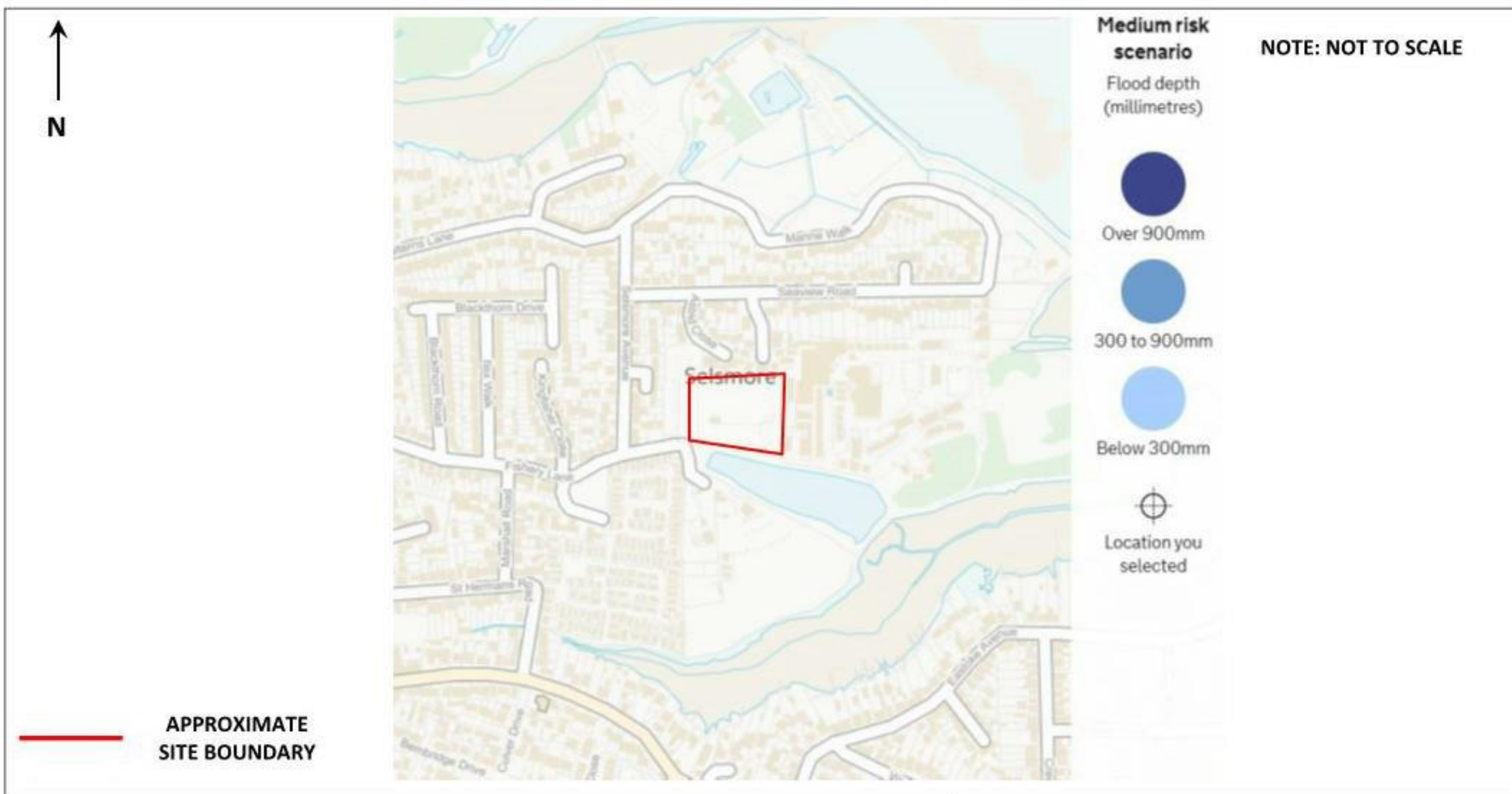
Date: September 2019

EA Surface Water Flood Map – High Risk Velocity

Ref: GWPR3294

Figure 8

ground&water



Project:		Fishers Caravan Park, 31 Fishery Lane, Hayling Island PO11 9NN		Figure 9 ground&water
Client:	General Estates Park Homes	Date:	September 2019	
EA Surface Water Flood Map – Medium Risk Depth		Ref:	GWPR3294	



NOTE: NOT TO SCALE



**Medium risk
scenario**
Flood velocity
(metres/second)



Over 0.25 m/s



Less than 0.25
m/s



Direction of
water flow



Location you
selected

**APPROXIMATE
SITE BOUNDARY**

Project:

Fishers Caravan Park, 31 Fishery Lane, Hayling Island PO11 9NN

Client:

General Estates Park Homes

Date:

September 2019

Ref:

GWPR3294

EA Surface Water Flood Map – Medium Risk Velocity

Figure 10

ground&water



NOTE: NOT TO SCALE

**Low risk
scenario**

Flood depth
(millimetres)



Over 900mm



300 to 900mm



Below 300mm



Location you
selected

 **APPROXIMATE
SITE BOUNDARY**



Project:

Fishers Caravan Park, 31 Fishery Lane, Hayling Island PO11 9NN

Client:

General Estates Park Homes

Date:

September 2019

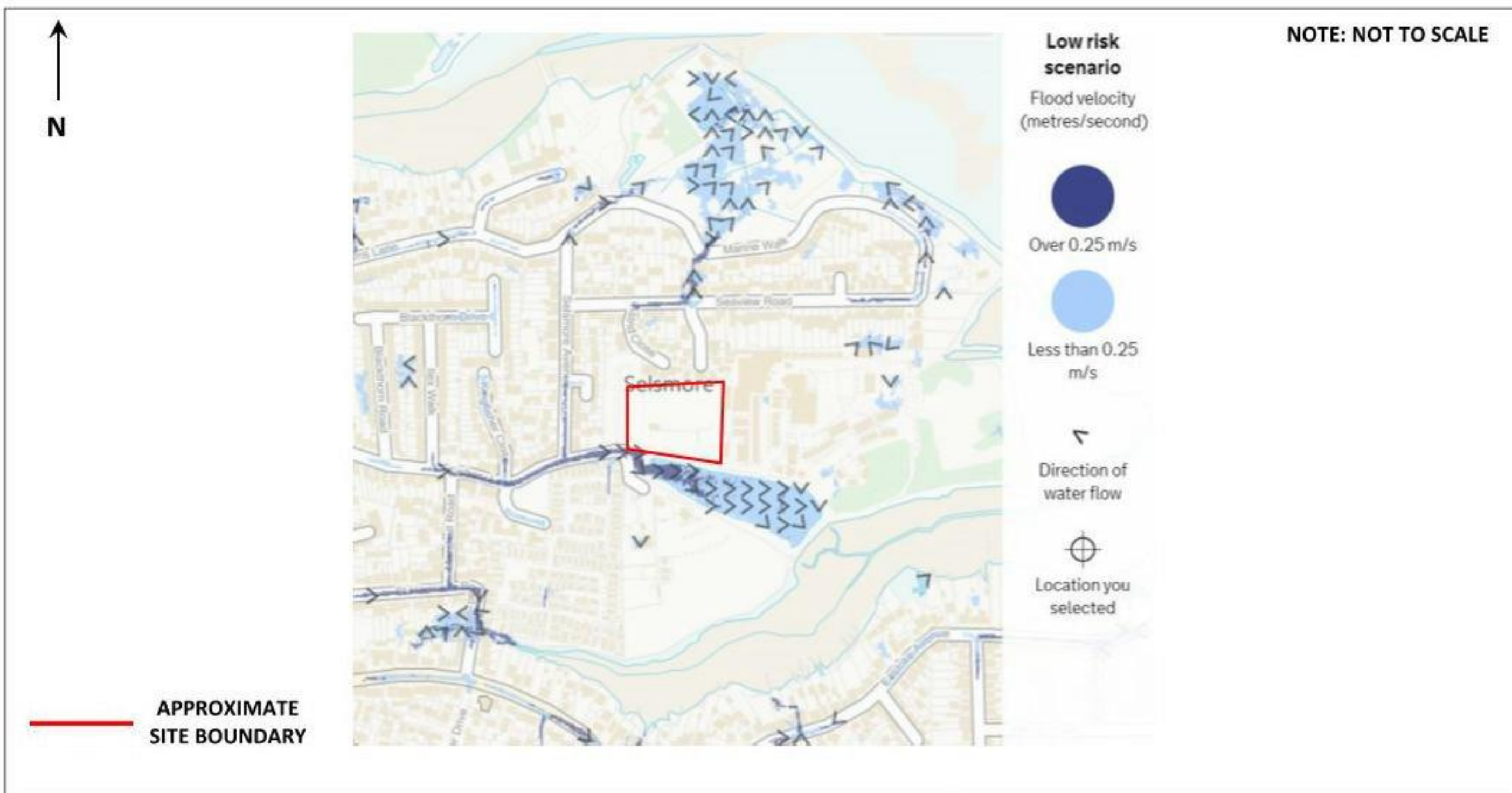
EA Surface Water Flood Map – Low Risk Depth

Ref:

GWPR3294

Figure 11

ground&water



Project:		Fishers Caravan Park, 31 Fishery Lane, Hayling Island PO11 9NN		Figure 12 ground&water
Client:		Date:	September 2019	
EA Surface Water Flood Map – Low Risk Velocity		Ref:	GWPR3294	

APPENDIX A

Legislative Background, Conditions and Limitations

The conclusions and recommendations relate to the proposed development known as Fishers Caravan Parks, 31 Fishery Lane, Hayling Island PO11 9NN.

Legislative Background

National Planning Policy Framework and Technical Guidance-Flooding, published March 2012, Planning is the current legislation that controls Flooding and associated Flood risk. It requires that consideration should be given to Flood Risk Assessment in the planning process. The guidance states that any flood risk assessments should:

- Identify land at risk from and the degree of risk of flooding from a river, watercourse, sea or other sources in the area;
- Consider the risk of flooding arising from the development in addition to the risk of flooding to the development;
- Take the impact of climate change into account;
- Consider both the potential adverse and beneficial effects of flood risk management infrastructure;
- Consider the vulnerability of those that could occupy and use the proposed development, taking account of the sequential and exception test and the vulnerability classification, including arrangements for safe access;
- Consider and quantify different types of flooding and identify flood risk reduction measures so that the assessments are fit for the purpose of the decisions being made;
- Consider the effects of a range of flooding events including extreme events on people, property, the natural and historic environment and river and coastal processes;
- Include the assessment of the remaining risk after risk reduction measures have been taken into account and demonstrate that this is acceptable for the particular development or land use;
- Consider how the ability of water to soak into the ground may change with development, along with how the proposed layout of development may affect drainage systems;
- Be supported by appropriate data and information, including historical information on previous event.

This is the information that should be included in a FRA which the Environment Agency has requested. The Environment Agency is the regulatory body with regard to Flood Risk Assessments.

Conditions and Limitations

Any information contained within this Flood Risk Assessment makes use of the best available information at the time of submission of the application.

A precautionary approach has been taken throughout this report and supported by information where possible.

The findings, recommendations and conclusions of this report are based on information obtained from a variety of external sources which are understood to be reputable. However, Ground and Water Limited cannot guarantee the authenticity or reliability of any data from third parties and no liability can be accepted for any erroneous information or the conclusion drawn from it.

The investigation, interpretations, and recommendations given in this report were prepared for the sole benefit of the client in accordance with their brief; as such these do not necessarily address all aspects of ground/groundwater/flooding behaviour at the site. No liability is accepted for any reliance placed on it by others unless specifically agreed in writing.

Current regulations and good practice were used in the preparation of this report. An appropriately qualified person must review the recommendations given in this report at the time of preparation of the scheme design to ensure that any recommendations given remain valid in light of changes in regulation and practice, or additional information obtained regarding the site.

It was not part of the scope of this report to comment on environment/contaminated land considerations.

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APPENDIX B
GroundSure FloodInsight Datasheet



Ground and Water Limited
15, Bow Street,
Alton, GU34 1NY

Groundsure Reference: HMD-445-6299470
Client Reference: Fishers_Caravan_Park

Report Date 10 Sep 2019

Report Delivery Method: xml

Client Email:



Flood Insight

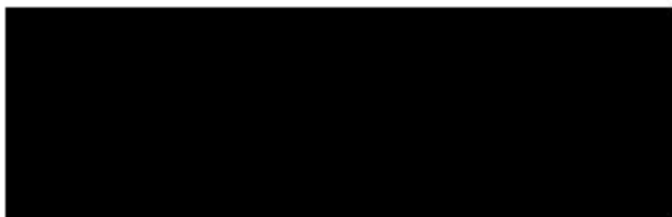
Address: FISHERS CARAVAN PARK, 31 FISHERS CARAVAN PARK, FISHERY LANE, HAYLING ISLAND, PO11 9NU

Dear Sir/ Madam,

Thank you for placing your order with Groundsure. Please find enclosed the **Groundsure Flood Insight** as requested.

If you need any further assistance, please do not hesitate to contact our helpline on 08444 159000 quoting the above Groundsure reference number.

Yours faithfully,



Managing Director
Groundsure Limited

Enc.
Groundsure Floodinsight

Flood Insight

Address: FISHERS CARAVAN PARK, 31 FISHERS CARAVAN PARK, FISHERY LANE, HAYLING ISLAND, PO11 9NU

Date: 10 Sep 2019

Reference: HMD-445-6299470

Client: Ground and Water Limited

NW N NE



SW S SE

Aerial Photograph Capture date: 23-Jul-2018
Grid Reference: 473536,098912
Site Size: 1.3351ha

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Overview of Findings

For further details on each dataset, please refer to each individual section in the main report as listed.

Section 1:Environment Agency/Natural Resources Wales Flood Zones

1.1 Are there any Enviroment Agency Zone 2 floodplains within 250m of the study site?	Yes
1.2 Are there any Environment Agency/Natural Resources Wales Zone 3 floodplains within 250m of the study site	Yes
1.3 Are there any Flood Defences within 250m of the study site?	No
1.4 Are there any areas benefiting from Flood Defences within 250m of the study site?	Yes
1.5 Are there any Proposed Flood Defences within 250m of the study site?	Yes
1.6 Are there any areas used for Flood Storage within 250m of the study site?	No

Section 2:Risk of Flooding from Rivers and the Sea (RoFRaS)

2.1 What is the Risk of Flooding from Rivers and the Sea (RoFRaS) Flood Rating for the study site?	High
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Section 3:Historic Flood Events

3.1 Has the site been subject to past flooding as recorded by the Environment Agency/Natural Resources Wales?	No
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Section 4:JBA Surface Water (Pluvial) Flood

4.1 Is the site or any area within 50m at risk of Surface Water (Pluvial) Flooding?	Yes
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Section 5: Surface Water Features

5.1 Are there any surface water features within 250m of the study site?	Yes
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Section 6: Groundwater Flooding

6.1 What is the maximum BGS Groundwater Flooding susceptibility within 50m of the study site?	Potential below Surface
6.2 What is the BGS confidence rating for the Groundwater Flooding susceptibility areas?	Low

Section 7:BGS Geological Indicators of historic flooding

7.1 Are there any geological indicators of historic flooding within 250m of the study site?	Yes
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Additional Matters

Riparian ownership

If your land abuts a river, stream or ditch, you may have responsibility to maintain this watercourse, even if Title Deeds show the property boundary to be adjacent to the watercourse. This includes the responsibility for clearing debris and obstructions which may impede the free passage of water and fish, and also includes the responsibilities to accept flood flows through your land, even if these are caused by inadequate capacity downstream. There is no duty in common law for a landowner to improve the drainage capacity of a watercourse. Please contact Groundsure if you need further advice on riparian ownership issues relating to this property.

Sewerage Flooding

Extreme rainfall events may overwhelm sewerage systems and cause local flooding. The water and sewerage companies within the UK are required to maintain 'DG5 – At Risk Registers' which record properties that have flooded from sewers and/or are considered to be at risk of flooding from sewers in the future. If your property is on the 'At Risk' Register, this may be recorded within a standard CON29 Drainage and Water search.

Using this Report

The following report is designed by Environmental Consultants for Environmental Professionals bringing together the most up-to-date market leading environmental data. This report is provided under and subject to the Terms & Conditions agreed between Groundsure and the Client.

Note: Maps

Only certain features are placed on the maps within the report. All features represented on maps found within this search are given an identification number. This number identifies the feature on the mapping and correlates it to the additional information provided below. This identification number precedes all other information and takes the following format -Id: 1, Id: 2, etc. Where numerous features on the same map are in such close proximity that the numbers would obscure each other a letter identifier is used instead to represent the features. (e.g. Three features which overlap may be given the identifier "A" on the map and would be identified separately as features 1A, 3A, 10A on the data tables provided).

Where a feature is reported in the data tables to a distance greater than the map area, it is noted in the data table as "Not Shown".

All distances given in this report are in Metres (m). Directions are given as compass headings such as N: North, E: East, NE: North East from the nearest point of the study site boundary.



Search Centre
 Search Buffers (m)
 Zone 2 Floodplain
 Zone 3 Floodplain
 Flood Defences
 Area used for Flood Storage
 Proposed Flood Defence Scheme
 Area Benefiting from Flood Defences

6

1. Environment Agency/Natural Resources Wales Flood Zones

1.1 River and Coastal Zone 2 Flooding

Is the site within 250m of an Environment Agency/Natural Resources Wales Zone 2 floodplain? **Yes**

Environment Agency/Natural Resources Wales Zone 2 floodplains estimate the annual probability of flooding as between 1 in 1000 (0.1%) and 1 in 100 (1%) from rivers and between 1 in 1000 (0.1%) and 1 in 200 (0.5%) from the sea. Any relevant data is represented on Map 1 – Flood Map for Planning:

ID	Distance (m)	Direction	Update	Type
1	0.0	On Site	20-Jun-2019	Zone 2 - (Fluvial /Tidal Models)

1.2 River and Coastal Zone 3 Flooding

Is the site within 250m of an Environment Agency/Natural Resources Wales Zone 3 floodplain? **Yes**

Zone 3 shows the extent of a river flood with a 1 in 100 (1%) or greater chance of occurring in any year or a sea flood with a 1 in 200 (0.5%) or greater chance of occurring in any year. Any relevant data is represented on Map 1 – Flood Map for Planning.

The following floodplain records are represented as green shading on the Flood Map (1):

ID	Distance (m)	Direction	Update	Type
42	0.0	On Site	20-Jun-2019	Zone 3 - (Fluvial Models)

1.3 River and Coastal Flood Defences

Are there any Flood Defences within 250m of the study site? **No**

This search consists only of flood defences present in the dataset provided by the Environment Agency/Natural Resources Wales. Any relevant data is represented on Map 1 – Flood Map for Planning.

Database searched and no data found.

1.4 Areas benefiting from Flood Defences

Are there any areas benefiting from Flood Defences within 250m of the study site? Yes

Any relevant data is represented on Map 1 – Flood Map for Planning.

These are areas that may benefit from the presence of major defences during a 1% fluvial (river) or 0.5% tidal flood event. These areas would flood if the defence were not present, but may not flood because the defence is present.

1.5 Areas of Proposed Flood Defences

Are there any Proposed Flood Defences within 250m of the study site? Yes

ID	Distance (m)	Direction	Project Name	Project reference	Flood Type	Projected Spend	Standard of Protection after completion (% likelihood of flooding in any given year)	Number of households to benefit*
61	79.0	N	Selsmore Sea Wall Maintenance	SOS005E/000A/004A	Sea Flooding	Year 1:£361,000 Year 2:£000 Year 3:£000 Year 4:£000 Year 5:£000	0.0	0

* This illustrates the number of households that move from 'very significant' or 'significant' to 'moderate' or 'low' probability of flood risk bands if the proposed flood scheme is to be implemented.

Any relevant data is represented on Map 1 – Flood Map for Planning.

Guidance: This search consists only of proposed flood defences present in the dataset provided by the Environment Agency/Natural Resources Wales. Please note that proposed flood defence schemes will not influence the current RoFRaS ratings for the site.

1.6 Areas used for Flood Storage

Are there any areas used for Flood Storage within 250m of the study site? No

Flood Storage Areas are considered part of the functional floodplain, and are areas where water has to flow or be stored in times of flood. Technical Guidance to the National Planning Policy Framework states that only water-compatible development and essential infrastructure should be permitted within flood storage areas, and existing development within this area should be relocated to an area with a lower risk of flooding. Any relevant data is represented on Map 1 – Flood Map for Planning.

Notes on Flood Zone Data:

This data relates solely to flooding from rivers or the sea. The Environment Agency/Natural Resources Wales estimate that over 2.5 million properties are at risk of flooding within England and Wales. River flooding occurs when a watercourse cannot cope with the water draining into it from the surrounding land. This can happen, for example, when heavy rain falls on an already waterlogged catchment. Coastal flooding results from a combination of high tides and stormy conditions. If low atmospheric pressure coincides with a high tide, a tidal surge may happen which can cause serious flooding.

The Groundsure Flood Insight Report comments upon whether a property lies in proximity to Environment Agency/Natural Resources Wales Zone 2 and Zone 3 floodplains. The Government's Technical Guidance to the National Planning Policy Framework explains how flood risk should be considered at all stages of the planning and development process in order to reduce future damage to property and potential loss of life. The Government looks to planning authorities to ensure that flood risk is properly taken into account in the planning of developments to reduce the risk of flooding and the damage which floods cause.

Flood Zones enable planning authorities to apply the sequential test (see Technical Guidance to the National Planning Policy Framework) for development proposals and prevent inappropriate development.

Technical Guidance to the National Planning Policy Framework defines the flood zones as: -

Zone 1 – little or no risk with an annual probability of flooding from rivers and the sea of less than 0.1%

Zone 2 – low to medium risk with an annual probability of flooding of 0.1-1.0% from rivers and 0.1-0.5% from the sea.

Zone 3 – high risk with an annual probability of flooding of 1.0% or greater from rivers, and 0.5% or greater from the sea.

Flood Zone 3b/Flood Storage Areas - very high risk with the site being used as part of the functional flood plain or as a Flood Storage Area.

The flood zones are the main constraint map underpinning decisions on development and flood risk.

Existing Flood Defences

Flood defences seek to reduce the risk of flooding and to safeguard life, protect property, sustain economic activity and the natural environment. Flood defences are designed to protect against flood events of a particular magnitude, expressed as risk in any one year. For example, defences in urban areas may be built to provide protection against flood events of a size which might occur on average once in one hundred years or less.

Proposed Flood Defences

This information is taken from the Environment Agency/Natural Resources Wales's database of Areas to Benefit from New and Reconditioned Flood Defences under the Medium Term Plan (MTP). The dataset contains funding allocation for the first financial year (from April). Funding for the following four financial years is not guaranteed, being only indicative, and will be reviewed annually. Projects within the Medium Term Plan qualify for inclusion in this dataset if:

- the investment leads to a change in the current standard of protection (change projects);
- the investment is a replacement or refurbishment in order to sustain the current standard of protection (sustain projects);
- the project has an initial construction budget of £100,000 or more; and
- the project is included within the first five years of the MTP

The data includes all the Environment Agency/Natural Resources Wales's projects over £100K that will change or sustain the standards of flood defence in England and Wales over the next 5 years. It also includes the equivalent schemes for all Local Authority and Internal Drainage Boards. The number of households and areas of land contributing to DEFRA's Outcome Measures (OM) are also attributed i.e. could benefit from major work on flood defences.

These data also contain Intermittence Flood Maintenance Programme that show the annual maintenance programme of work scheduled to be carried by the Environment Agency/Natural Resources Wales, Local Authority or Internal Drainage Board on flood defences. Data details routine maintenance as well as intermittent work that has been funded for the coming year. The data contains a start and end coordinate defining the relevant river section where work is planned.

Information Warning

Please note that the maps show the areas where investment is being made to reduce the flood and coastal erosion risk and are not detailed enough to account for individual addresses. Individual properties may not always face the same risk of flooding as the areas that surround them. Also, note that funding figures are indicative and any use or interpretation should account for future updates where annual values may change.

Every possible care is taken to ensure that the maps reflect all the data possessed by the Environment Agency/Natural Resources Wales and that they have applied their expert knowledge to create conclusions that are as reliable as possible. The Environment Agency/Natural Resources Wales consider that they have created the maps as well as they can and so should not be liable if the maps by their nature are not as accurate as might be desired or are misused or misunderstood, despite their warnings. For this reason, they are not able to promise that the maps will always be accurate or completely up to date.

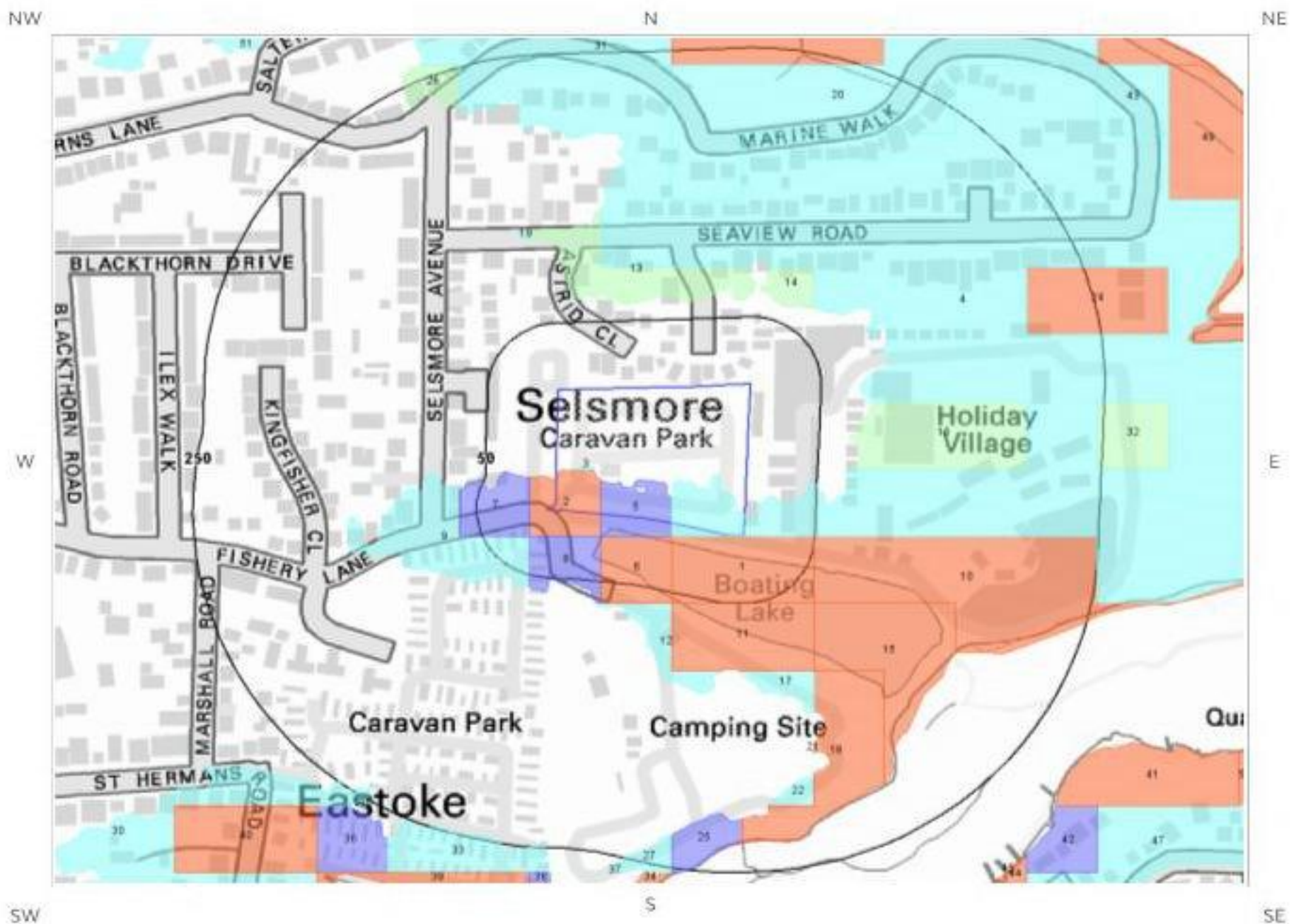
This site includes mapping data licensed from Ordnance Survey used for setting the Environment Agency/Natural Resources Wales's data in its geographical context. Ordnance Survey retains the copyright of this material and it can not be used for any other purpose.

Flood Storage Areas

Flood Storage Areas may also act as flood defences. A flood storage area may also be referred to as a balancing reservoir, storage basin or balancing pond. Its purpose is to attenuate an incoming flood peak to a flow level that can be accepted by the downstream channel. It may also delay the timing of a flood peak so that its volume is discharged over a longer time interval.

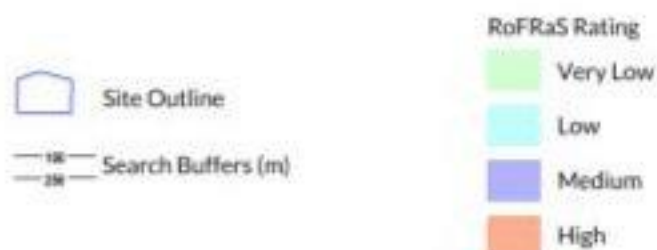
A flood storage area may take the form of a wet or dry reservoir. A wet reservoir is a water storage facility in which storage can be effected by allowing water levels to rise during flood times. A dry reservoir is typically adjacent to a river and comprises an enclosed area that accepts water only at peak times. These areas are also referred to as Zone 3b or 'the functional floodplain' and has a 5% or greater chance of flooding in any given year, or is designed to flood in the event of an extreme (0.1%) flood or another probability which may be agreed between the Local Planning Authority and the Environment Agency/Natural Resources Wales, including water conveyance routes. Development within Flood Storage Areas is severely restricted.

2. Environment Agency/Natural Resources Wales RoFRaS Flooding Map



Environment Agency/Natural Resources
Wales RoFRaS Flooding legend

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2. Environment Agency/Natural Resources Wales Risk of Flooding from Rivers and the Sea (RoFRaS)

2.1 Environment Agency/Natural Resources Wales Risk of Flooding from Rivers and the Sea (RoFRaS) Flood Rating (River and Coastal)

What is the highest risk of flooding onsite?

High

The Environment Agency/Natural Resources Wales RoFRaS database provides an indication of river and coastal flood risk at a national level on a 50m grid with the flood rating at the centre of the grid calculated and given above. The data considers the probability that the flood defences will overtop or breach by considering their location, type, condition and standard of protection.

RoFRaS data for the study site indicates the property is in an area with a High (1 in 30 or greater) chance of flooding in any given year.

Any relevant data within 250m is represented on the RoFRaS Flood map. Data to 50m is reported in the table below.

ID	Distance (m)	Direction	RoFRaS Flood Risk
1	0.0	On Site	High
2	0.0	On Site	High
3	0.0	On Site	Low
4	0.0	On Site	Low
5	0.0	On Site	Medium
6	10.0	S	High
7	13.0	W	Medium
8	17.0	S	Medium
9	23.0	SW	Low
10	49.0	E	High
11	50.0	S	High

Notes on RoFRaS data:

This information is based on the very latest Environment Agency/Natural Resources Wales Risk of Flooding from Rivers and the Sea (RoFRaS) data. This data has been created by dividing the flood plain into 50m squares, or smaller areas where a square is intersected by a river or coastline. These are called impact cells. The method then calculates the likelihood that the centre of each impact cell will start to flood using a number of different flood scenarios.

A number of insurance companies providing cover for flood risk use this data as the basis of their risk model, although they may also utilise additional information such as claims histories, which may further influence their decision. Where a high risk of flooding is identified flood risk insurance may be difficult to obtain without further work being undertaken. Property owners of sites within Low and Medium risk areas are still considered to be at risk of flooding and insurance premiums may be increased as a result. Owners of properties within Low, Medium and High risk areas are advised to sign up to the Environment Agency/Natural Resources Wales's Flood Warning scheme. The probability estimates for RoFRaS risk bands are as follows:

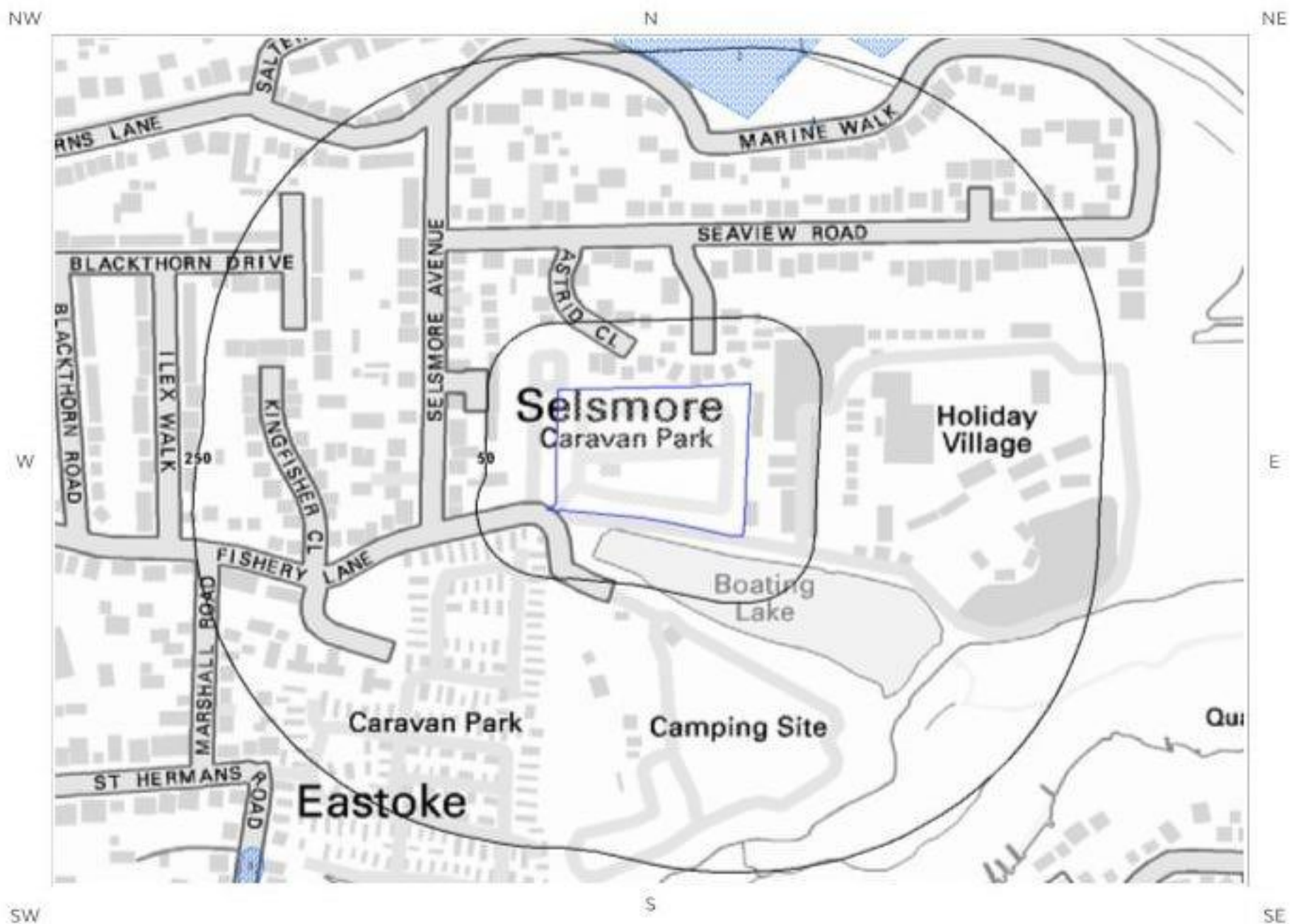
Very Low – the chance of flooding from rivers or the sea is considered to be less than 1 in 1000 (0.1%) in any given year.

Low – the chance of flooding from rivers or the sea is considered to be less than 1 in 100 (1%) but greater than or equal to 1 in 1000 (0.1%) in any given year.

Medium – the chance of flooding from rivers or the sea is considered to be less than 1 in 30 (3.3%) but greater than 1 in 100 (1%) in any given year.

High – the chance of flooding from rivers or the sea is considered to be greater than or equal to 1 in 30 (3.3%) in any given year.

3. Environment Agency/Natural Resources Wales Historic Flooding Events Map



Environment Agency/Natural Resources
Wales Historic Flooding Events legend

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3. Environment Agency/Natural Resources Wales Historic Flooding Events

3.1 Historic Flood Outlines

Has the site or any area within 250m been subject to historic flooding as recorded by the Environment Agency/Natural Resources Wales? Yes

This database shows the individual footprint of every flood event recorded by the Environment Agency/Natural Resources Wales and previous bodies.

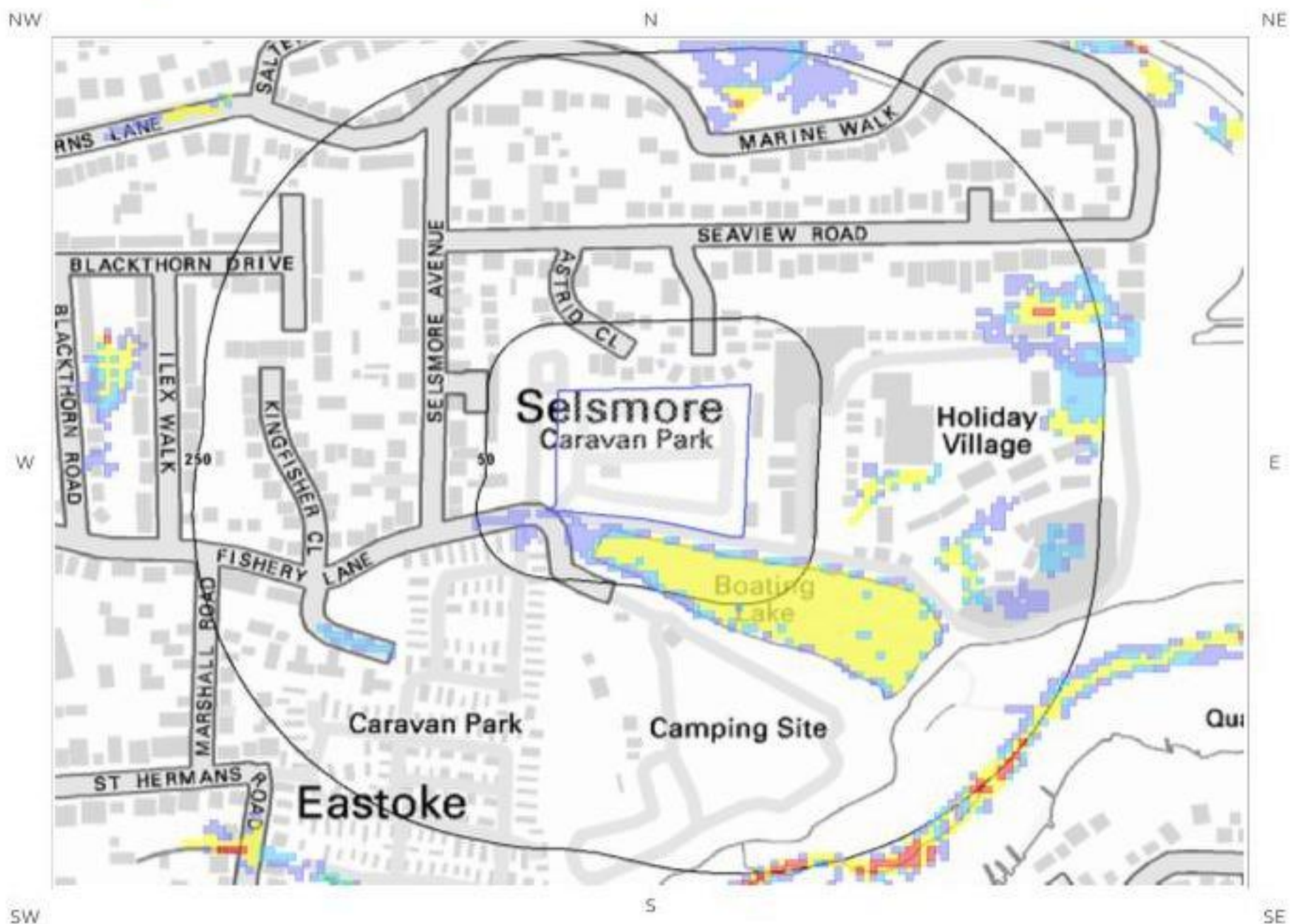
Any records found within the search radius are displayed on Map 3 – Historic Flooding Events.

ID	Distance	Direction	Event Name	Date of Flood	Flood Source	Flood Cause	Type of Flood
1	196.0	N	07128feg01378feb01060	Start Date: 01-01-2050 End Date: 01-01-2050	Unknown	Channel capacity exceeded (no raised defences)	no data
2	197.0	N	14/12/1981_Coast_Mengham, Hayling Island	Start Date: 14-12-1981 End Date: 14-12-1981	Other	Unknown	Coastal

Notes on Historic Flooding data:

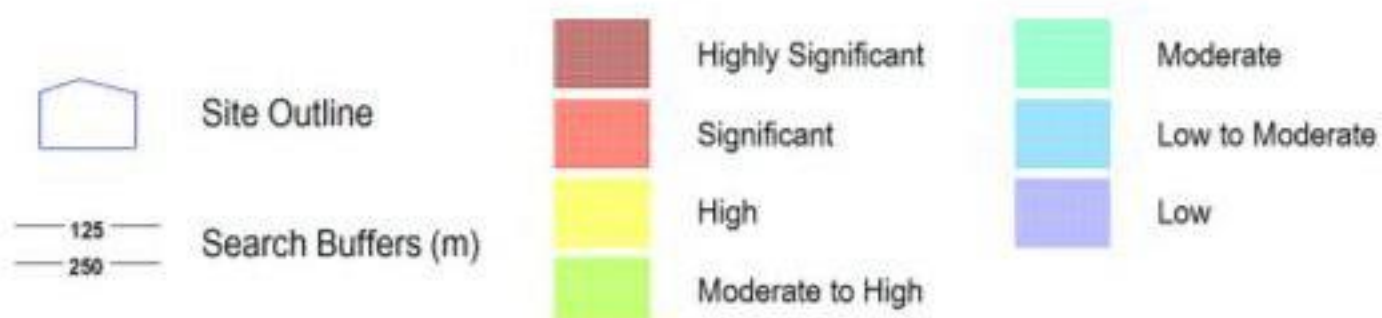
Over 21,000 separate events are recorded within this database, dating back to 1947. This data is used to understand where flooding has occurred in the past and provides details as available. Absence of a historic flood event for an area does not mean that the area has never flooded, but only that the Environment Agency/Natural Resources Wales do not currently have records of flooding within the area. Equally, a record of a flood footprint in previous years does not mean that an area will flood again, and this information does not take account of flood management schemes and improved flood defences.

4. JBA Surface Water (Pluvial) Flood Map



JBA Surface Water (Pluvial) Flood Legend

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4. JBA Surface Water (Pluvial) Flooding

Surface Water (pluvial) flooding is defined as flooding caused by rainfall-generated overland flow before the runoff enters a watercourse or sewer. In such events, sewerage and drainage systems and surface watercourses may be entirely overwhelmed.

Surface Water (pluvial) flooding will usually be a result of extreme rainfall events, though may also occur when lesser amounts of rain falls on land which has low permeability and/or is already saturated, frozen or developed. In such cases overland flow and 'ponding' in topographical depressions may occur.

What is the risk of pluvial flooding at the study site? Low

Guidance: The site or an area in close proximity has been assessed to be at Low Risk of surface water (pluvial) flooding. This indicates that this area would be expected to be affected by surface water flooding in a 1 in 1000 year rainfall event to a depth of greater than 0.1m.

Flood data provided by JBA RISK MANAGEMENT LIMITED Copyright © JBA RISK MANAGEMENT LIMITED 2008-2019

The following pluvial (surface water) flood risk records within 50m of the study site are shown on the JBA Surface Water Flooding Map:

Distance	Direction	Risk
0.0	On Site	Low
3.0	S	Low
8.0	S	Low
8.0	S	Low
8.0	S	Low
9.0	S	Low to Moderate
10.0	S	Low
10.0	S	Low to Moderate
10.0	S	Low to Moderate
10.0	S	Low to Moderate
11.0	S	High
12.0	SW	Low
17.0	S	Low to Moderate
21.0	SE	Low to Moderate
27.0	S	Low to Moderate
28.0	S	Low to Moderate
31.0	S	Low
31.0	S	Low to Moderate
34.0	S	Low to Moderate
35.0	S	Low

Distance	Direction	Risk
35.0	S	Low
35.0	S	Low to Moderate
36.0	S	Low to Moderate
37.0	SE	Low
42.0	S	Low
45.0	S	Low to Moderate
46.0	S	Low
46.0	S	Low to Moderate
47.0	S	Low
50.0	S	Low
50.0	S	Low to Moderate

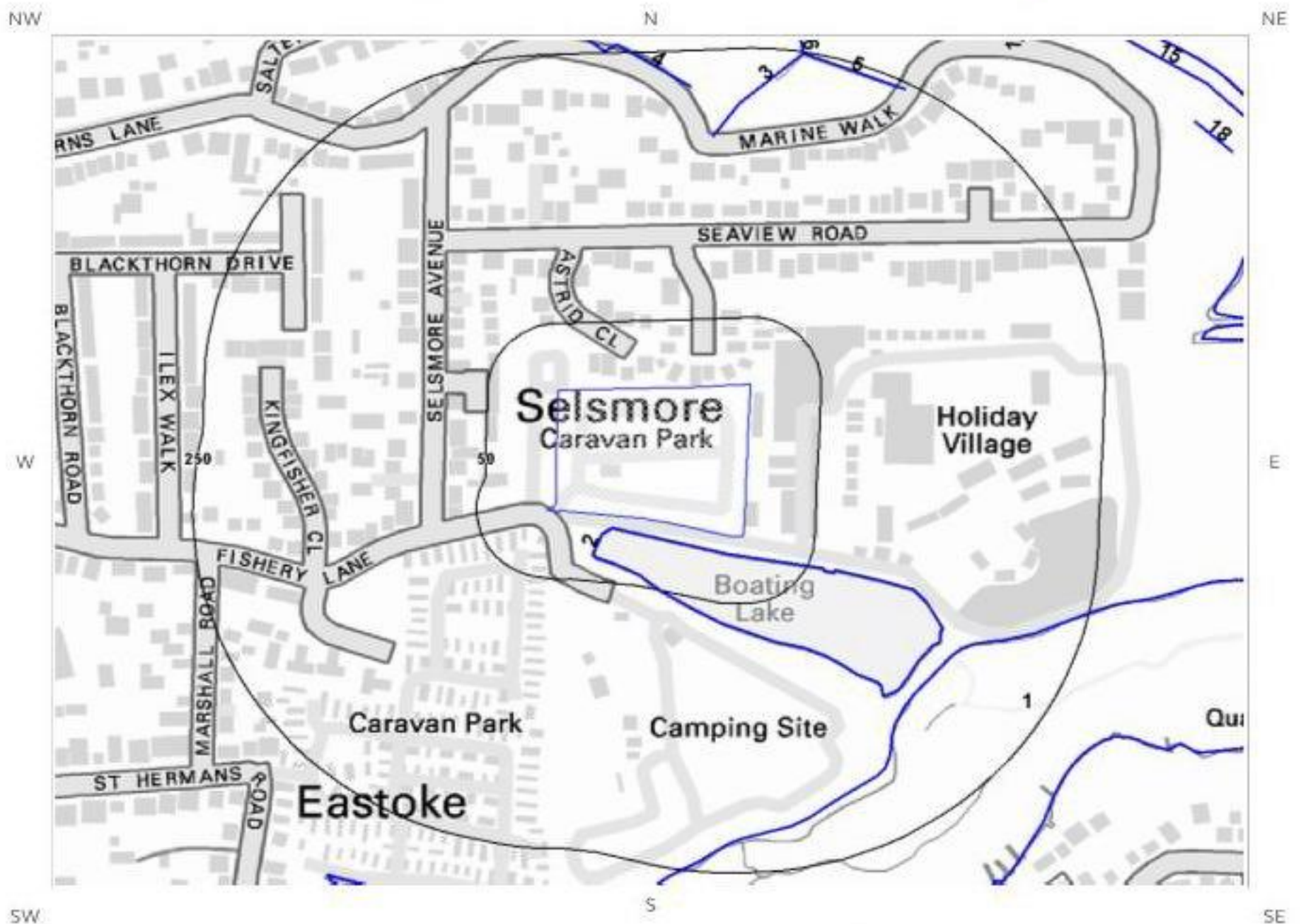
Notes on Surface water (Pluvial) Flooding data:

JBA Consulting surface water flood map identifies areas likely to flood following extreme rainfall events, i.e. land naturally vulnerable to surface water or “pluvial” flooding. This data set was produced by simulating 1 in 75 year, 1 in 200 year and 1 in 1000 year rainfall events. Modern urban drainage systems are typically built to cope with rainfall events between 1 in 20 and 1 in 30 years, though older ones may even flood in a 1 in 5 year rainstorm event.

The model provides the maximum depth of flooding in each 5m “cell” of topographical mapping coverage. The maps include 7 bands indicating areas of increasing natural vulnerability to surface water flooding. These are:-

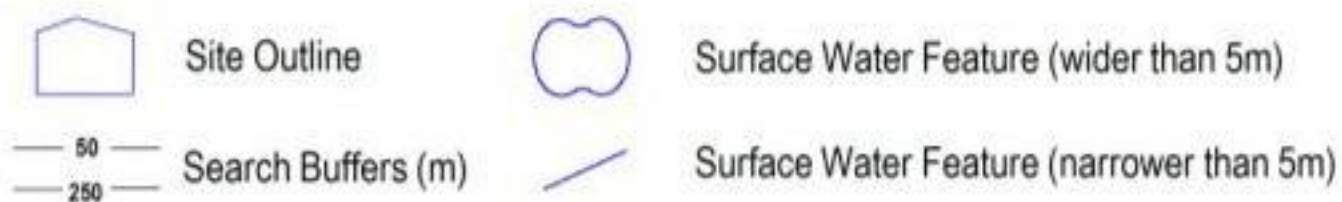
- **Less than 0.1m in a 1 in 1000 year rainfall event** - Negligible
- **Greater than 0.1m in a 1 in 1000 year rainfall event** - Low
- **Between 0.1m and 0.3m in a 1 in 200 year rainfall event** – Low to Moderate
- **Between 0.3m and 1m in a 1 in 200 year rainfall event** – Moderate
- **Greater than 1m in a 1 in 200 year rainfall event** – Moderate to High
- **Between 0.1m and 0.3m in a 1 in 75 year rainfall event** – High
- **Between 0.3m to 1m in a 1 in 75 year rainfall event** - Significant
- **Greater than 1m in a 1 in 75 year rainfall event** – Highly Significant

5. Surface Water Features map



Surface Water Features legend

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5. Surface Water Features

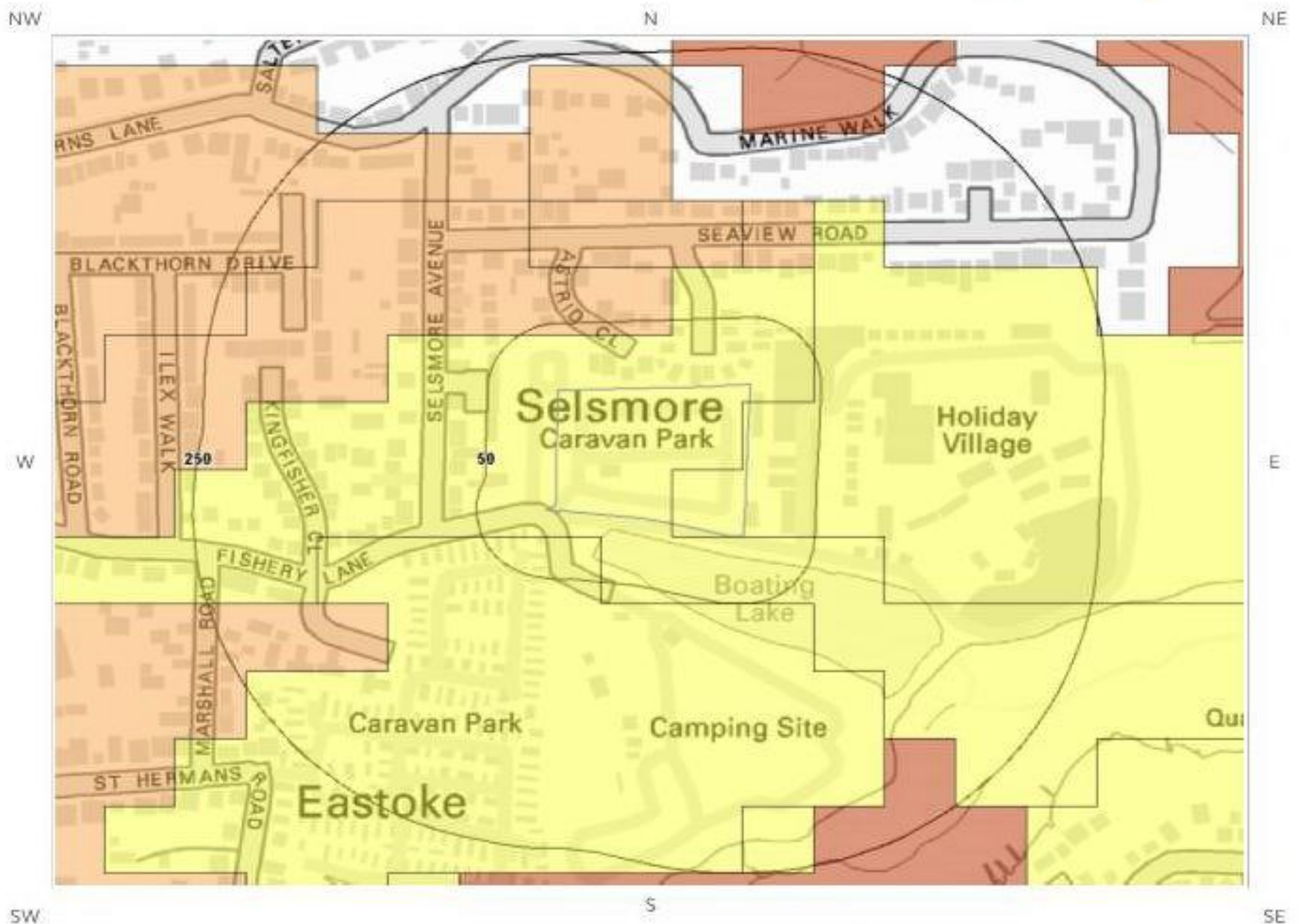
Are there any surface water features within 250m of the study site?

Yes

The following surface water records are represented on mapping:

ID	Distance (m)	Direction
1	168.0	SE
2	9.0	S
3	185.0	N
4	223.0	N
5	244.0	N
6	249.0	N

6. BGS Groundwater Flooding Map



BGS Groundwater Flooding legend

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 Site Outline
 50
 250
 Search Buffers (m)

 Limited potential for groundwater flooding to occur
 Potential for groundwater flooding of property below ground level
 Potential for groundwater flooding to occur at surface

6. Groundwater Flooding

6.1 Groundwater Flooding Susceptibility Areas

Are there any British Geological Survey groundwater flooding susceptibility flood areas within 50m of the boundary of the study site? Yes

What is the highest susceptibility to groundwater flooding in the search area based on the underlying geological conditions? Potential for groundwater flooding of property below ground level

Does this relate to Clearwater Flooding or Superficial Deposits Flooding? Clearwater Flooding

Where potential for groundwater flooding of property situated below ground level is indicated, this means that given the geological conditions there may be a groundwater flooding hazard to basements and other below surface infrastructure. Unless other relevant information, e.g. records of previous flooding, suggests groundwater flooding has occurred before in this area you need take no further action in relation to groundwater flooding hazard. If there are records of previous incidences of groundwater flooding, then is recommended that other information e.g. rainfall history, property type, and land drainage information in addition to previous records of flooding be investigated in order to establish relative, but not absolute, risk of groundwater flooding.

6.2 Groundwater Flooding Confidence Areas

What is the British Geological Survey confidence rating in this result? Low

Groundwater flooding is defined as the emergence of groundwater at the ground surface or the rising of groundwater into man-made ground under conditions where the normal range of groundwater levels is exceeded.

The confidence rating is on a threefold scale - Low, Moderate and High. This provides a relative indication of the BGS confidence in the accuracy of the susceptibility result for groundwater flooding. This is based on the amount and precision of the information used in the assessment. In areas with a relatively lower level of confidence the susceptibility result should be treated with more caution. In other areas with higher levels of confidence the susceptibility result can be used with more confidence.

Notes on Groundwater Flooding data:

The BGS Susceptibility to Groundwater Flooding hazard dataset identifies areas where geological conditions could enable groundwater flooding to occur and where groundwater may come close to the ground surface.

Groundwater flooding may either be associated with shallow unconsolidated sedimentary aquifers which overlie unproductive aquifers (Superficial Deposits Flooding), or with unconfined aquifers (Clearwater Flooding).

The susceptibility data is suitable for use for regional or national planning purposes where the groundwater flooding information will be used along with a range of other relevant information to inform land-use planning decisions. It might also be used in conjunction with a large number of other factors, e.g. records of previous incidence of groundwater flooding, rainfall, property type, and land drainage information, to establish relative, but not absolute, risk of groundwater flooding at a resolution of greater than a few hundred metres. The susceptibility data should not be used on its own to make planning decisions at any scale, and, in particular, should not be used to inform planning decisions at the site scale. The susceptibility data cannot be used on its own to indicate risk of groundwater flooding.

7. BGS Geological Indicators of Flooding

Are there any geological indicators of flooding within 250m of the study site?

Yes

This dataset identifies the presence of superficial geological deposits which indicate that the site may be, or have been in the past, vulnerable to inland and/or coastal flooding. This assessment does not take account of any man-made factors such as flood protection schemes, and the data behind the report are purely geological.

Distance	Direction	Description
0.0	On Site	Lower flood potential from rivers: areas affected by secondary flooding in extreme cases as a result of a prolonged flood event.
144.0	E	Lower flood potential from the sea: areas affected in extreme cases due to combined factors e.g. very high tides/high wind speeds/large storm surge.
180.0	SE	Higher flood potential from the sea: the first areas to experience the effects of coastal flooding.
193.0	NW	Lower flood potential from the sea: areas affected in extreme cases due to combined factors e.g. very high tides/high wind speeds/large storm surge.

Notes on BGS Geological Indicators of Flooding data:

The BGS Geological Indicators of Flooding (GIF) data set is a digital map based on the BGS Digital Geological Map of Great Britain at the 1:50,000 scale (DiGMapGB-50). It was produced by characterising Superficial (Drift) Deposits on DiGMapGB-50 in terms of their likely vulnerability to flooding, either from coastal or inland water flow. These Superficial Deposits are considered 'recent' in geological terms, most having been formed in the later parts of the Quaternary geological period (i.e. within the last few tens of thousands of years). Observations made during recent major inland and coastal flooding events have demonstrated that the erosion and deposition of these recent geological sediments have produced subtle topographical variations, resulting in landforms such as fluvial and coastal floodplains. The mapping of these landforms, in conjunction with the fluvial and/or coastal deposits that underlie them, has in turn determined the extent of previous coastal and inland flooding.

On this basis, the floodplains which are at greatest risk from flooding can be both visualised and defined by Superficial Deposits as depicted on geological maps. These include deposits such as river alluvium and lacustrine (lake) alluvium, as well as the First River Terrace or 'Floodplain terrace' (raised flat areas adjacent to or within floodplains, which represent the level of the floodplain prior to the most recent episode of down-cutting). Older and higher river terraces have been excluded as they lie outside the geologically defined floodplain. Areas at risk from coastal inundation are similarly characterised by a range of estuarine or marine deposits that include, for example, tidal flats.

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BGS Geological Hazards Reports and general geological enquiries



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