Groundwater site assessments

South Norfolk Council - November Regulation 18

10/11/2023

Prepared for:

South Norfolk Council

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Contents

1 Introduction

1.1 Additional sites

To inform the South Norfolk Council's Regulation 18 consultation in November, an additional site screening exercise has been undertaken to assess the flood risk to a number of newly shortlisted sites to inform the sequential and exception tests. These are listed in Table 1-1 below.

Table 1-1 Additional sites shortlisted in November 2023

Site reference	Location	Status
SN0433REVA	Alpington	(Shortlisted)
SN0552REVC	Barford	(Shortlisted)
SN6000	Barford	(Shortlisted)
SN0055	Barnham	(Shortlisted)
VC BAW1 REV	Bawburgh	(Shortlisted)
SN4020	Broome	(Shortlisted)
VC DIT1 REV	Ditchingham	(Shortlisted)
SN0078	Ditchingham	(Shortlisted)
SN0218REV	Earsham	(Shortlisted)
VC GIL1 REV	Gillingham	(Shortlisted)
VC SWA2	Swardeston	(Carried Forward)
VC SPO1 REV	Spooner Row	(Shortlisted)
VC TAC1 REV	Tacolneston	(Shortlisted)
VC WIC1 REV	Wicklewood	(Shortlisted)

The outputs of the screening identified that the following sites showed >50% susceptibility to groundwater using the Environment Agency's Areas Susceptible to Groundwater Flooding map and required further analysis to inform the exception test. These sites are listed as follows:

- Ditchingham VC DIT1 REV
- Barford SN6000
- Barford SN0552REVC
- Broome SN4020
- Earsham SN0218REV
- Spooner Row VC SPO1 REV

These sites have been assessed in Section 2 below, apart from Ditchingham where the groundwater assessment and new site boundary has been updated within the existing Level 2 SFRA site table (separate document - see Level 2 SFRA Appendix, previously VC DIT1).

One further site, VC GIL1 REV showed flood risk from various sources of flooding in this screening exercise. The previous site table for this area has also been updated to reflect the new boundary and assessment of flood risk (separate document - see Level 2 SFRA Appendix, previously VC GIL1).

1.2 Groundwater assessment

This section provides a more detailed overview of the flood risk at each of the sites identified at >50% susceptibility to groundwater, and a figure of each site showing the JBA Groundwater Emergence Map extents at and surrounding the site. These sites were screened against all sources of flooding and were identified to be potentially susceptible to groundwater flooding. The individual summary tables below provide an overview of potential groundwater issues at each site.

Two datasets were used to assess potential the sites:

- The EA's Areas Susceptible to Groundwater Flooding (AStGWF) dataset, showing the degree to which areas are susceptible to groundwater flooding based on geological and hydrogeological conditions. It does not show the likelihood of groundwater flooding occurring, i.e., it is a hazard based, not risk based dataset.
- The JBA Groundwater Emergence map, showing the risk of groundwater flooding to both surface and subsurface assets, based on predicted groundwater levels.

A three-stage approach has been adopted to assess the risk of groundwater flooding:

- Firstly, the AStGWF dataset was used to identify grid squares that are most susceptible to groundwater flooding. Based on this dataset, any areas with greater than 50% susceptibility to groundwater flooding were taken forward for further analysis.
- Of the areas identified in the above, the JBA Groundwater Emergence Map was used to locate areas where this groundwater is most likely to emerge. For this assessment, areas where groundwater levels are predicted to be within 0.5m of the surface level were identified.
- For locations that met both of the above parameters, the 0.1% AEP surface water extent from the EA's RoFSW map alongside topographical data such as LiDAR was used to identify where any groundwater emerging in these locations is most likely to flow.

The JBA Groundwater Emergence Map categorises risk from groundwater flooding in to the five categories explained below in Table 1-2.

Table 1-2: An explanation of each risk category displayed in the JBA Groundwater Emergence Map

Groundwater depth range	Explanation of associated risk level
Within 0.025 m of the surface	Within this zone there is a risk of groundwater flooding to both surface and subsurface assets. Groundwater may emerge at significant rates and has the capacity to flow overland and/or pond within any topographic low spots.
Between 0.025 m and 0.5 m of the ground surface	Within this zone there is a risk of groundwater flooding to both surface and subsurface assets. There is the possibility of groundwater emerging at the surface locally.
Between 0.5 m and 5 m of the ground surface	There is a risk of flooding to subsurface assets but surface manifestation of groundwater is unlikely.
Levels are at least 5 m below the ground surface	Flooding from groundwater is not likely.
No Risk	This zone is deemed as having a negligible risk. from groundwater flooding due to the nature of the local geological deposits

1.3 Planning implications

As the sites within this document have been identified as susceptible to groundwater flooding, additional investigation work may be required to support the detailed design of the site and drainage system. This may include groundwater monitoring to demonstrate that a sufficient unsaturated zone has been provided above the highest occurring groundwater level.

The groundwater risk to each site is described individually in Section 2. Additionally, considerations for development in areas with a higher risk from groundwater flooding are set out below:

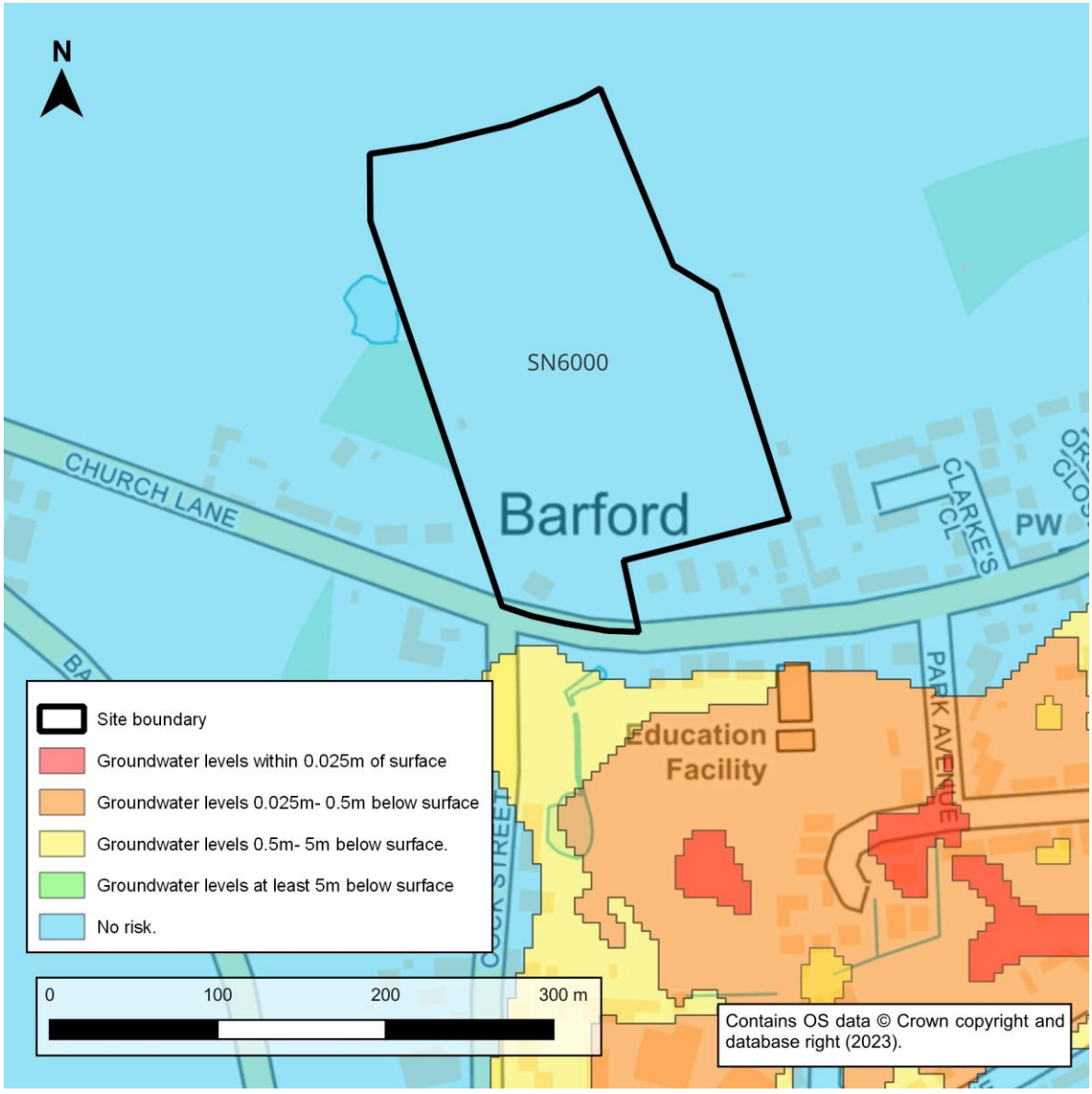
- A sequential approach should be adopted to the site layout, steering more vulnerable development to the lowest areas of flood risk.
- High groundwater levels could be a potential constraint in the design or the surface water drainage system, and this should be consulted with Norfolk County Council as Lead Local Flood Authority regarding their requirements.
- Detention and attenuation features should be designed to prevent groundwater ingress from impacting hydraulic capacity and structural integrity.
- Below ground development such as basements are not appropriate in areas of higher groundwater flood risk.
- Infiltration testing may be required in accordance with BRE365 at the locations of and depths commensurate with proposed infiltration features. This is particularly important in areas where the underlying geology means that the site is more impermeable.

2 Groundwater site assessments

Individual groundwater assessments for each of the following sites are below:

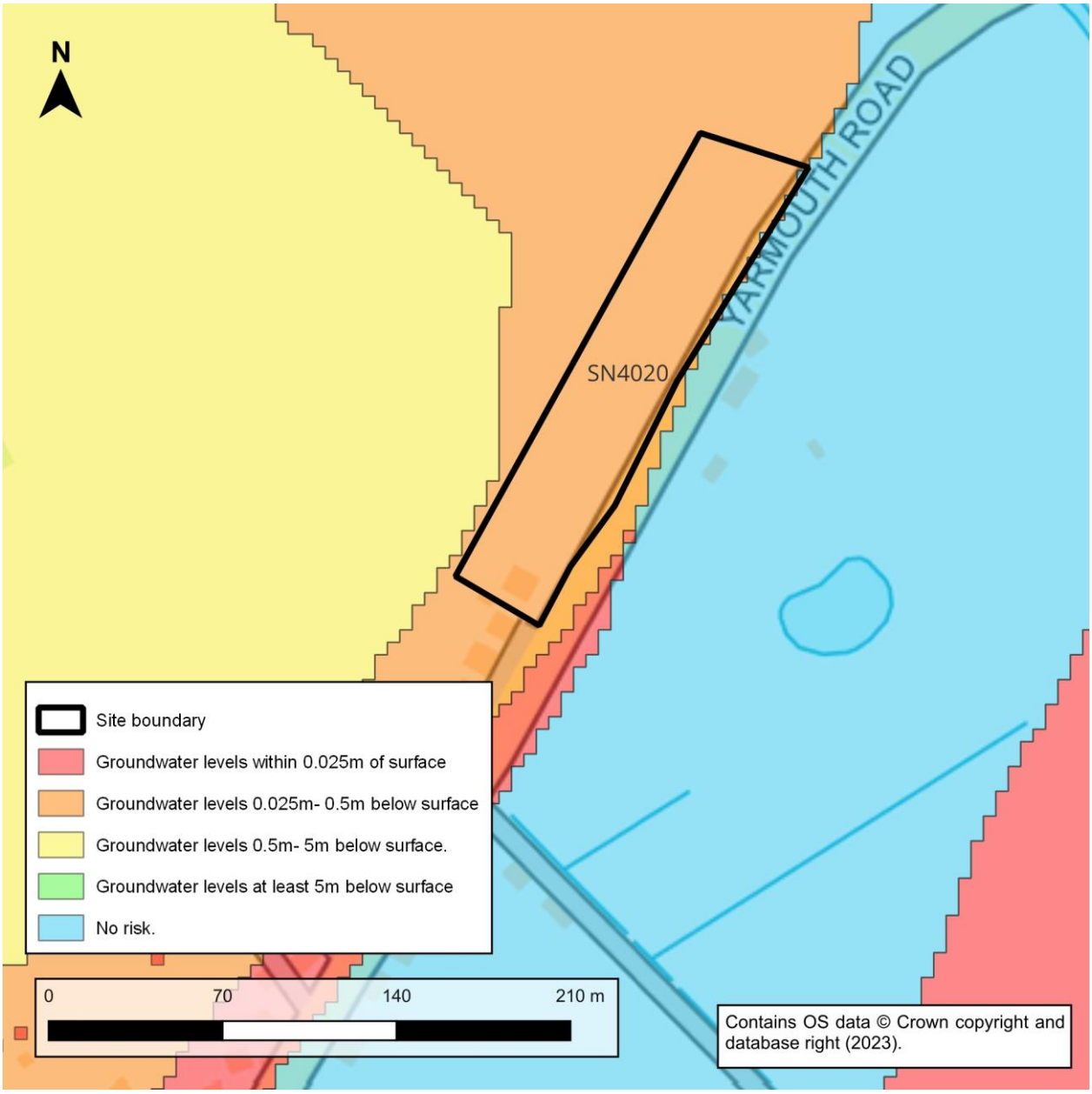
- Barford SN6000
- Barford SN0552REVC
- Broome SN4020
- Earsham SN0218REV
- Spooner Row VC SPO1 REV

Site Code	SN6000
Location	Barford, Land North of Chapel Street
AStGWF results	Preliminary screening using the EA's AStGWF dataset indicated groundwater flood susceptibility of 75% or greater across the majority of the site, with a small portion of the site being between 50% and 75% susceptibility.
JBA Groundwater Emergence Mapping	The JBA groundwater map shows groundwater levels are between 0.5m and 5m immediately south of the site, although no groundwater flood risk is detected within the site boundary. From assessing the 0.1% AEP surface water flooding outputs, groundwater emerging south of the site has the potential to flow on to and along Chapel Street/Church Lane, which could impact access and egress to the site. Potential groundwater issues at the site should be considered further during a site-specific Flood Risk Assessment.



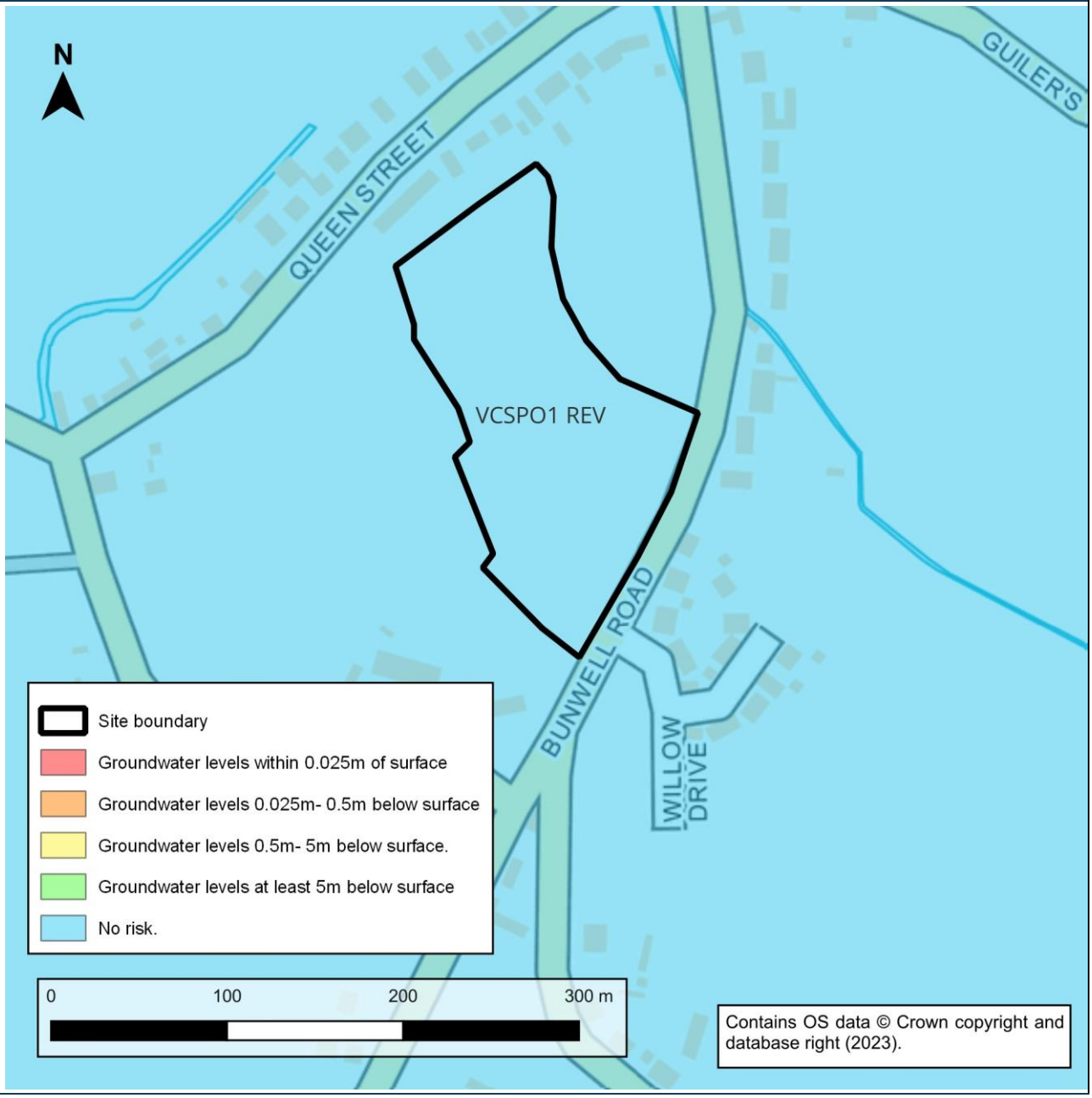
Site Code	SN0552REVC (adjacent to VC BAR1)
Location	Barford, Land at Watton Road
AStGWF results	Preliminary screening using the EA's AStGWF dataset indicated groundwater flood susceptibility of 75% or greater across the entire site.
JBA Groundwater Emergence Mapping	The JBA groundwater map indicates no risk of groundwater emergence within the site. Consideration of the 0.1% AEP surface water flood extent shows groundwater emerging 140m east of the site could potentially flow along Watton Road and impact access and egress from the site. Potential groundwater issues at the site should be considered further during a site-specific Flood Risk Assessment. See the separate Level 2 site table assessment for VC BAR1 adjacent site assessment and recommendations.

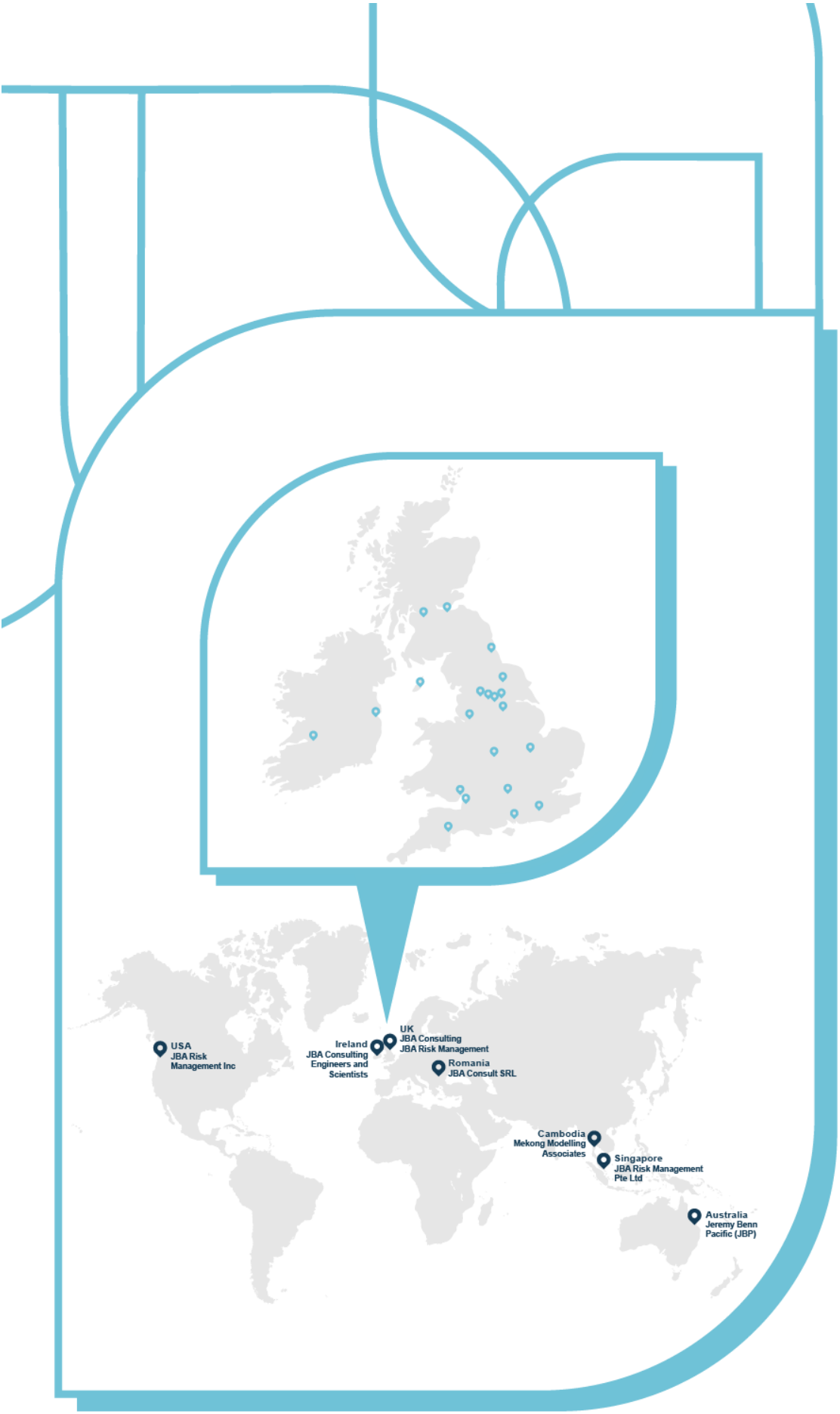
Site Code	SN4020
Location	Broome, West of Yarmouth Road (opposite Bridge House)
AStGWF results	Preliminary screening using the EA's AStGWF dataset indicated groundwater flood susceptibility of between 50% and 75% across roughly half of the site.
JBA Groundwater Emergence Mapping	The JBA Groundwater Emergence Map highlights the potential risk of groundwater emergence at the site, with predicted groundwater levels across the site between 0.025m and 0.5m below the ground surface. While no 0.1% AEP surface water flood extents are apparent at the site, topography suggests that groundwater emerging at the site may flow to the north to Broome Beck. Potential groundwater issues at the site should be considered further during a site-specific Flood Risk Assessment.



Site Code	SN0218REV
Location	Earsham, Land North of The Street
AStGWF results	Preliminary screening using the EA's AStGWF dataset indicated groundwater flood susceptibility of between 50% and 75% across roughly half of thesite.
JBA Groundwater Emergence Mapping	The JBA Groundwater Emergence Map highlights the potential high risk of groundwater emergence at the site with predicted groundwater levels across the site within 0.025m of the ground surface. 0.1% AEP surface water flooding outputs indicate that groundwater emerging at the site could potentially pond near the site's boundary with The Street which could impact access and egress from the site. Potential groundwater issues at the site should be considered further during a site-specific Flood Risk Assessment.

Site Code	VCSPO1 REV
Location	Spooner Row, Land West of Bunwell Road
AStGWF results	Preliminary screening using the EA's AStGWF dataset indicated groundwater flood susceptibility of between 50% and 75% across the majority of the site.
JBA Groundwater Emergence Mapping	The JBA Groundwater Emergence Map indicates no risk of groundwater emergence at or within close proximity of the site.





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