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DRAINAGE STRATEGY & ASSESSMENT OF FLOOD

FOR

PROPOSED COMMERCIAL RE-DEVELOPMENT

ON

LAND TO REAR OF 97 BLACKGATE LANE TARLETON PR4 6UT

ON BEHALF OF

BELLA HOMES LIMITED

CFC22032

Rev A

July 2022

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1.0 INTRODUCTION

CFA Civils Ltd was appointed by Bella Homes Ltd to undertake a Drainage Strategy including a brief assessment of flood risk in support of their planning application for a commercial re-development of thirteen units on the land to the rear of 97 Blackgate Lane, Tarleton, PR4 6UT.

This report sets out a drainage strategy for the proposal in accordance with the National Planning Policy Framework and Building Regulations Approved Document H3 in respect of surface and foul water drainage of the site, and comments on flood risk for the proposed development referencing the guidance contained within the National Planning Policy Framework and Flood Risk & Coastal Change Guidance.

2.0 EXISTING SITE & FLOOD RISK

2.1 Site Location

The site is centred on NGR 344540, 420130, and is situated on the southern side of Blackgate Lane approximately 700m south-west from the centre of Tarleton village.

A location plan and aerial image of the site are contained within Appendix A to this report.

2.2 Site Description & Topography

The red-edged application land comprises a small commercial site on an irregular-shaped plot with a total area of 0.565Ha. The site is accessed along a narrow tarmac drive off Blackgate Lane.

The site is bounded to the north by the rear gardens of properties fronting Blackgate Lane; to the south by a domestic curtilage [81a Blackgate Lane] and an open field; to the east by the access road serving 81a Blackgate Lane; and to the west by 99 Blackgate Lane and the paddock to its rear.

There are currently a number of commercial buildings on the site which are all currently unoccupied. The existing buildings on the site have a total roof area measured as 0.076Ha, and the existing concrete/tarmac yard, access road and other hardstanding areas measure 0.111Ha.

The land slopes generally from north-east to south-west with ground levels between 13.88m and 11.93m AOD. The site entrance at Blackgate Lane has a level of 13.03m AOD.

A topographical survey of the existing site is contained in Appendix B to this report.

2.3 Existing Site & Area Drainage

The land lies on the eastern extent of the Alt and Crossens Management Catchment of the North West River Basin with the closest main river being a feeder into The Tarleton Runner, 420m to the south of the site at its closest point.

The surrounding area, outside the village of Tarleton, is characterized by flat open countryside with an extensive network of drainage ditches and rivers.

There are no watercourses within the red-edged site boundary, although site investigations have determined that a culverted watercourse runs along the northern side of Blackgate Lane from the east to a point opposite the site entrance, at which point it crosses under the highway to a manhole in front of 99 Blackgate Lane before continuing to the south, eventually discharging into The Tarleton Runner. A piped connection from the application site joins the culvert at that manhole.

United Utilities' public sewer records indicate a combined sewer within Blackgate Lane. An inspection of the manhole in the road outside 97 Blackgate Lane was attempted, but the manhole cover and frame are seized so a depth

and pipe size could not be confirmed. However, an inspection of another nearby manhole on the line of this sewer to the east of the site revealed a depth of over 5m to invert.

2.4 Ground Conditions

BGS mapping indicates the underlying geology as being Superficial Deposits of Devensian Glacial Till (Diamicton), generally described as firm-stiff sandy silty gravelly clay and very compact clay silty gravelly sand, over bedrock comprising Sherwood Sandstone.

Soil mapping from "Soilscapes" web-site by Cranfield Soil & Agrifood Institute confirms the soil type in the vicinity of the application site as "Slowly permeable, seasonally wet slightly acid but base-rich clayey soils". An extract from this mapping is contained in Appendix C to this report.

2.5 Existing Flood Risk

The site lies in Flood Zone 1: Low Probability as defined in PPS25: Table D1. This zone comprises land assessed as having a less than 1 in 1000 annual probability of flooding from fluvial or tidal sources in any year [$<0.1\%$].

Environment Agency Flood Mapping indicates that the site is not in an area liable to flooding from Rivers & Sea, Surface Water or Reservoirs. Extracts from the Flood Maps for Planning and Long-Term Risk mapping are contained within Appendix D to this report.

No reports of flooding to the site from nearby sewers are reported by United Utilities.

3.0 PROPOSED SITE DRAINAGE & FUTURE FLOOD RISK

3.1 Proposed Works

The planning application proposes the retention of two of the existing buildings on the site, the demolition of the remaining buildings, and the erection of thirteen commercial units in two terraced blocks along with associated access, parking and landscaping.

The development will be served from the existing access drive off Blackgate Lane.

The existing buildings to be demolished have a roof area of 0.048Ha and two buildings with a total roof area of 0.028Ha are to be retained.

The proposed new units on the site will have a total roof area of 0.116Ha.

Ground floor levels will be set at least 150mm above the existing site level, but with a minimum level of 13.25m AOD.

The proposed site plan is contained within Appendix E to this report.

3.2 Vulnerability

The NPPF Annex 3: Flood risk vulnerability classification identifies the proposed site use as Less Vulnerable.

Therefore, from Table 3: Flood risk vulnerability and flood zone compatibility, that land use is considered as appropriate.

3.3 Climate Change

The National Planning Policy Framework (NPPF) sets out how the planning system should help minimise vulnerability and provide resilience to the impacts of climate change. This includes demonstrating how flood risk will be managed now and over the development's lifetime, taking climate change into account.

The assessment of future flood risk to the site takes into account climate change guidance given in "Flood Risk Assessments: Climate Change Allowances" published by The Environment Agency in February 2016 and most recently updated in May 2022.

The selection of climate change allowance should reflect the lifespan of the proposed development. This development would have a maximum expected lifespan 20-25 years thus the 2050's Epoch figures apply.

As a "less vulnerable" development in Flood Zone 1 situated in the Alt and Crossens Management Catchment of the North West River Basin, the Central Climate Change Allowance figure for both the 1% & 3.3% AEP event of 25% should be applied to rainfall intensities when calculating surface water run-off from the site.

3.4 Drainage Strategy

In accordance with the National Planning Policy Framework and Building Regulations, the site should be drained on a separate system with foul water draining to the public sewer and surface water draining in the most sustainable way.

The chosen strategy should demonstrate that the site will be safe from flooding; not increase flood risk elsewhere when compared to the pre-development run-off rates; and should seek to avoid pumped systems.

3.4.1 Surface Water

Planning Practice Guidance and the Building Regulations Approved Document H3 outline the hierarchy to be investigated when considering a surface water drainage strategy, in the following order of priority:

- Into the ground (infiltration);
- To a surface water body;
- To a surface water sewer, highway drain, or another drainage system;
- To a combined sewer.

3.4.1.1 Infiltration

Soilscape (England) - The Simplified Soil Map of England and Wales produced by National Soil Resources Institute (NSRI) indicates the area to be typified by slowly permeable, seasonally wet clayey soils.

As such it is thought likely that formal soakaways would not provide an appropriate means for surface water disposal from any new development on the site, and this level of the drainage hierarchy is passed.

Nevertheless, given the depth of topsoil over the natural drift layer, some localized hard standing can be laid with falls onto landscaped areas.

3.4.1.2 Surface Water Bodies

There is a culverted watercourse within the footpath close to the front of the site, connecting to the drainage network south of the site and discharging into The Tarleton Runner.

Therefore, it is proposed that surface water will be drained to this culvert and thence the watercourse network, thus complying with the drainage hierarchy.

3.4.1.3 Design

As the plot has clearly been occupied for many years, the proposal could be treated as a previously developed site for the purposes of determining the peak surface water run-off rates.

However, in this instance it has been agreed with West Lancashire Borough Council that in order to comply with the aspirations of the SuDS Manual, existing runoff characteristics will be estimated by considering the site as being a Greenfield site but using a high SOIL value in the normal calculations to take account of the impervious nature of the site [hardstanding and roofs].

Based on this principle, the Greenfield run-off estimates for the whole site area have been calculated as follows:

- 1 year event 4.13 l/sec;
- Q_{bar} [2.3 year] 4.75 l/sec;
- 30 year event 8.08 l/sec;
- 100 year event 9.88 l/sec.

Calculations in support of the Greenfield run-off rates are contained in Appendix G to this report.

As part of the detailed design for the development, it is proposed to provide a system comprising permeable surface materials where appropriate, along with rainwater from new roofs draining into a layer of voided sub-base [SuddsAgg or equivalent] with a minimum 30% voids ratio, wrapped in appropriate geo-textile membranes, with a flow control fitted within the outlet chamber, limiting the peak discharge into the nearby culverted watercourse in Blackgate Lane as described above. The design should incorporate a 25% additional climate change allowance on rainfall intensities as required by the latest guidance described in Section 3.3 above.

Paved areas associated with the new dwellings will be formed in permeable paving or laid to fall onto landscaped areas within the site.

3.4.2 Foul Water

All new foul drainage from the proposed development will be connected into the existing sewerage system in Blackgate Lane via the existing lateral connection serving the site.

This discharge may be subject to Section 106 Water Industries Act approval from United Utilities on flow rates.

3.5 Future Flood Risk

As a commercial development, the vulnerability of the site is classified as "Less Vulnerable", and is considered as appropriate in Flood Zone 1.

The Flood Map for Planning and Long-term Risk Maps contained in Appendix D indicate that the site is not in an area liable to flooding from Rivers & Sea, Surface Water or Reservoirs.

The implementation of surface water attenuation scheme as required within the new site, restricting the peak run-off to a flow rate during a 1 in 100 year plus climate change storm event will ensure that flood risk is not increased elsewhere as a result of the development.

4.0 FUTURE MAINTENANCE

Any shared SuDS elements such as any permeable surfaces and attenuation systems, catchpits and control chambers within the proposed development will remain as private assets and thus will be the joint responsibility of the landlord or individual occupiers of the commercial units.

If the units are to be sold off, a management company, registered at Companies House, should be set up with shares being owned initially by the Site Developer, and upon the sale of plots, individual shares will be transferred to the new owners.

These shares will attract an annual maintenance fee, paid to the management company, who will be responsible for on-going inspections to assess asset performance and condition, along with operational costs for regular maintenance or remedial works as appropriate, for the lifetime of the development in accordance with the following inspection and maintenance plan.

Site Drainage

Under normal usage geo-cellular storage tanks do not require any maintenance apart from a visual inspection of the vent termination to the tank to ensure it is not obstructed.

The sub-base attenuation storage is protected by appropriate membranes to prevent fines from entering the system.

Both the geo-cellular crates and sub-base attenuation are further protected by installation of a number of catchpits upstream of those features, and the control chamber is fitted with a removeable filter to protect the orifice plate.

However, it is important that the drainage infrastructure leading to the tank or tanks is maintained on a regular basis as follows:

It is recommended that that all drainage is inspected / surveyed and its condition recorded by the developer immediately after the construction phase.

Subsequently, it is recommended that a quarterly inspection of all inspection chambers including the flow control, catchpits and rain water gullies is carried out for the first 12 months following completion of the attenuation system.

Thereafter, all chambers and rain water gullies should be checked for silt build-up annually, and silt or debris removed if required.

The SuDS Manual [C753]: Appendix B, published by CIRIA comprises a Maintenance Inspection Checklist.

A copy of this document is contained in Appendix F to this report, and should be provided to the Landlord/Management Company for their guidance and reference to be used as a template for future maintenance.

This inspection and maintenance régime will secure the operation of the drainage scheme throughout the lifetime of the development.

5.0 CONCLUSION

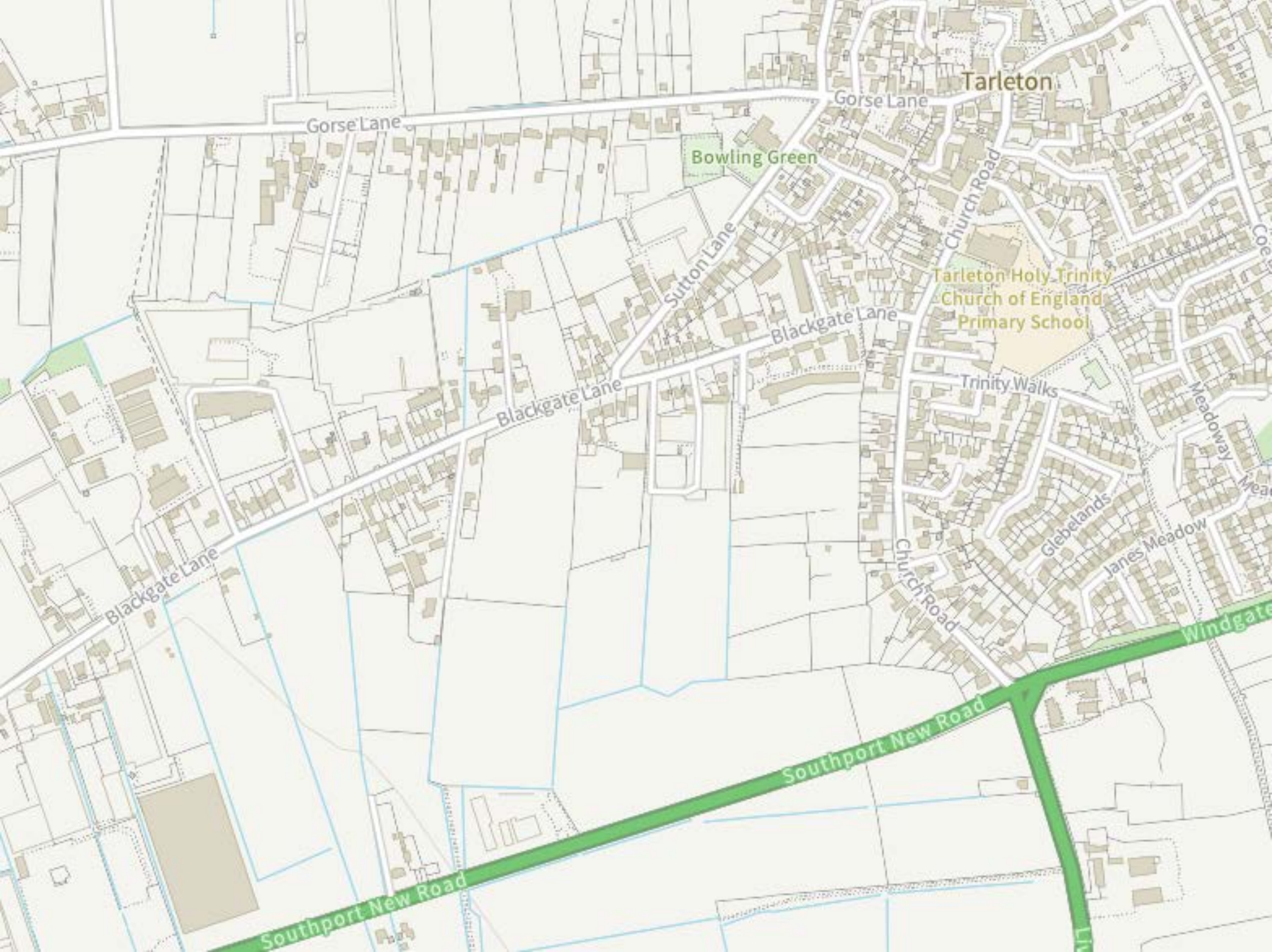
The site is considered to be at negligible risk from flooding.

Surface water disposal has been considered in accordance with the preferred hierarchy of options, and will be attenuated to adjusted Greenfield run-off rates, taking into account the effects of climate change.

It is proposed to drain the site on a separate system of foul and surface water drains with foul discharging to a public sewerage system and surface water draining to the nearby watercourse network to the north-west of the site.

Based on all the above, the proposal will not increase flood risk elsewhere.

APPENDIX A - Location Plan & Aerial Image



Tarleton

Gorse Lane

Gorse Lane

Bowling Green

Sutton Lane

Tarleton Holy Trinity
Church of England
Primary School

Blackgate Lane

Trinity Walks

Blackgate Lane

Blackgate Lane

Church Road

Glebelands

Janes Meadow

Southport New Road

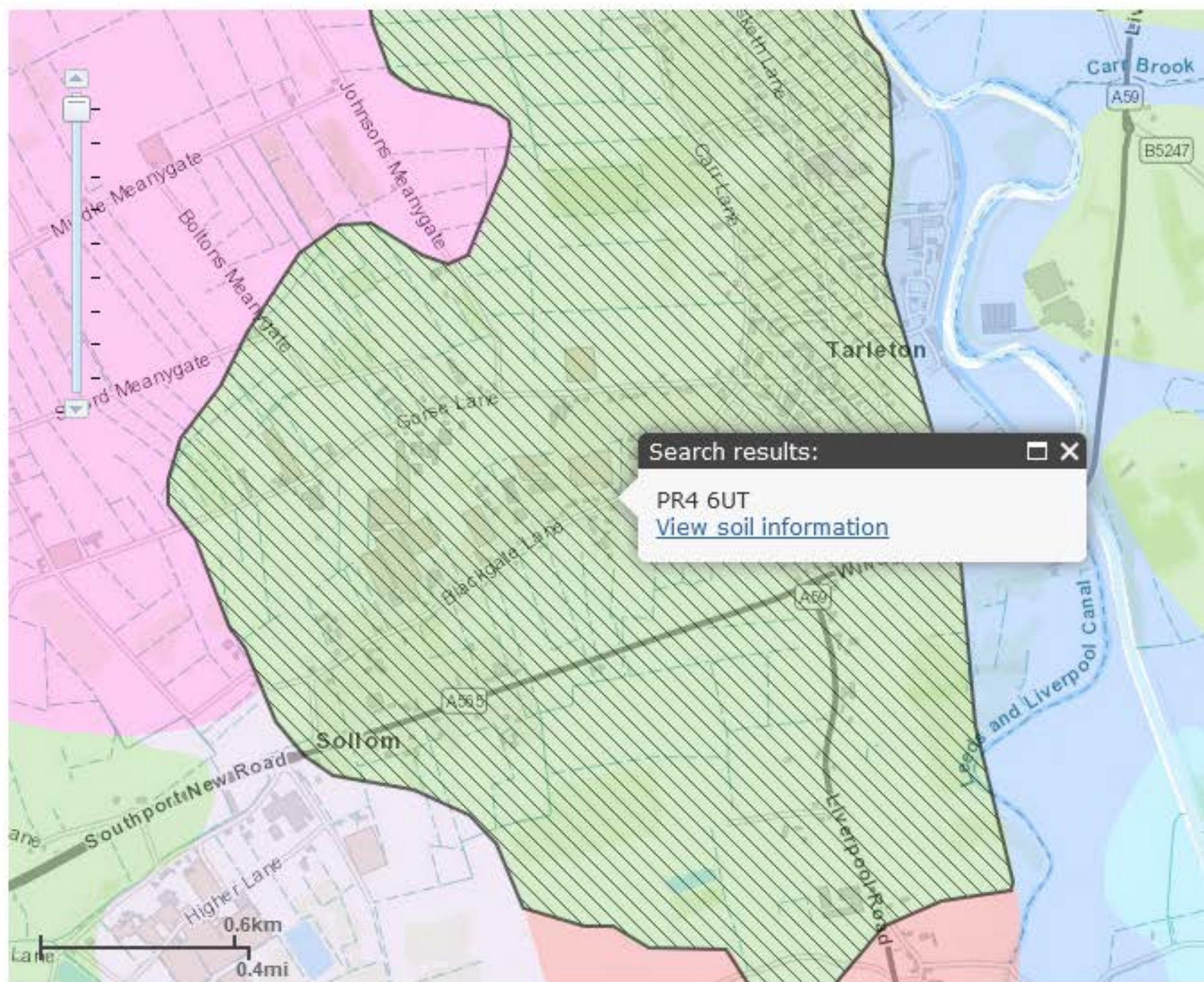
Windgate

Southport New Road



APPENDIX B - Topographical Survey

APPENDIX C - Soil Type from Soilscales Web-Site



Search results:

PR4 6UT

[View soil information](#)

Legend

Search

Soil information

Slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils

Texture:

Loamy and clayey

Coverage:

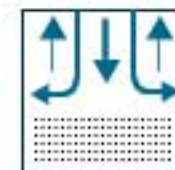
England: 19.9% Wales: 2.4%
England & Wales: 17.5%

Selected area:

9.4km²

Drainage:

Impeded drainage



Fertility:

Moderate



Habitats:

Seasonally wet pastures and woodlands

Landcover:

Grassland and arable some woodland

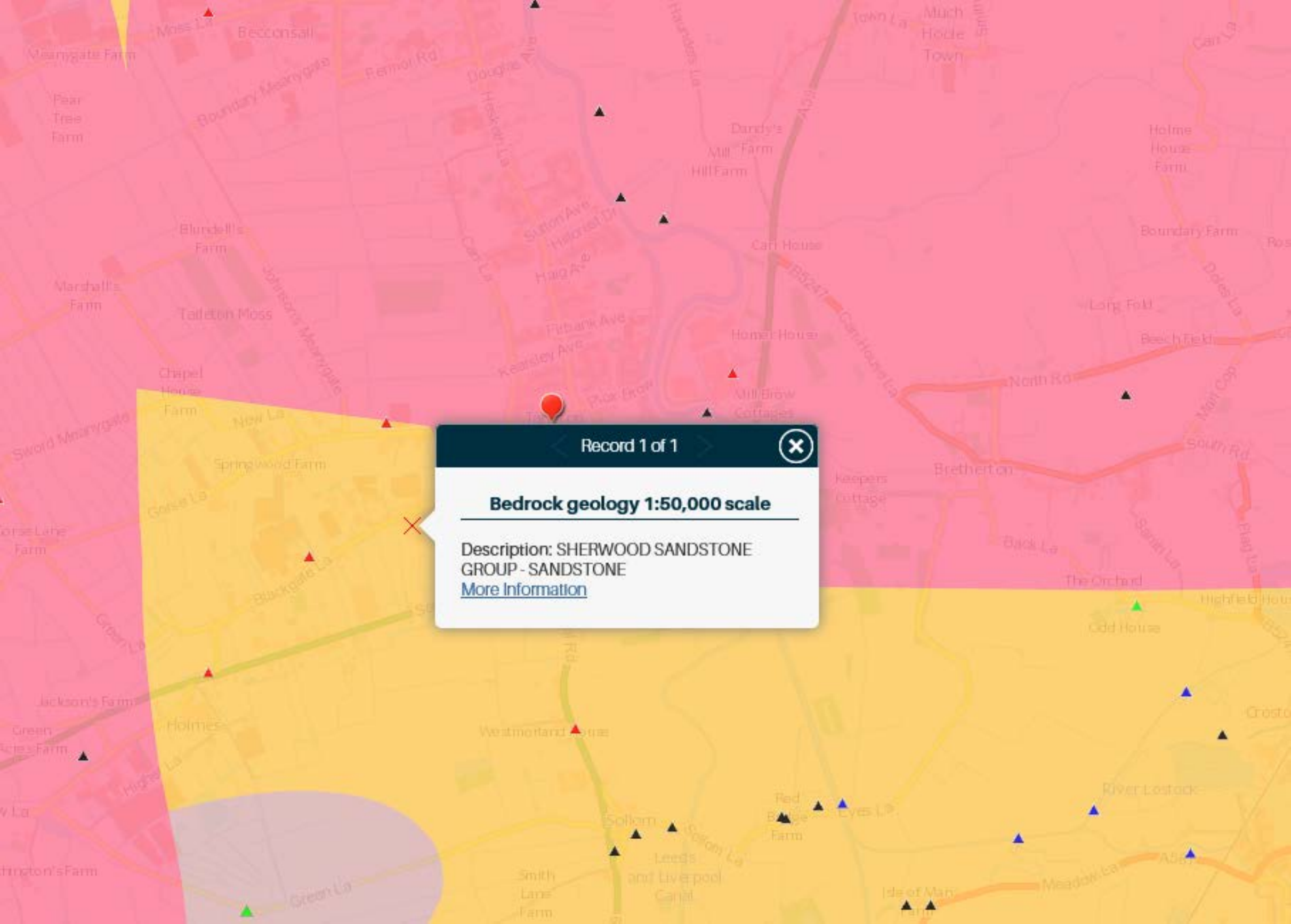
Carbon:

Low

Drains to:

Stream network

Adjust transparency



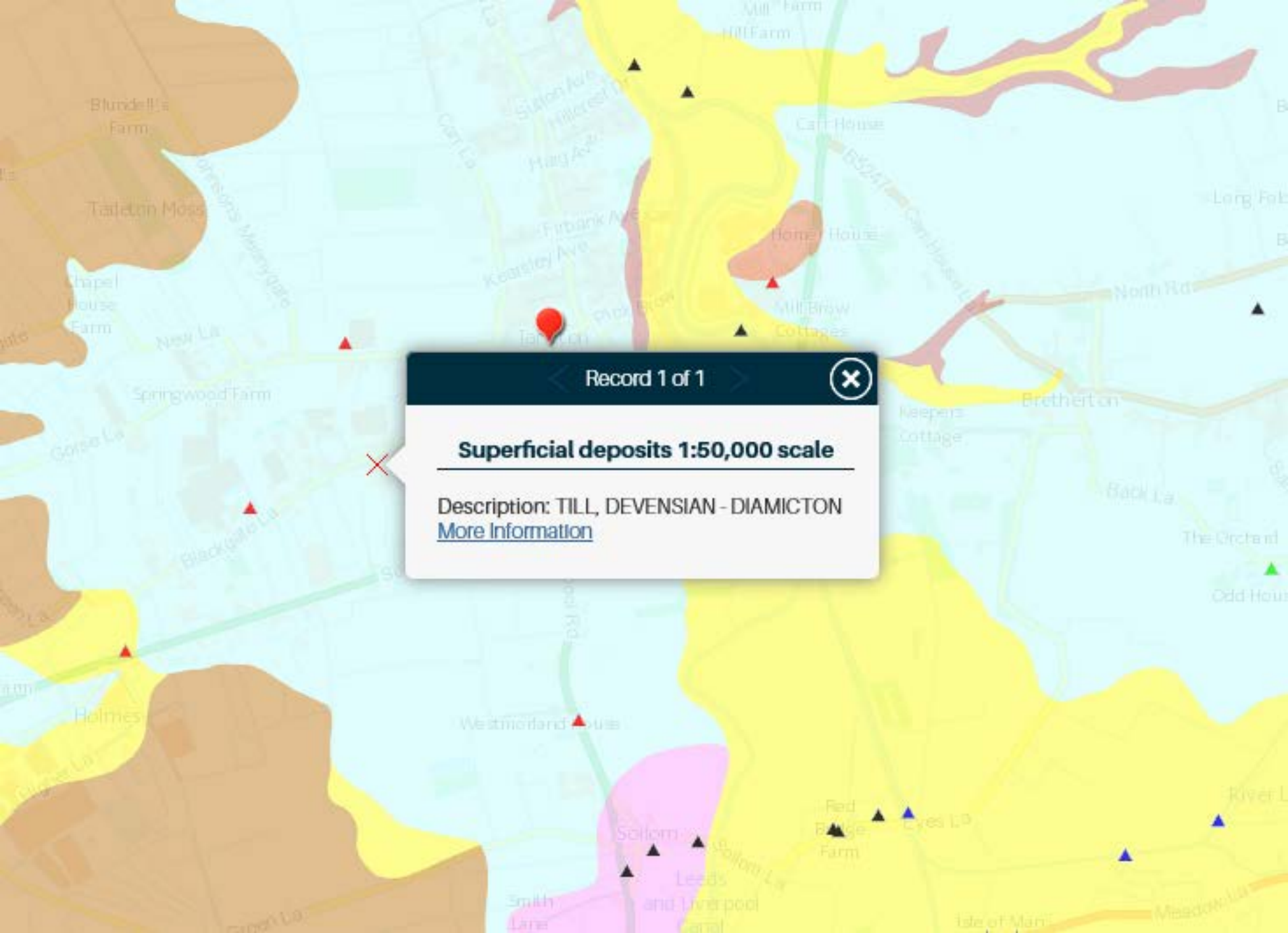
Record 1 of 1



Bedrock geology 1:50,000 scale

Description: SHERWOOD SANDSTONE GROUP - SANDSTONE

[More Information](#)



Record 1 of 1



Superficial deposits 1:50,000 scale

Description: TILL, DEVENSIAN - DIAMICTON

[More Information](#)

APPENDIX D - EA Flood Zone Report & Long-term Mapping

Flood map for planning

Your reference
CFC22032

Location (easting/northing)
344540/420130

Created
24 Jun 2022 14:30

Your selected location is in flood zone 1, an area with a low probability of flooding.

You will need to do a flood risk assessment if your site is **any of the following:**

- bigger than 1 hectare (ha)
- In an area with critical drainage problems as notified by the Environment Agency
- identified as being at increased flood risk in future by the local authority's strategic flood risk assessment
- at risk from other sources of flooding (such as surface water or reservoirs) and its development would increase the vulnerability of its use (such as constructing an office on an undeveloped site or converting a shop to a dwelling)

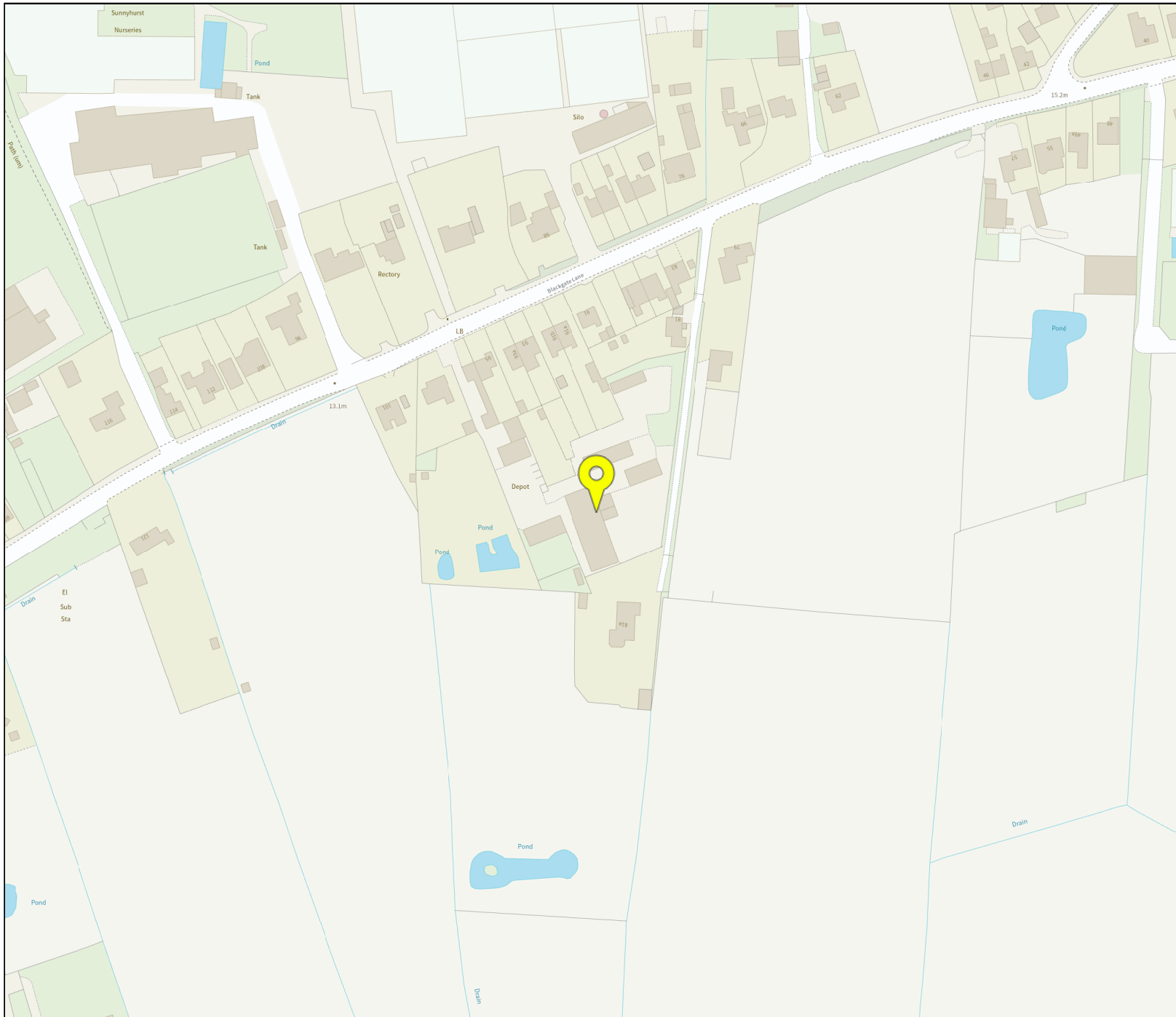
Notes

The flood map for planning shows river and sea flooding data only. It doesn't include other sources of flooding. It is for use in development planning and flood risk assessments.

This information relates to the selected location and is not specific to any property within it. The map is updated regularly and is correct at the time of printing.

Flood risk data is covered by the Open Government Licence **which** sets out the terms and conditions for using government data. <https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/>

Use of the address and mapping data is subject to Ordnance Survey public viewing terms under Crown copyright and database rights 2021 OS 100024198. <https://flood-map-for-planning.service.gov.uk/os-terms>



Flood map for planning

Your reference
CFC22032

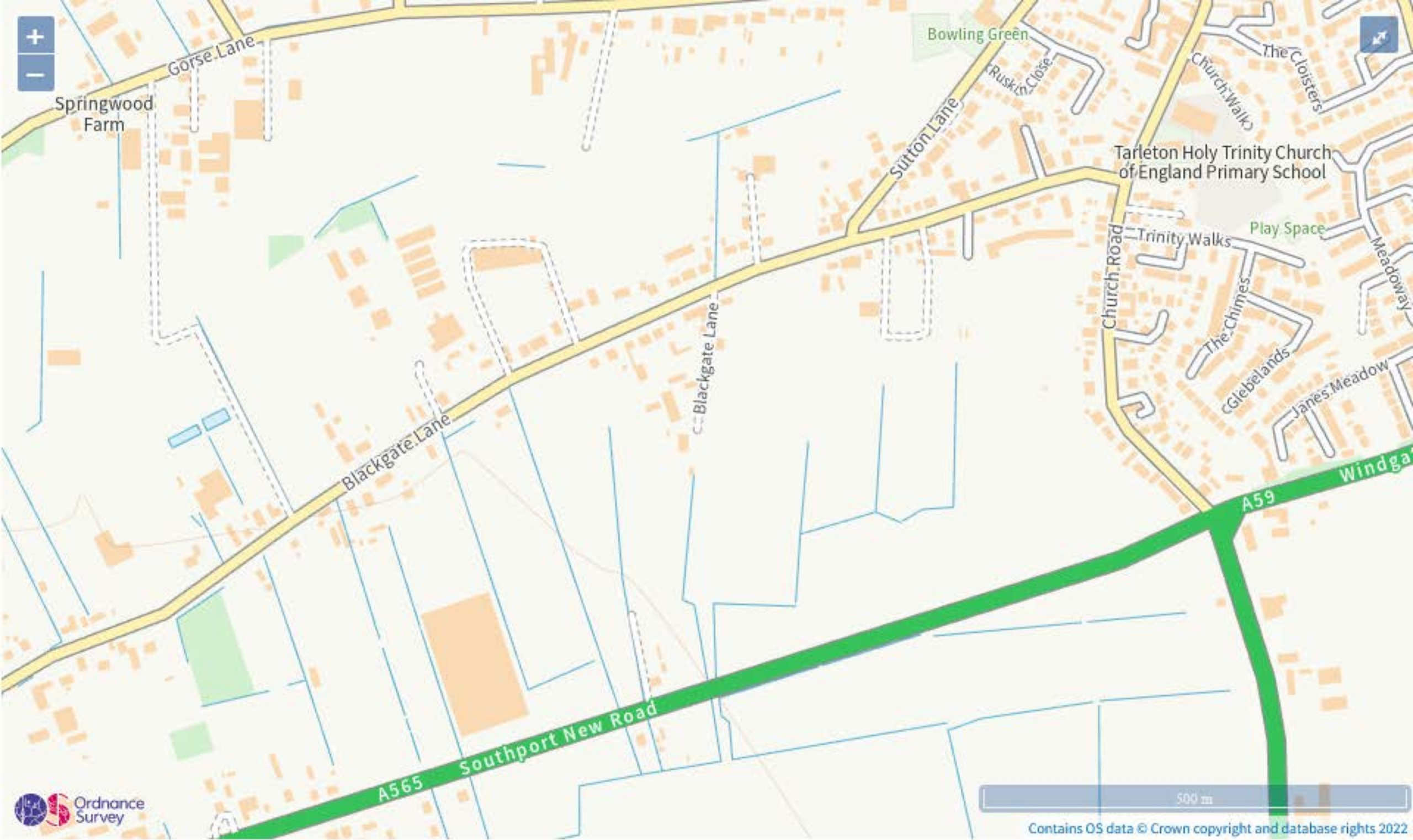
Location (easting/northing)
344540/420130

Scale
1:2500

Created
24 Jun 2022 14:30

- Selected point
- Flood zone 3
- Flood zone 3: areas benefitting from flood defences
- Flood zone 2
- Flood zone 1
- Flood defence
- Main river
- Water storage area





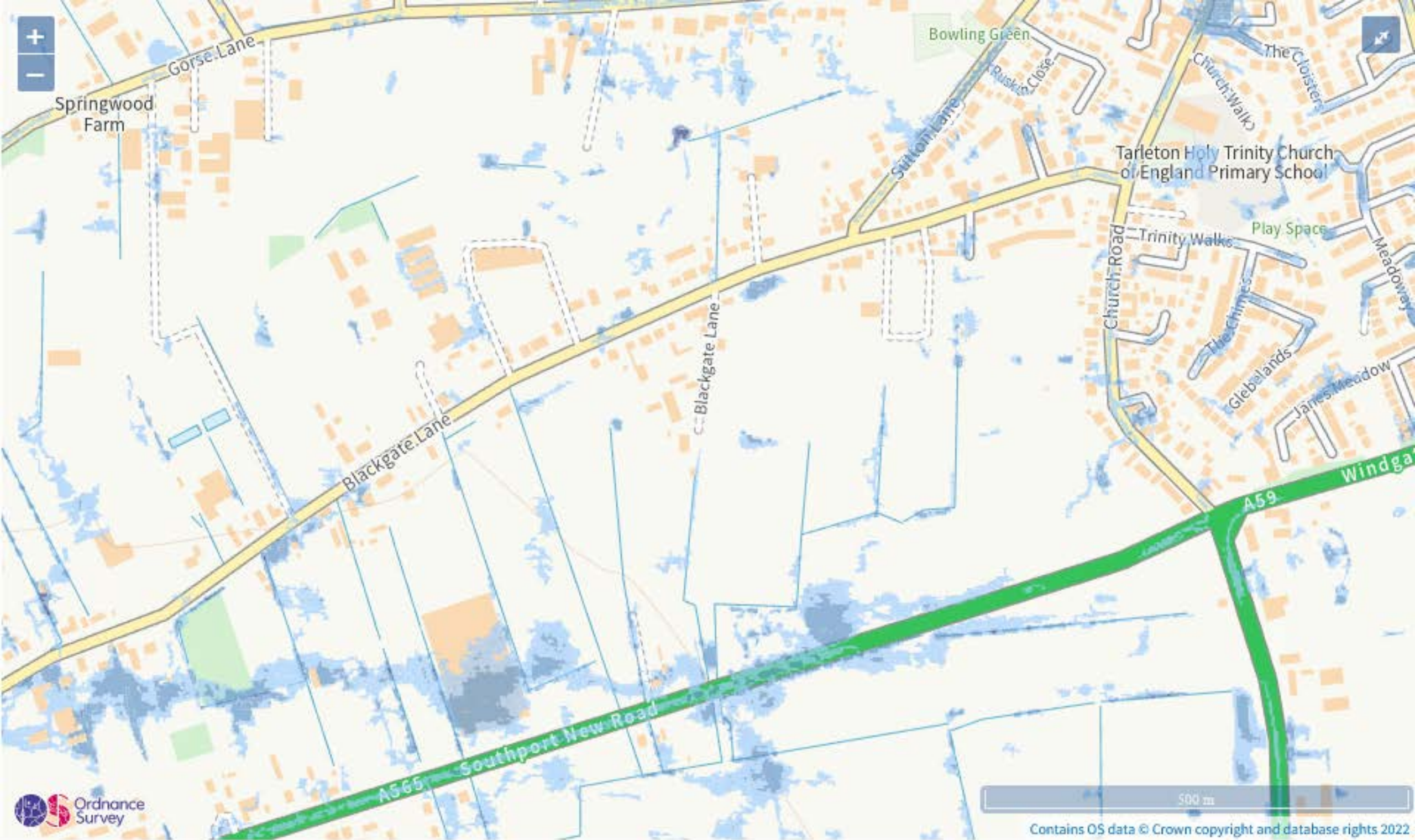
Extent of flooding from rivers or the sea

- High
- Medium
- Low
- Very low



Extent of flooding from surface water

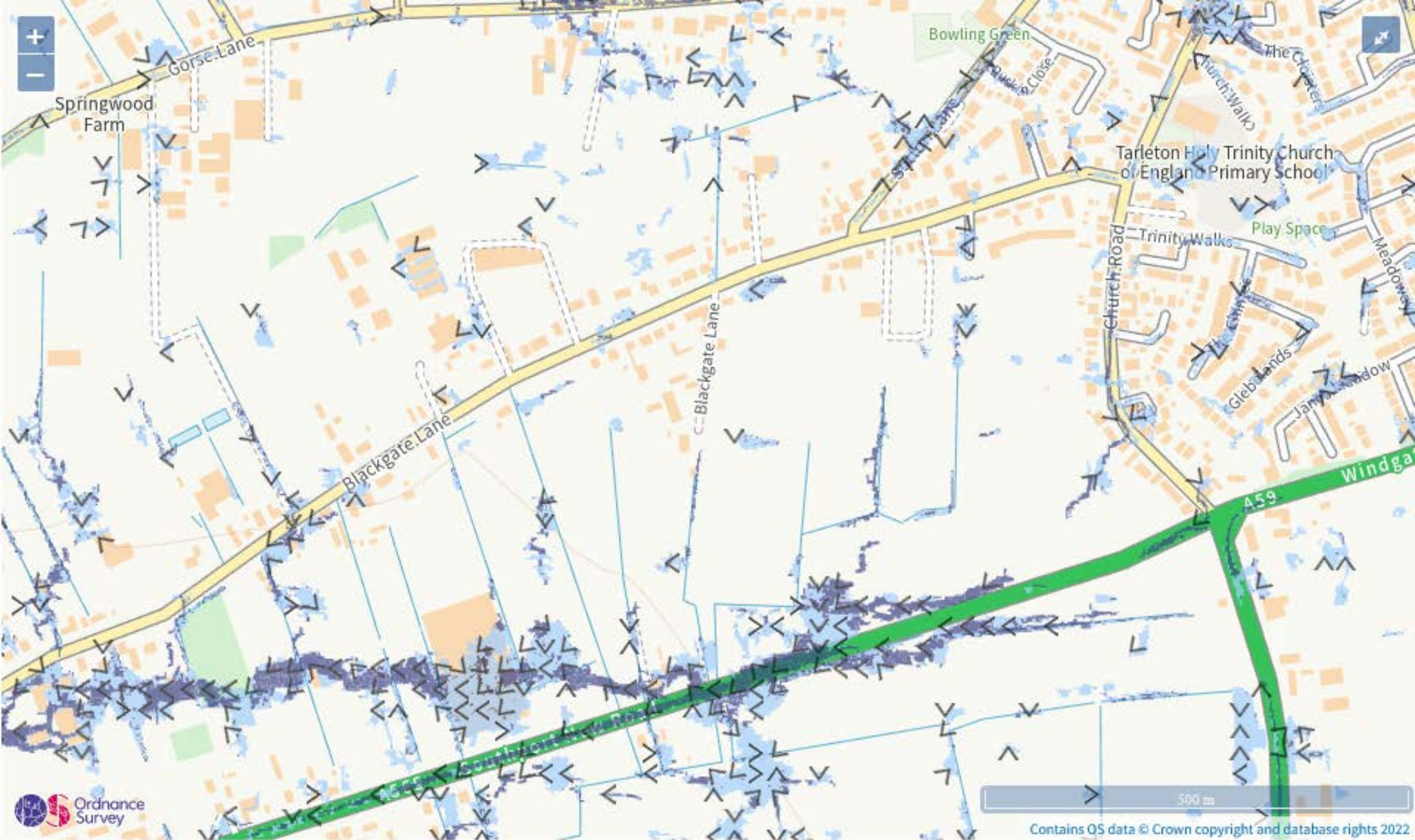
- High
- Medium
- Low
- Very low



Surface water flood risk: water depth in a low risk scenario

Flood depth (millimetres)

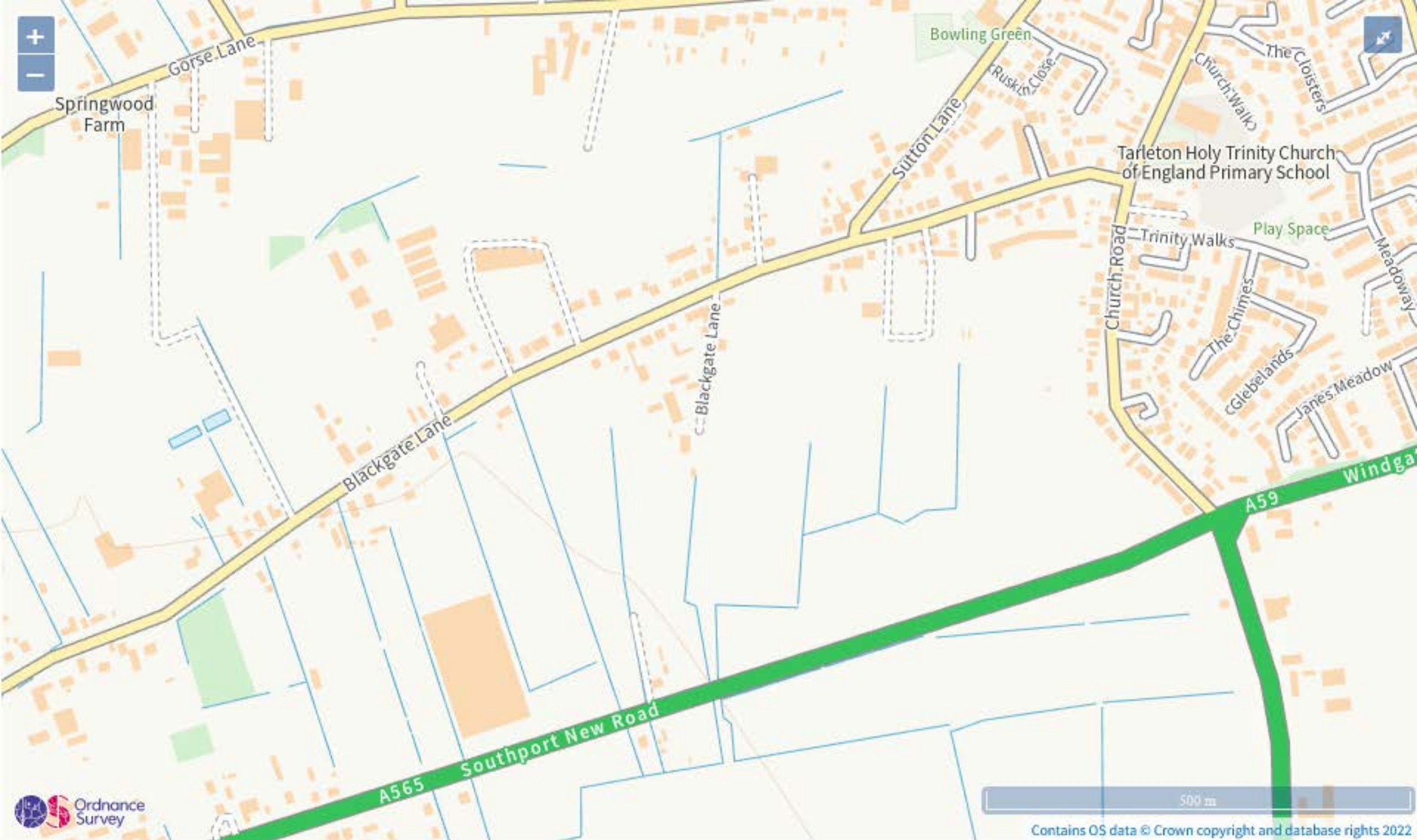
- Over 900mm
- 300 to 900mm
- Below 300mm



Surface water flood risk: water velocity in a low risk scenario

Flood velocity (metres/second)

● Over 0.25 m/s
 ● Less than 0.25 m/s
 ↖ Direction of water flow



Maximum extent of flooding from reservoirs:

- when river levels are normal
- when there is also flooding from rivers

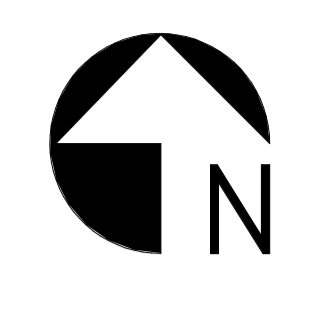
APPENDIX E - Proposed Site Layout

IMPORTANT
 © This drawing copyright remains the property of this practice
 Do not scale of this drawing
 All dimensions to be checked on site
 Positions of existing services to be confirmed prior to proceeding

STATUS DESCRIPTION
 S0 - Work In Progress
 S1 - Co-Ordination
 S2 - Information
 S3 - Internal Review / Comment
 S4 - Construction Approval
 D - Costing / Tender

A - For Construction
 AB - As Built

NOTES



Site Application Boundary - 5692m²
 Site Ownership Boundary

A - 5no PROPOSED COMMERCIAL UNITS TYPE A at 83 m² / 1,007 sqft each
 B - 8no PROPOSED COMMERCIAL UNITS TYPE C at 83 m² / 1,007 sqft each

Total 13no Units - 984m² / 10,692 sqft

PARKING PROVISION:
 Block A: 5no parking spaces (1no parking space per unit)
 Block B: 16no parking spaces (2no parking spaces per unit)
 Visitors: 5no parking spaces
 Total: 26no parking spaces (including 2no accessible bays)



Within 5m of road, brick garden wall to be 0.5m maximum height to retain visibility splays

New garden wall
 New garden hedge

9m vehicle passing space at site entrance

Existing vehicle parking area for No97 retained

Sliding security gate

Access Road

2m high closed boarded timber fence
 Footpath

Refuse Store

Grass / Managed meadow
 Existing building retained

3no visitors

2no visitors

Car Park

Proposed trees

Pond

Pond

Footpath

NOTE: 2m high closed boarded timber fence along site boundary

REV	DATE	DESCRIPTION
05	2020/03	Minor Revision Site Boundary
04	2020/01	Minor Revision Site Bound
03	2020/11	Planning Revision: Site Entrance
02	2020/03	Finalise revised
01	2020/02	Amount of proposed units reduced / layout revised to suit

CLIENT
 Bella Homes NW LTD

PROJECT
 Site Redevelopment
 97 Blackgate Lane, Tarleton

DRAWING TITLE
 Combined Site and Block Plan - Proposed

STATUS
 S2

INFORMATION
 SCALE: 1:200@A0
 DATE: 04/02/19
 DRAWN: JO
 CHECKED: NA

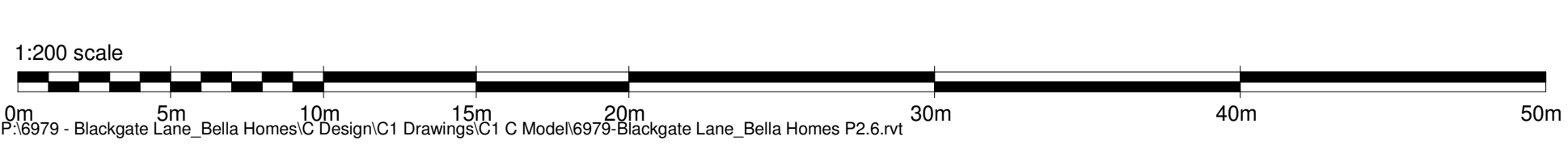
DWG NO:
 6979-FWP-L(02)02

REV:
 05

fwp

FWP
 6 & 7 RIBBLESDALE PLACE
 PRESTON PR1 3NA
 T: 01772 259824
 F: 01772 203375
 E: mail@fwp.co.uk
 www.fwgroup.co.uk

Frank White Partnership Limited



P:\6979 - Blackgate Lane, Bella Homes\02 Design\01 Drawing\01 C Model\6979\Blackgate Lane, Bella Homes P2.dwg

APPENDIX F - Maintenance Inspection Checklist

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Appendix B: Maintenance inspection checklist



Table B.25 SuDS maintenance inspection checklist			
General information			
Site ID	97 Blackgate Lane		
Site location and co-ordinates (GIS if appropriate)	97 Blackgate Lane, Tarleton, PR4 6UT. NGR 344540, 420130		
Elements forming the SuDS scheme	SW Attenuation	Approved drawing reference(s)	
Inspection frequency	3 month / 12 month	Approved specification reference	
Type of development	Commercial	Specific purpose of any parts of the scheme (eg biodiversity, wildlife and visual aspects)	Attenuation

Inspection date								
	Details	Y/N	Action required	Date completed	Details	Y/N	Action required	Date Completed
General inspection items								
Is there any evidence of erosion, channelling, ponding (where not desirable) or other poor hydraulic performance?								
Is there any evidence of accidental spillages, oils, poor water quality, odours or nuisance insects?								
Have any health and safety risks been identified to either the public or maintenance operatives?								
Is there any deterioration in the surface of permeable or porous surfaces (eg rutting, spreading of blocks or signs of ponding water)?								

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Appendix B: Maintenance inspection checklist



Silt/sediment accumulation							
Is there any sediment accumulation at inlets (or other defined accumulation zones such as the surface of filter drains or infiltration basins and within proprietary devices)? If yes, state depth (mm) and extent. Is removal required? If yes, state waste disposal requirements and confirm that all waste management requirements have been complied with (consult environmental regulator)							
Is surface clogging visible (potentially problematic where water has to soak into the underlying construction or ground (eg underdrained swale or infiltration basin)?)							
Does permeable or porous surfacing require sweeping to remove silt?							
System blockages and litter build-up							
Is there evidence of litter accumulation in the system? If yes, is this a blockage risk?							
Is there any evidence of any other clogging or blockage of outlets or drainage paths?							
Vegetation							
Is the vegetation condition satisfactory (density, weed growth, coverage etc)? (Check against approved planting regime.)							
Does any part of the system require weeding, pruning or mowing? (Check against maintenance frequency stated in approved design.)							
Is there any evidence of invasive species becoming established? If yes, state action required							
Infrastructure							
Are any check dams or weirs in good condition?							
Is there evidence of any accidental damage to the system (eg wheel ruts?)							

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Appendix B: Maintenance inspection checklist



Is there any evidence of cross connections or other unauthorised inflows?								
Is there any evidence of tampering with the flow controls?								
Are there any other matters that could affect the performance of the system in relation to the design objectives for hydraulic, water quality, biodiversity and visual aspects? (Specify.)								
Other observations								
Information appended (eg photos)								
Suitability of current maintenance regime								
Continue as current Increase maintenance Decrease maintenance								
Next inspection								
Proposed date for next inspection								

APPENDIX G - Greenfield Run-off Rate Estimation

Calculated by:

Site name:

Site location:

Site Details

Latitude:

Longitude:

Reference:

Date:

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013), the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Runoff estimation approach

Site characteristics

Total site area (ha):

Methodology

Q_{BAR} estimation method:

SPR estimation method:

Soil characteristics

Default Edited

SOIL type:

HOST class:

SPR/SPRHOST:

Hydrological characteristics

Default Edited

SAAR (mm):

Hydrological region:

Growth curve factor 1 year:

Growth curve factor 30 years:

Growth curve factor 100 years:

Growth curve factor 200 years:

Notes

(1) Is $Q_{BAR} < 2.0$ l/s/ha?

When Q_{BAR} is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

(3) Is $SPR/SPRHOST \leq 0.3$?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

Greenfield runoff rates

Default Edited

Q_{BAR} (l/s):

1 in 1 year (l/s):

1 in 30 years (l/s):

1 in 100 year (l/s):

1 in 200 years (l/s):

This report was produced using the greenfield runoff tool developed by HR Wallingford and available at www.uksuds.com. The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at www.uksuds.com/terms-and-conditions.htm. The outputs from this tool are estimates of greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, CEH, Hydrosolutions or any other organisation for the use of this data in the design or operational characteristics of any drainage scheme.