



Flood Risk Assessment

21T2034 – Cleator Moor Innovation Quarter - BOC Yard
CMIQ-BGP-04-XX-RP-C-FRA004

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Flood Risk Assessment

Project: Cleator Moor Innovation Quarter - BOC Yard

Client: Copeland Borough Council

LLFA: Cumbria County Council

BGP Job No: 21T2034

Document Checking:

Prepared By: J Herbert – Design Engineer

Checked By: J Conway – Director

Issue	Date	Status	Checked for Issue
001	11/01/2022	First Draft	JC
002	04/03/2022	Planning	JC

This document has been prepared solely as a Flood Risk Assessment for Copeland Borough Council regarding the proposed scheme at land off Leconfield Street, Cleator Moor. Billinghurst George & Partners accepts no responsibility or liability for any use that is made of this document other than by the Client for which it was originally commissioned and prepared.



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1. Introduction

- 1.1. This Flood Risk Assessment has been prepared in accordance with the requirements of The National Planning Policy Framework (Ministry of Housing, Communities and Local Government - February 2019) [The Framework] and the Planning Practice Guidance to the National Planning Policy Framework Website (Launched 6th March 2014) [The Technical Guidance].
- 1.2. This report has been prepared to supplement the planning application for the proposed development on land off Leconfield Street, Cleator Moor, Cumbria. See Appendix A for the site location plan.
- 1.3. The proposals are to construct a concrete yard for storage and distribution purposes and an associated access road on the brownfield site that was previously used as a service yard.
- 1.4. To support the planning application the BGP Flood Risk Assessment (004) March 2022 is provided as a separate document.

2. Existing Site Description and Location

2.1. Site Location

- 2.1.1 Site Name: Leconfield Industrial Estate
- 2.1.2 Site Address: Land off Leconfield Street, Cleator Moor
- 2.1.3 OS Grid Reference: E: 301400, N: 515601
- 2.1.4 National Grid Reference: NY013155

2.2. Site Description

- 2.2.1 Site Area: 0.670 Ha
- 2.2.2 Site Area to be developed: 0.447 Ha
- 2.2.3 Existing Land Use: Service Yard
- 2.2.4 Proposed Land Use: Concrete yard used for storage and distribution.
- 2.2.5 Local Planning Authority: Copeland Borough Council
- 2.2.6 Sewer Undertaker: United Utilities (UU)
- 2.2.7 At approximately 0.670 Ha in size the Brownfield site is located approximately 5.15km southeast of Whitehaven and approximately 18km southwest of Cockermouth. The site is currently part historic service yard and part soft landscaping. The site is bound by woodland and grass to the northern boundary, existing industrial buildings to the east and south and a demolished building footprint to the west.

2.3. Flood Zone (Table 1 NPPF)

- 2.3.1 The development lies within Flood Zone 1. (See Appendix C for Flood Maps).

2.4. NPPF Site Classification (Table 2 NPPF)

- 2.4.1 The vulnerability classification for 'Buildings used for shops, financial, professional and other services, restaurants and cafes, hot food takeaways, offices, general industry, storage and distribution, non-residential institutions not included in "more vulnerable", and assembly and leisure' is "Less Vulnerable".

2.5. Flood Zone “Compatibility” (Table 3 NPPF):

Table 1 – NPPF Flood Zone Compatibility (Table 3 within NPPF)

	Essential Infrastructure	Highly Vulnerable	More Vulnerable	Less Vulnerable	Water Compatible
Flood Zone 1	Yes	Yes	Yes	Yes	Yes
Flood Zone 2	Yes	Exception test required	Yes	Yes	Yes
Flood Zone 3a	Exception test required	No	Exception test required	Yes	Yes
Flood Zone 3b	Exception test required	No	No	No	Yes

2.5.1 The proposal to construct a yard for storage and distribution on land off Leconfield Street is acceptable in terms of flood risk in accordance with Table 3 of the NPPF (above).

2.6. Sequential Test

2.6.1 As the site is located within Flood Zone 1, the sequential test does not need to be applied.

3. Definition of the Flood Hazard

3.1. Tidal Flood Risk

The site is approximately 5.5km from the sea and located between elevations of approximately 80.6m AOD to 81m AOD. It is therefore considered that the site will not be affected by flooding from the sea.

The risk of flooding from the sea is categorised as **LOW**.

3.2. Fluvial Flood Risk

The nearest named watercourse is Nor Beck, which where open is located 275m northeast of the site. Through CCTV investigation it is evident that it is culverted from the northeast point mentioned and runs southeast into Leconfield Industrial Estate and through the development site. Nor Beck culvert continues southeast through Norbeck Park and adjacent fields ultimately converging with the River Keekle.

There are no other named or unnamed watercourses within close proximity to site.

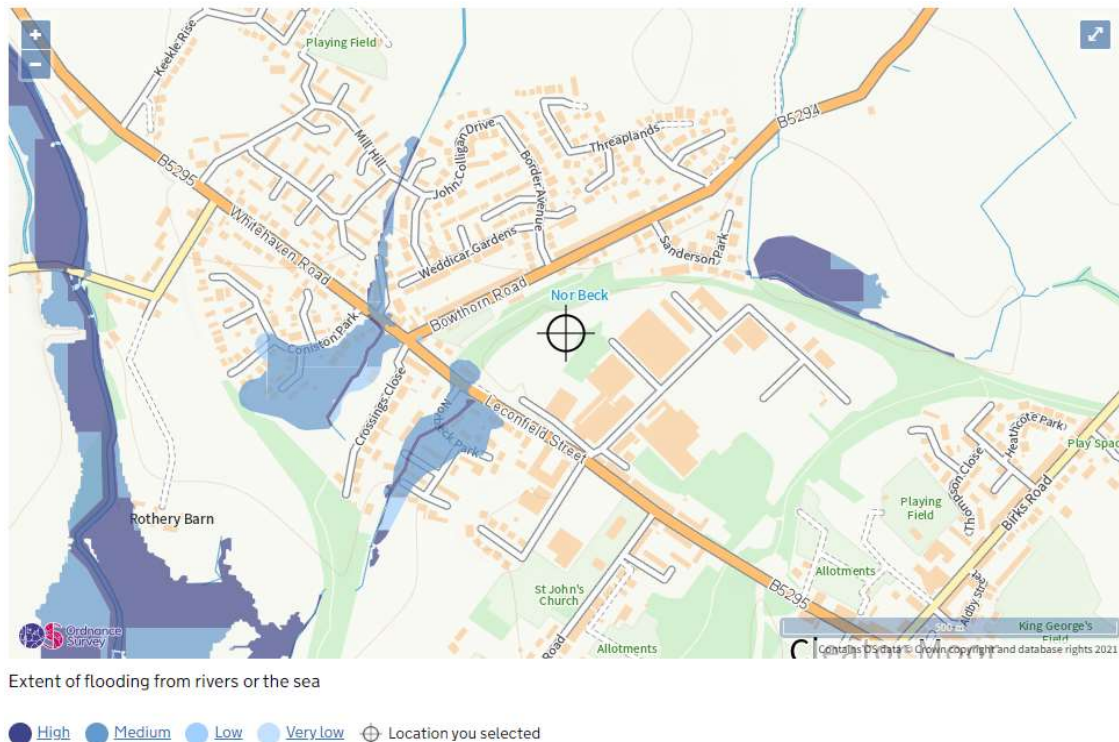


Figure 1 – Environment Agency Flood Map for Planning

The Copeland Borough Council Strategic Flood Risk Assessment (SFRA) Level 1 report has been reviewed. This states that there are no incidents of historical flooding within the site.

The Environment Agency 'Flood Map for Planning' (Figure 1 and Appendix C) shows that the proposed site is unaffected by this or any other watercourse and is wholly within Flood Zone 1. Flood Zone 1 is land that is assessed as having less than a 1 in 1000 (0.1 percent) chance of flooding each year.

It is considered that the risk of flooding to the site from fluvial sources is categorised as **LOW**.

3.3. Overland Flood Risk

Intensive rainfall, often of short duration, that is unable to soak into the ground or enter drainage systems can run quickly off land and result in localised flooding.



Figure 2 – Environment Agency Surface Water Flooding Map for Planning

Figure 2 'Surface Water Flooding Map for Planning' shows that the site is for the majority at 'Very Low' (<0.1%) risk to surface water flooding with a small area towards the centre of the site at medium risk (between 1% and 3.3%).

The site is relatively flat at an approximate level of between 80.6m and 81.0m AOD, falls existing within the existing adjacent service yard to provide drainage falls to gullies. The site falls from southeast to northwest at an approximate gradient of 1 in 280 from 81.0m to 80.8m AOD. The lowest point of the site is the location in which gullies are sited within the existing service yard at 80.60m AOD.

The medium risk area of surface water flooding indicated within Figure 2 above is at the lowest elevation of site where gullies are sited. This level of surface water flooding likely occurs due to gullies not being maintained due to the site being derelict following demolition of the adjacent building. It is anticipated that through the development of the site and introduction of positive drainage systems throughout that this will be alleviated.

Based on the above, the existing risk of flooding from overland sources is categorised as **LOW**.

3.4. Groundwater Flood Risk

Groundwater flooding occurs when water levels in the ground rise above surface elevations. It is most likely to occur in low lying areas underlain by permeable rocks.

A 'Phase 1 Desk Study' and 'Phase 2 Site Investigation' have been carried out by White Young Green dated November 2020. (Report No. A114312-1). This has been carried out as part of the wider Leconfield Industrial Estate development. Exploratory locations TP102, WS102 and CP101 were investigated within the proposed yards site boundary.

The Phase 2 Site Investigation exploratory locations reveal that the ground is made up of approximately 9.0m BGL of made ground, generally comprising slag. This overlaid silty/sandy clay up to 15m BGL and thereafter mudstone. Groundwater was encountered within 6 of the 23 overall exploratory locations. It was noted within 2 of the 3 noted exploratory locations local to site noting groundwater strikes were seepage.

It is anticipated that given the ground conditions infiltration rates returned would be poor.

Therefore, the risk of flooding to the proposed site from ground water is therefore categorised as **LOW**.

3.5. Flooding from Sewers

See Appendix D for locations of existing United Utilities public drains. Several United Utilities combined drains and manholes are located toward to primary access of Leconfield Industrial Estate. The 300mm diameter combined sewer drains from southeast to northwest along Leconfield Street in keeping with the topography of the highway.

A United Utilities 675mm diameter combined sewer is located just beyond the north western boundary, which drains southwest.

Therefore, the main sources of flood risk from sewers will be from the United Utilities adopted sewers, any existing private drainage and all proposed drainage. These sources include:

- Any flooding from the UU combined sewer located toward the primary access to Leconfield Industrial Estate would flow away from the site due to the elevation of the site being higher than the surrounding levels. Combined sewers are less prone to flooding and the likelihood of the sewers flooding is minimal as it is adopted and maintained by UU.
- Any flooding from the UU combined sewer located northwest of the site would flow away from the site due to the elevation of the site being higher than the surrounding levels. Combined sewers are less prone to flooding and the likelihood of the sewers flooding is minimal as it is adopted and maintained by UU.
- All proposed drainage is to be designed in accordance with current best practices and follow the requirements of the Lead Local Flood Authority in order to obtain planning permission. As such, the proposed drainage system would need to be designed in order to prevent flooding to buildings for rainfall events up to and including the 1 in 100-year event with an additional 40% increase allowance for climate change. Therefore, the expected risk of flooding from proposed drainage would be low.

Based on the above the risk of flooding from sewers is categorised as **LOW**.

3.6. Flooding from Artificial Sources

Based on the Environment Agency map 'Flood Risk from Reservoirs' the site is not at risk from any artificial sources such as reservoirs.

The risk of flooding from artificial sources is categorised as **LOW**.

4. Probability of Flooding

- 4.1. The Environment Agency maps have been reviewed (see Appendix C). The entirety of the site is identified as being in Flood Zone 1 as categorised by the National Planning Policy Framework (NPPF) and Technical Guidance.
- 4.2. Flood Zone 1 describes the land assessed as having a less than 1 in 1000 annual probability of river or sea flooding in any one year.
- 4.3. The Copeland Borough Council Strategic Flood Risk Assessment (SFRA) Level 1 report has been reviewed. This states that there are no incidents of historical flooding within the site.
- 4.4. The previous section describes other flood hazards and the risk they pose to this project. A summary of the existing flood risk and the mitigation required is provided within Table 2 below.
- 4.5. Based on the previous section the overall assessment of the probability of flooding to the site is **LOW**.

Table 2 – Summary of existing flood risk and mitigation strategies

Flood Risk Source	Current Risk Level	Mitigation Requirement during detailed design	Risk Level following Mitigation
Tidal and Fluvial Flooding	LOW	Development areas are located in Flood Zone 1. No mitigation required.	LOW
Surface Water	MEDIUM	A positive sewage network will be designed for the site to direct flows from low lying areas into an attenuation system. This is expected to alleviate the potential surface water flooding within the existing service yard.	LOW
Groundwater	LOW	Development areas are located in Flood Zone 1. No mitigation required.	LOW
Sewer Flooding	LOW	Any flooding from UU sewers within the surrounding area due to blockages or following intense rainfall periods would be directed away from site as the development is located at a higher elevation than surrounding drains. Mitigation measures: • Ensure all proposed drainage is designed in accordance with best practices with an allowance for climate change. • Design proposed levels to direct surface water around buildings or structures that could form a barrier and away from building entrances.	LOW
Artificial Sources	LOW	The site is not at risk from any artificial sources according to the EA map 'Flood Risk from Reservoirs'.	LOW

5. Climate Change

- 5.1. NPPF Planning Practice Guidance website provides information on the impacts of climate change, which include sea level changes, river flash flooding and more frequent high intensity, short-duration rainfall. These are based on the Environment Agency current recommendations.
- 5.2. As concluded previously the risk of flooding from all sources is low. Therefore, these sources of flood risk are unlikely to be affected by climate change.

6. Detailed Development Proposals

- 6.1. The proposals are to construct a concrete yard for storage and distribution purposes on the brownfield site that was previously used as a service yard and soft landscaping. See Appendix A for the site location plan.
- 6.2. The proposed site layout within Appendix B shows the extents of the yard. The yard will be accessible via existing Leconfield Industrial Estate access roads.
- 6.3. Minor highway works are proposed to the existing private access roads to form an access. These works will be in accordance with the Civil Engineers details.
- 6.4. The current use means that the surface water drainage discharge rate will need to be kept as close as practicable to Greenfield rates as per the Cumbria County Council SuDS Adoption Guidance for Major Developments.
- 6.5. The proposed attenuation is to be designed to store surface water for rainfall events up to and including the 1 in 100 year with an allowance for climate change based on current Environment Agency recommendations. This volume will be based on the proposed impermeable surfaced area and the surface water discharge rate which is to be agreed with the Lead Local Flood Authority and the Environment Agency.
- 6.6. Further details of the proposed drainage works are available in the 'Drainage Philosophy' report (21T2034 – Drainage Philosophy 004 March 2022) by BGP that is submitted as part of this planning application.

7. Flood Risk Management Measures

As stated in previous sections, the site is at low risk of flooding from tidal, fluvial, sewer, overland, groundwater and artificial sources post development. All impermeable areas will be positively drained via a suitable drainage system.

Surface water attenuation will be provided within the proposal to accommodate the 1 in 100 year storm, with an allowance for climate change based on current Environment Agency recommendations.

8. Off Site Impacts

The proposals for this site should not increase the flood risk elsewhere off site for the following reasons: -

- The proposed surface water discharge rate will be restricted as close as reasonably practicable to Brownfield runoff rates and agreed with the Lead Local Flood Authority and Environment Agency.
- The impermeable areas within the site will be positively drained via a proposed drainage network.
- The site will allow extreme rainfall event flow routes to pass along the site perimeter, retaining flora and fauna.

9. Residual Risks

Recommendations have been made within Section 7 to mitigate against any flood sources that pose any significant risk to the proposed site. All sources of flooding have been considered and the conclusion is that any residual risks are negligible.

10. Conclusions

From the analysis through it can be seen that the risk to the proposed storage and distribution yard on the brownfield land within Leconfield Industrial Estate is **LOW** from all forms of flooding following mitigation as categorised in the Framework and Technical Guidance. This confirms the flood designation for the site.

The proposed uses of land are appropriate in this Flood Zone. (Tables 1, 2 & 3 of the Technical Guidance).

This report has been prepared with reference to the information available at the time of writing. The summary and recommendations may be revised upon receipt of additional or further information.

Report No: CMIQ-BGP-01-XX-RP-C-FRA004

Report Title: Flood Risk Assessment – Cleator Moor Innovation Quarter - BOC Yard

James Herbert – Design Engineer
Date: 04/03/2022

Jim Conway – Director
Date: 04/03/2022

For and on behalf of Billinghurst George & Partners



Appendix A

Site Location Plan



- DO NOT SCALE -



Issued for Planning	JJH	P01	JC	04.03.2022
AMENDMENT	BY	REV	CHK	DATE
Rev P = Preliminary T = Tender C = Construction LCI = Last Construction Issue				
In instances where this drawing completes or partly completes a contract, Billinghurst George & Partners will consider that it's product has been validated, unless in a period not exceeding 90 working days, the client advises to the contrary.				

Client Copeland Borough Council		Drawn JJH	Date March 2022	Checked JC	Date March 2022	Size A3	Scale 1:5000	Class. 90.4	Rev. P01
Project Cleator Moor Innovation Quarter - BOC Yard	Project No. 21T2034	Location CMIQ	Originator BGP	Volume 04	Level XX	Type DR	Role C	Unique No. 04100	
Drawing Title Site Location Plan		File Reference CMIQ-BGP-04-XX-DR-C-90.4-04100							



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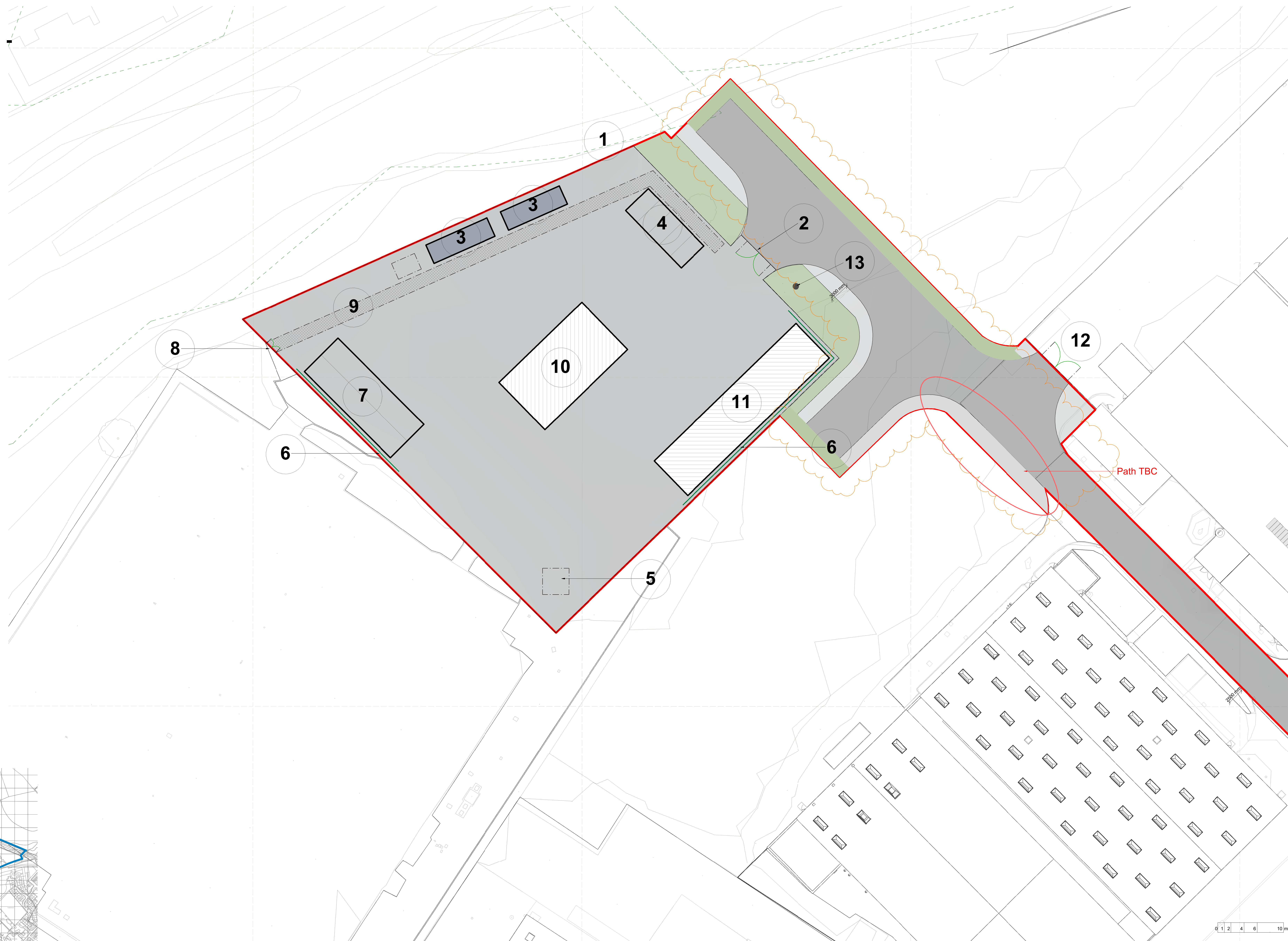
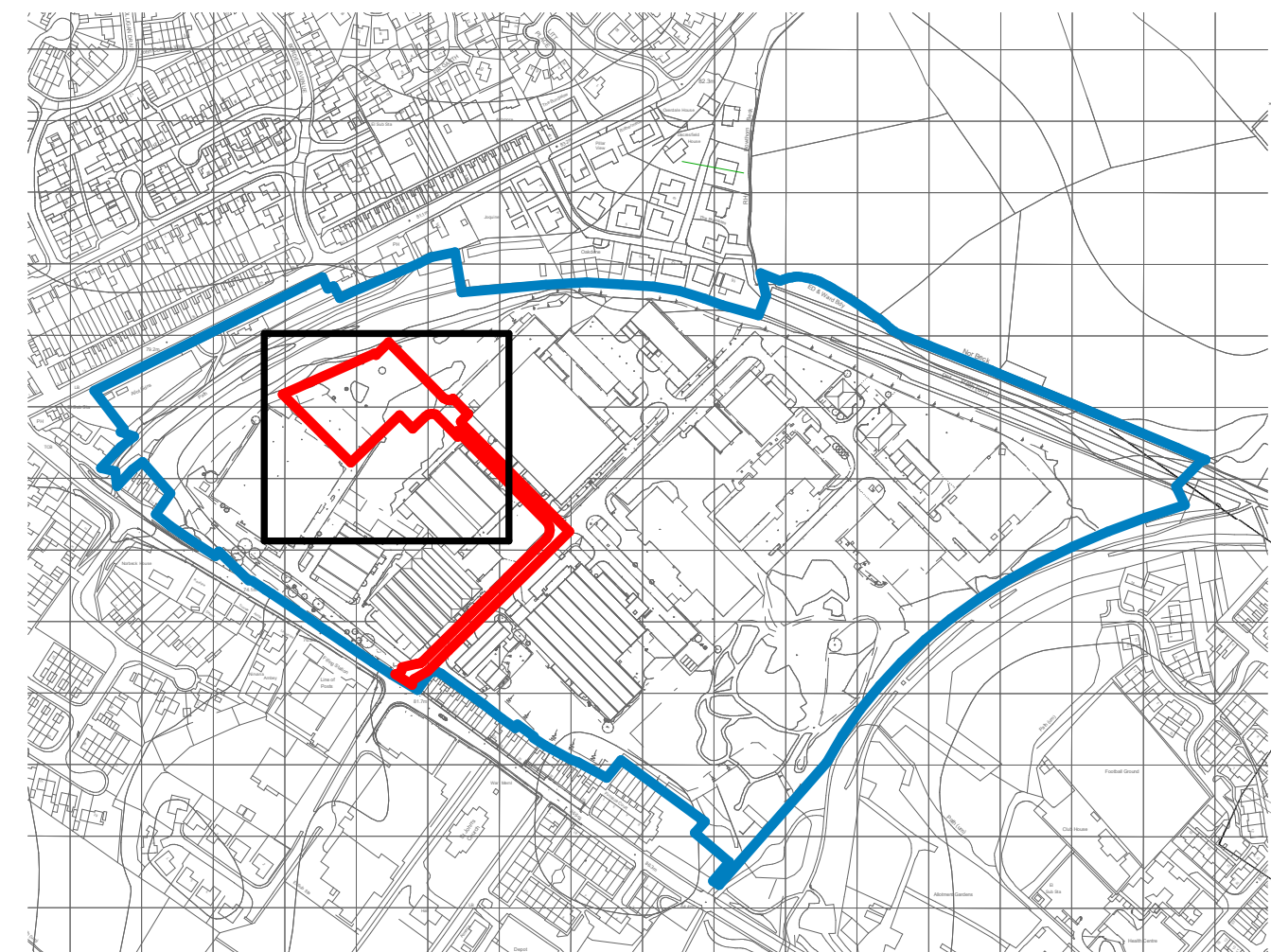


Appendix B

Proposed Site Layout

- APPLICATION BOUNDARY
 ADDITIONAL LAND UNDER COUNCIL OWNERSHIP
 GRASS
 HARDSTANDING / FOOTPATH
 ROAD

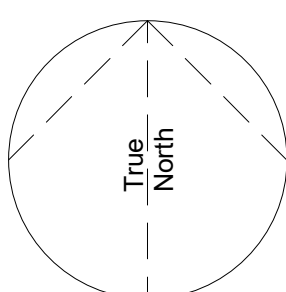
- 1. Perimeter Fencing -**
2.4m high Lochrin Bain
Combi Palisade Fencing with
3mm 'D' section Single
Pointed Tops Galvanised
Fencing
- 2. Main Gates -**
2.4m high, Double Leaf
Vehicle Gate
- 3. New Portakabins -**
(32ftx10ft) to be provided by
BOC
- 4. Car Parking -**
Showing 5 car parking
spaces
- 5. Gas Cylinder Location**
- 6. Rubberised Kerb**
- 7. Lorry Parking -**
Showing 2 lorry parking
spaces
- 8. Emergency Access Gate**
- 9. Pedestrian Walkway**
- 10. Loading area**
- 11. Cylinder sorting and
Storage area**
- 12. Relocated Existing Gate -**
fence to be re-positioned to
sit next to the building.
- 13. Totem Sign Location**



Constructors must only work to figured dimensions which are to be checked on site. Do not scale from hard copy drawings.

[illegible]

North Arrow



THIS DRAWING IS SUBJECT TO ALL VARIATIONS BY: ENGINEER AND CONTRACTOR. ENGINEERING DESIGN, CONFIRMATION OF BOUNDARIES, EASEMENTS AND COVENANTS, FLOOD RISK ASSESSMENT, SERVICES UTILITIES, TOPOGRAPHICAL SURVEY, VERIFICATION ASSESSMENT, STRUCTURAL ASSESSMENT, PLANNING / BUILDING CONTROL AND HIGHWAYS APPROVALS. NOT THESE ADDITIONAL REQUIREMENTS NOR EXHAUSTIVE.

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Drawn JS	Date 21-12-21
Checked DS	Date 21-12-21
Scale As indicated @ A0	

Drawing No.	Rev
CMIQ-NOR-BOC00-DR-A-90002	P06



Appendix C

Environment Agency Flood Maps

Flood map for planning

Your reference
BOC Yard

Location (easting/northing)
301400/515601

Created
16 Dec 2021 8:16

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

This means:

- you don't need to do a flood risk assessment if your development is smaller than 1 hectare and not affected by other sources of flooding
- you may need to do a flood risk assessment if your development is larger than 1 hectare or affected by other sources of flooding or in an area with critical drainage problems

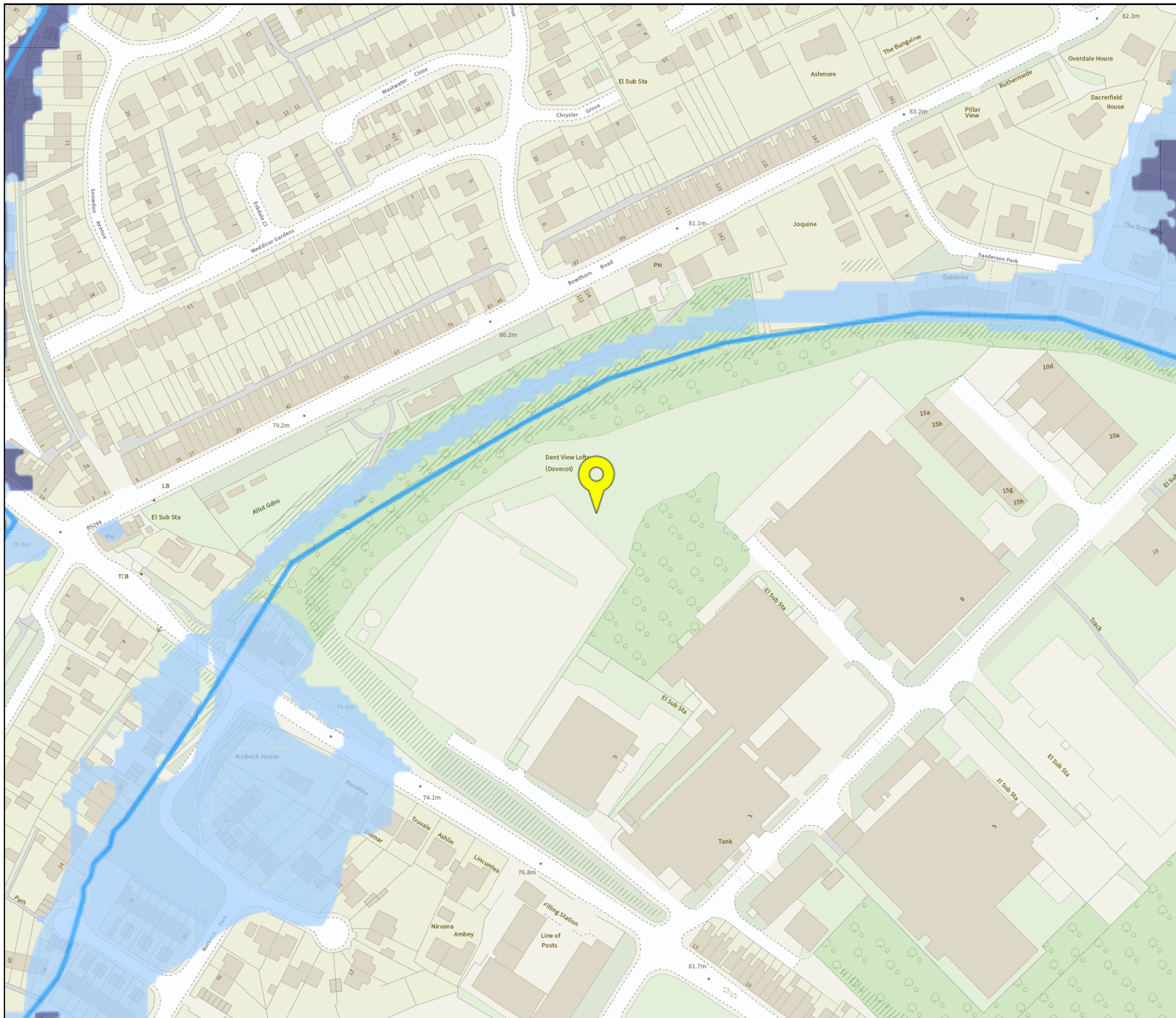
Notes

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
BOC Yard

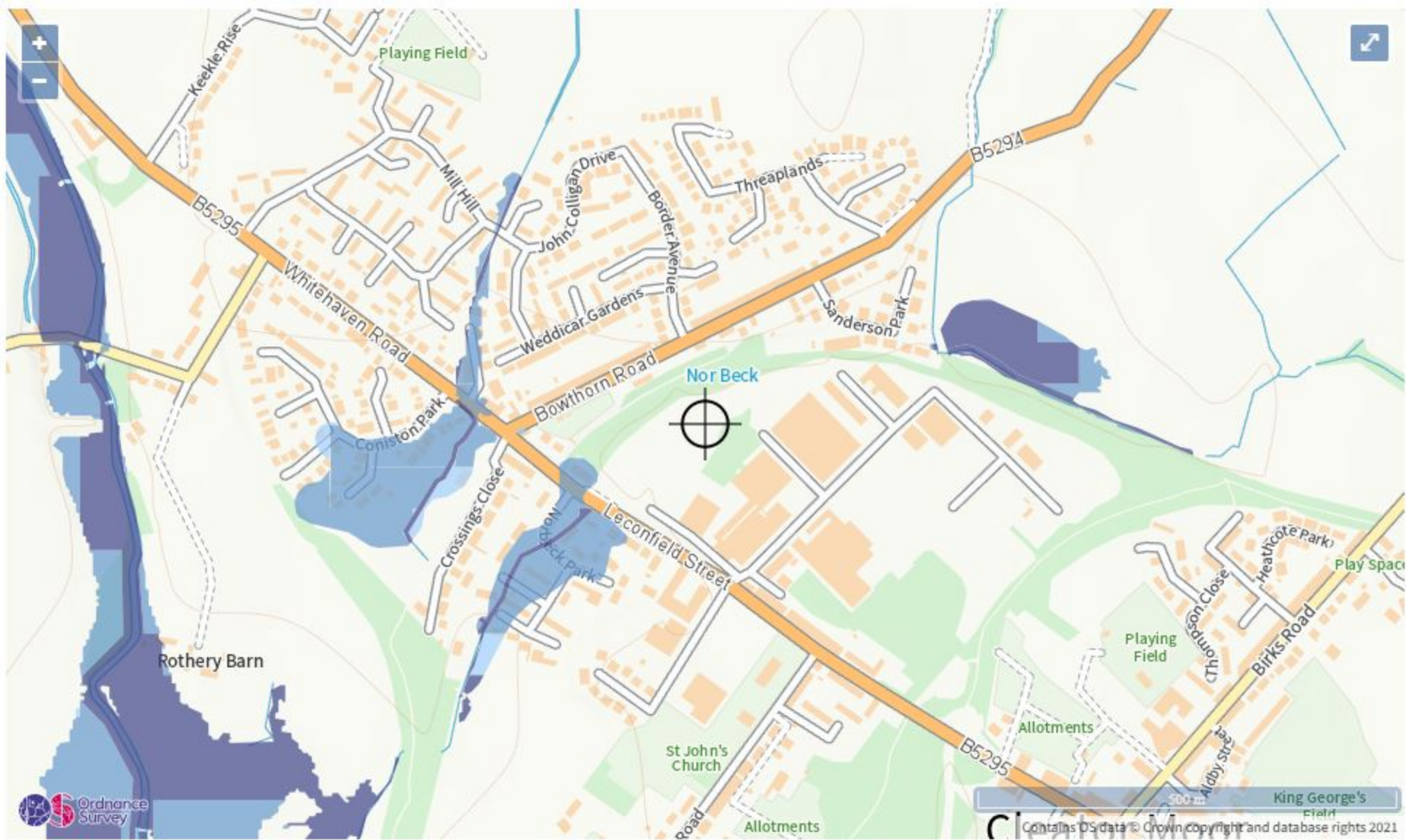
Location (easting/northing)
301400/515601

Scale
1:2500

Created
16 Dec 2021 8:16

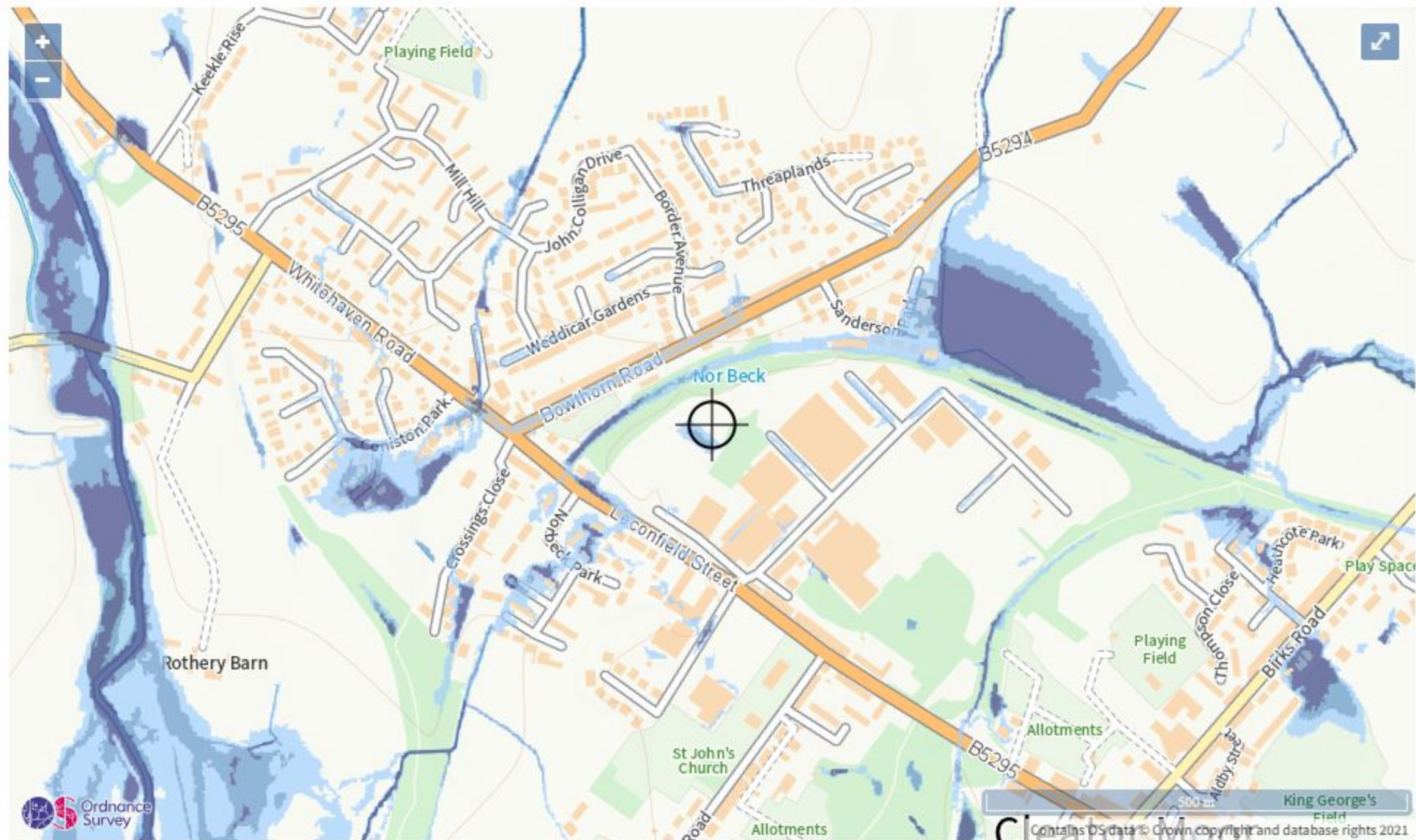
-  Selected point
-  Flood zone 3
-  Flood zone 3: areas benefitting from flood defences
-  Flood zone 2
-  Flood zone 1
-  Flood defence
-  Main river
-  Flood storage area


0 20 40 60m



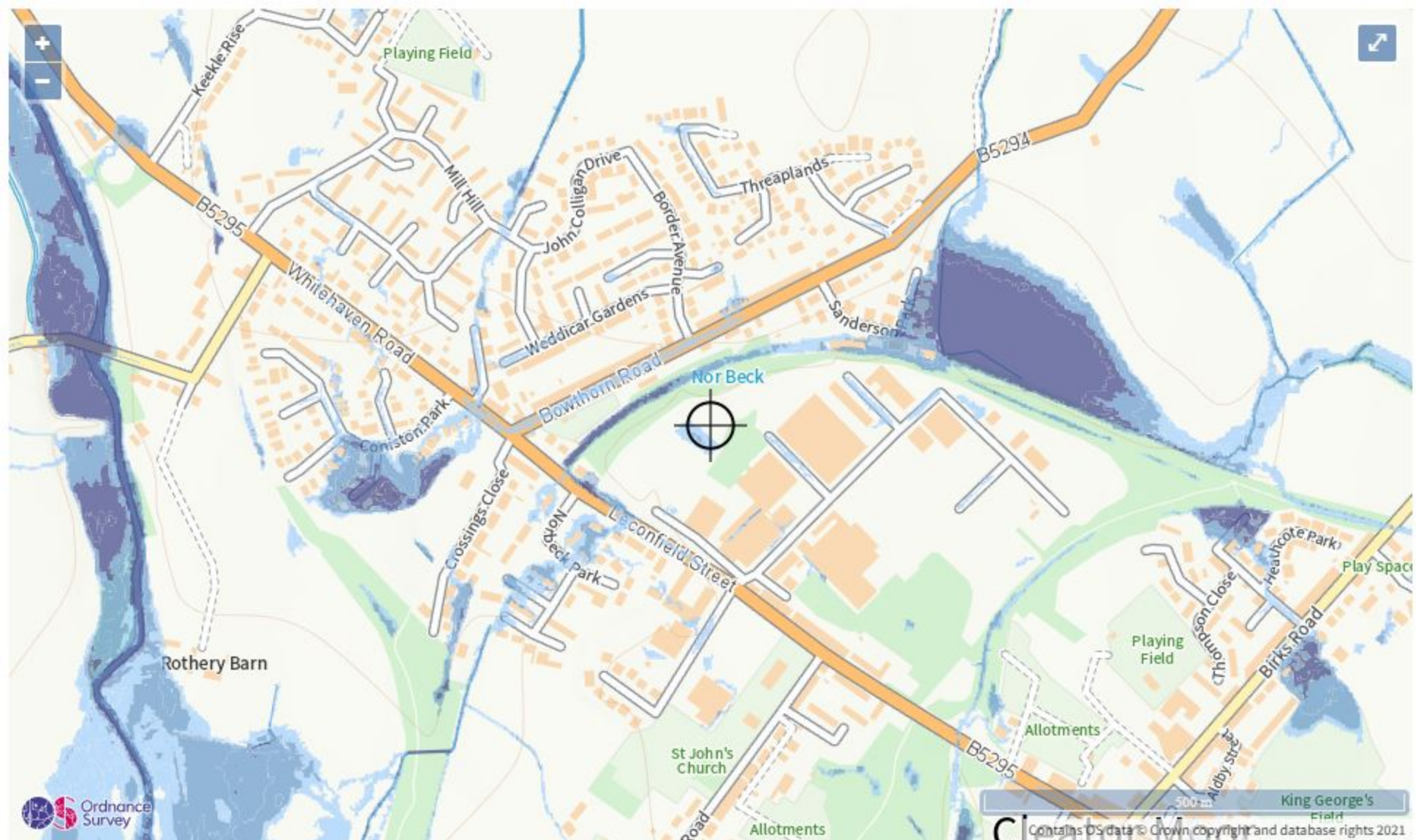
Extent of flooding from rivers or the sea

High **Medium** **Low** **Very low** Location you selected



Extent of flooding from surface water

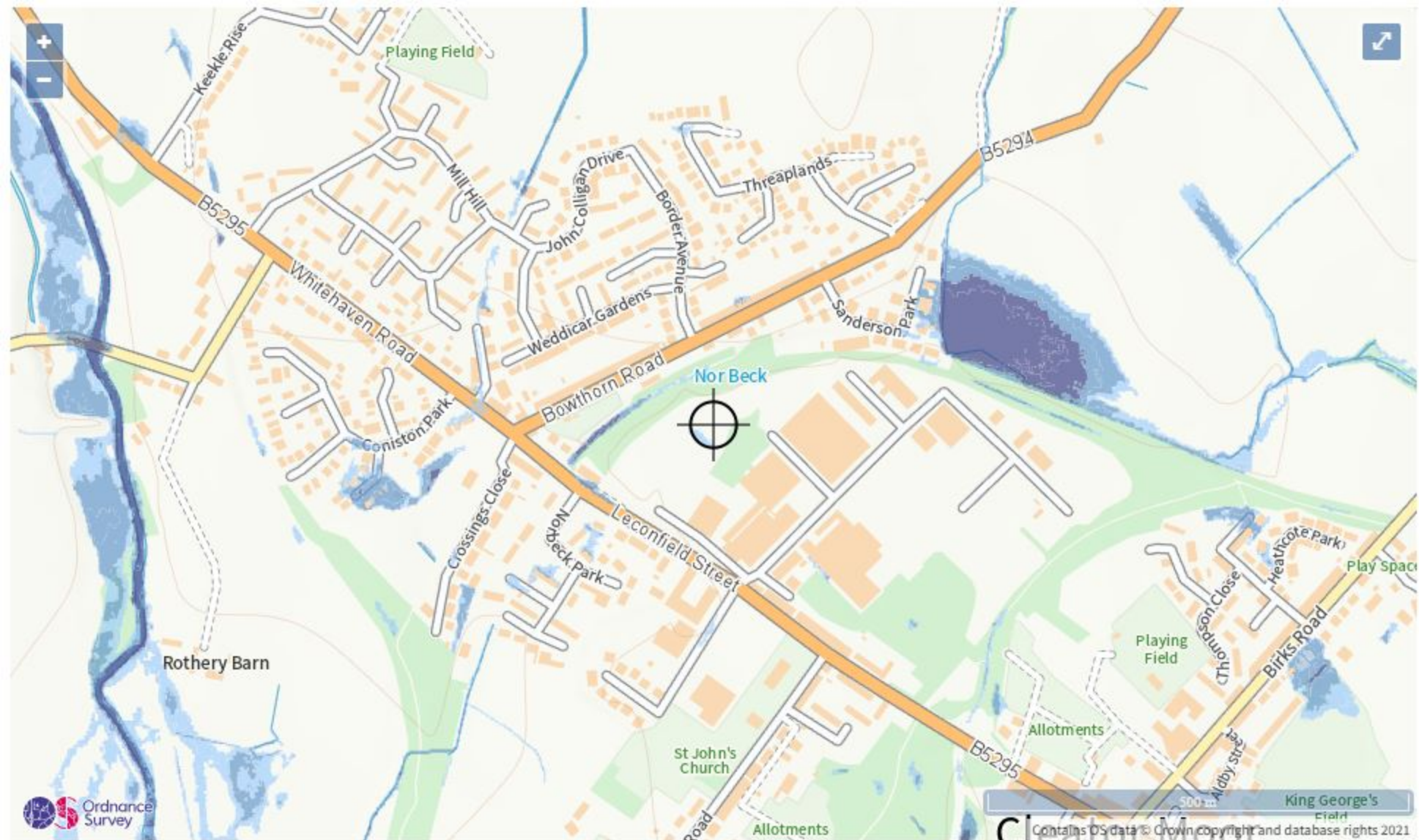
High Medium Low Very low Location you selected



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

Flood depth (millimetres)

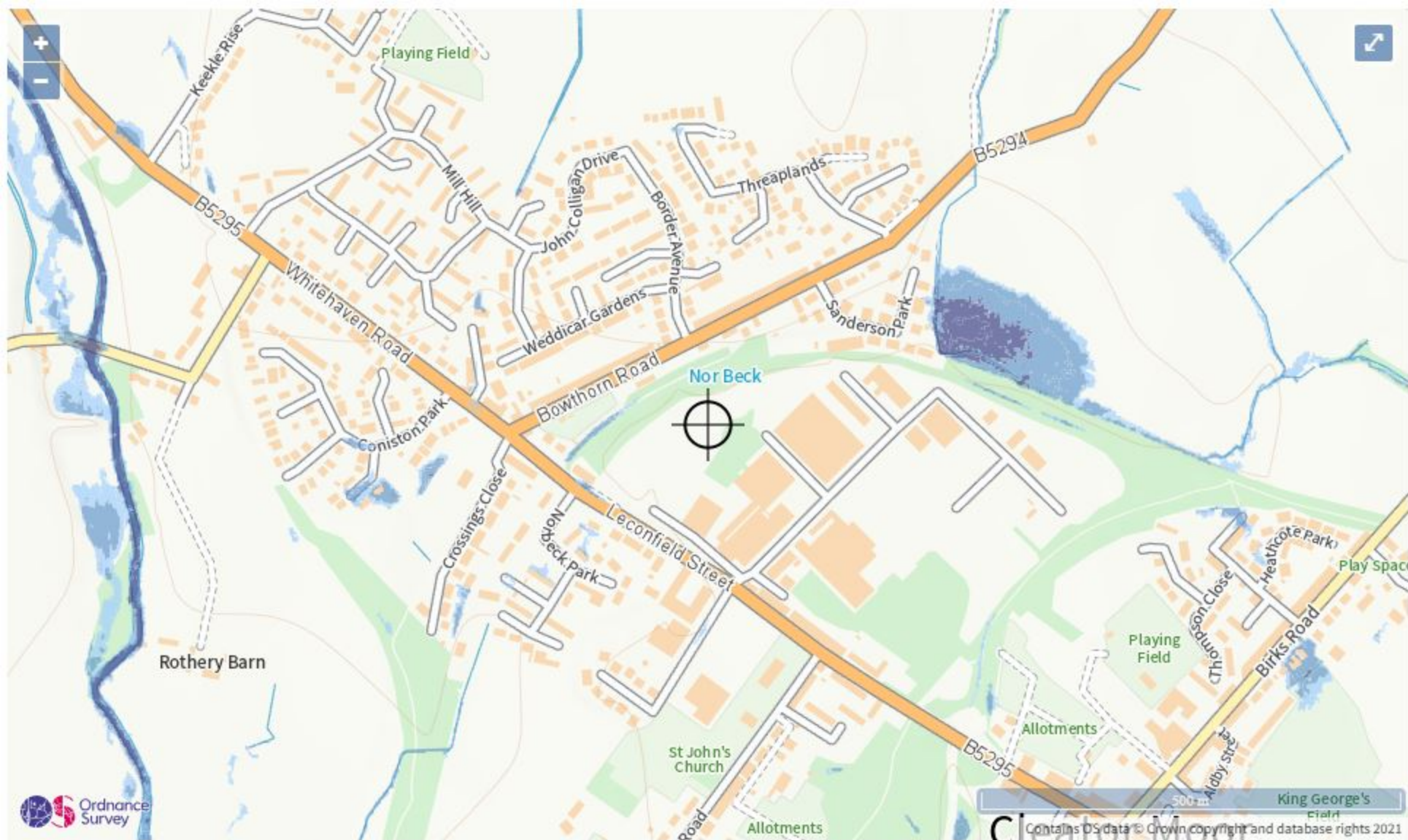
Over 900mm 300 to 900mm Below 300mm Location you selected



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

Flood depth (millimetres)

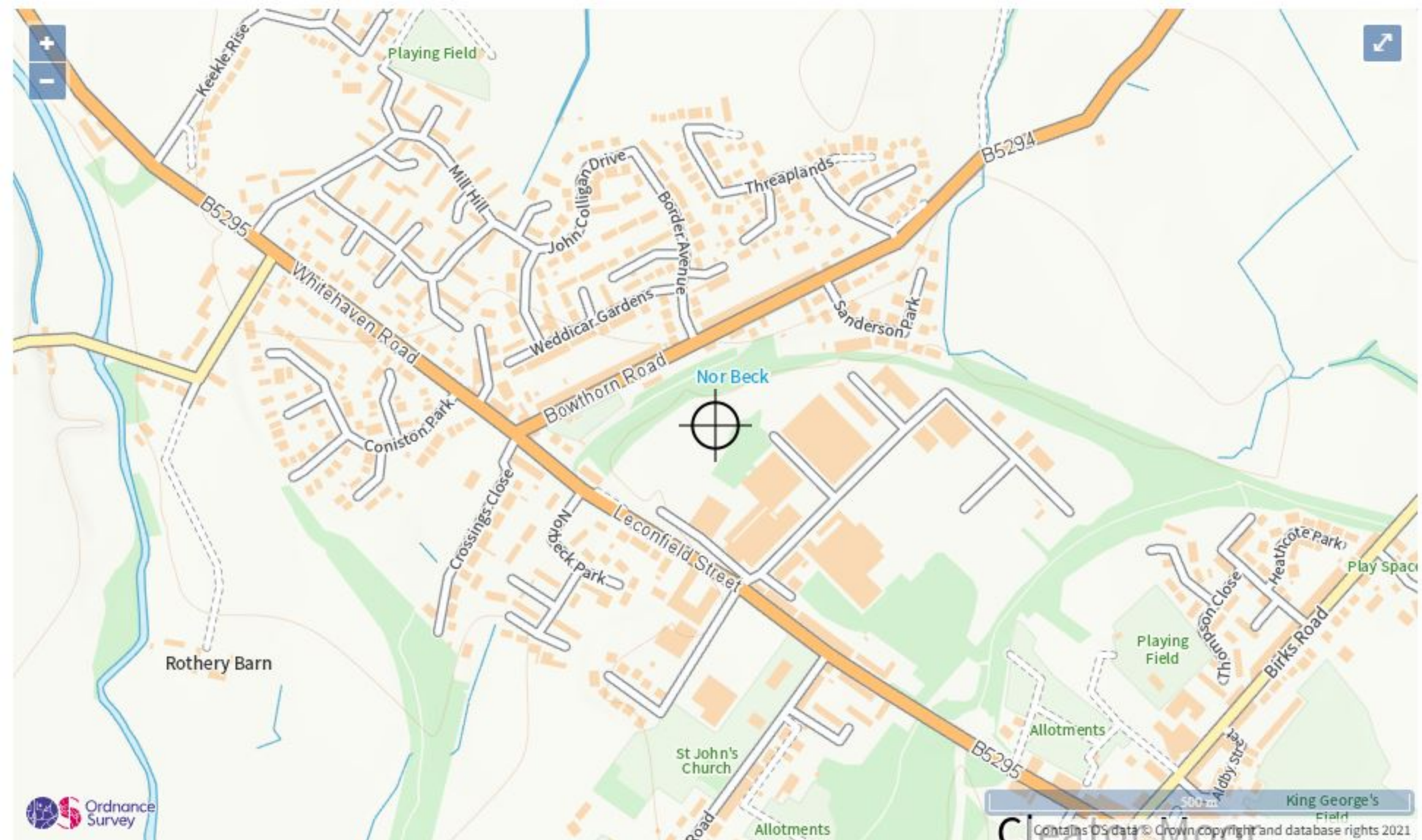
Over 900mm 300 to 900mm Below 300mm Location you selected



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

Flood depth (millimetres)

Over 900mm 300 to 900mm Below 300mm Location you selected



Maximum extent of flooding from reservoirs:

when river levels are normal when there is also flooding from rivers Location you selected



Appendix D

United Utilities Drainage Records



Water for the North West

SEWER RECORDS

Address or Site Reference

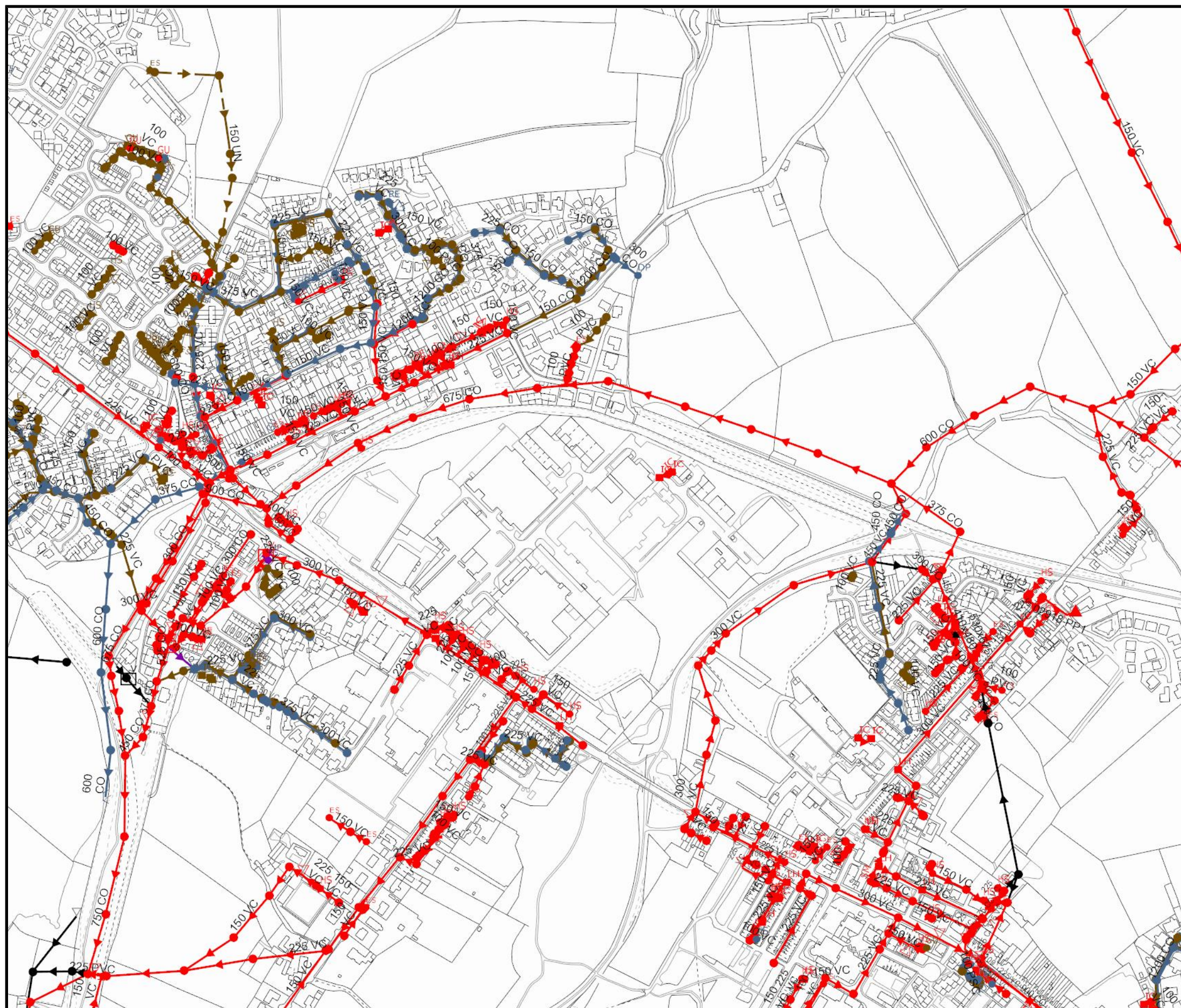
CAPITAL ALUMINIUM
EXTRUSIONS LTD LECONFIELD
INDUSTRIAL ESTATE,
CLEATOR MOOR,
CA25 5QB

Scale: 1:5000
Date: 21/09/2021

Printed by: Property Searches

The position of the underground apparatus shown on this plan is approximate only and is given in accordance with the best information currently available. United Utilities Water will not accept liability for any loss or damage caused by the actual position being different from those shown.

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Ordnance Survey 100022432. Unauthorised
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Appendix E

Topographic Survey



Appendix F

Reference Documents List

The National Planning Policy Framework (March 2012)	Communities and Local Government
The Technical Guidance to the NPPF (March 2012)	Communities and Local Government
Flood Risk Assessment Guidance Note 1	Environment Agency
Copeland Level 1 SFRA	JBA