Flood Risk Assessment

21T2034 – Cleator Moor Innovation Quarter - Hub Building
CMIQ-BGP-05-XX-RP-C-FRA005

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Flood Risk Assessment

Project: Cleator Moor Innovation Quarter – Hub Building

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	23/03/2022	Planning	JC

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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 new hub building with associated car parking on the brownfield site that was previously used as a storage yard. The Hub will be a community space that brings together different uses to create natural meeting opportunities for people across the wider site. Uses may potentially include café-bar, lecture theatre, offices and development workshop spaces.

1.4. To support the planning application the BGP Drainage Philosophy (005) 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: 301842, N: 515530

2.1.4 National Grid Reference: NY018155

2.2. Site Description

2.2.1 Site Area: 1.785 Ha

2.2.2 Site Area to be developed: 1.25 Ha

2.2.3 Existing Land Use: Storage Yard

2.2.4 Proposed Land Use: Hub Building and Car parking

2.2.5 Local Planning Authority: Copeland Borough Council

2.2.6 Sewer Undertaker: United Utilities (UU)

2.2.7 At approximately 1.785 Ha in size the Brownfield site is located approximately 5.15km southeast of Whitehaven and approximately 18km southwest of Cockermouth. The site currently comprises existing service yards, old building footprints and part soft landscaping. The site is bound by woodland and grass to the northern, eastern and southern boundary, existing industrial buildings and demolished building footprints 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 the hub building 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 83.1m AOD to 82.9m 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 50m north of the site. Through CCTV investigation it is evident that it is culverted at a point northwest of site and runs southwest into Leconfield Industrial Estate and through to Leconfield Street. Nor Beck culvert continues southwest 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.

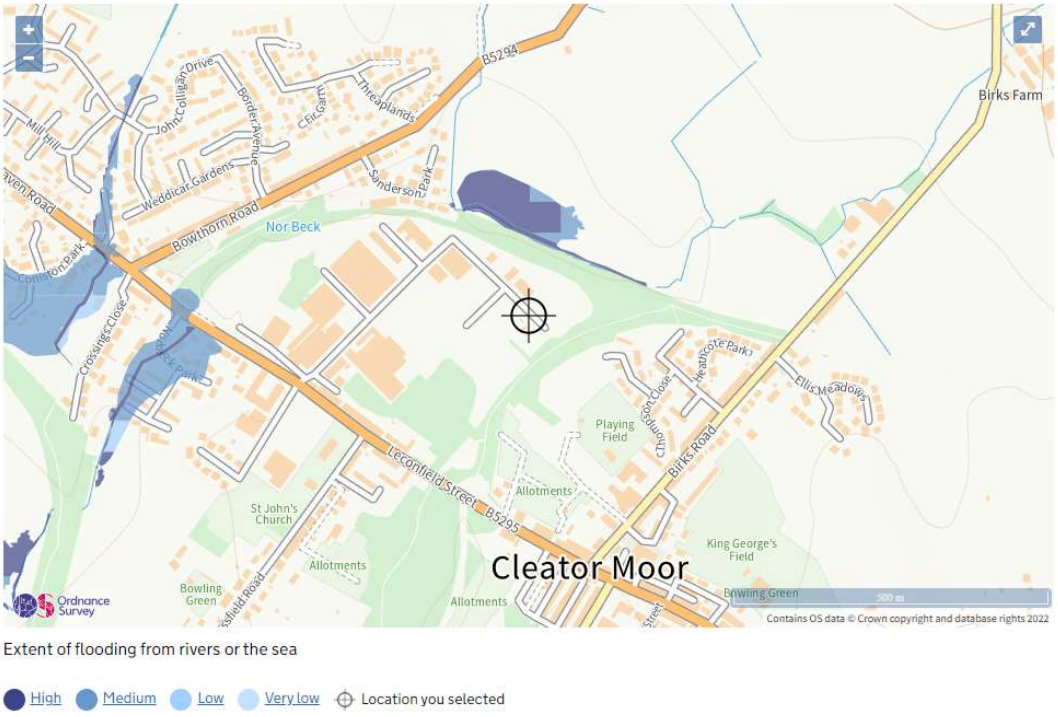

Figure 1 – Environment Agency Flood Map for Planning

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.

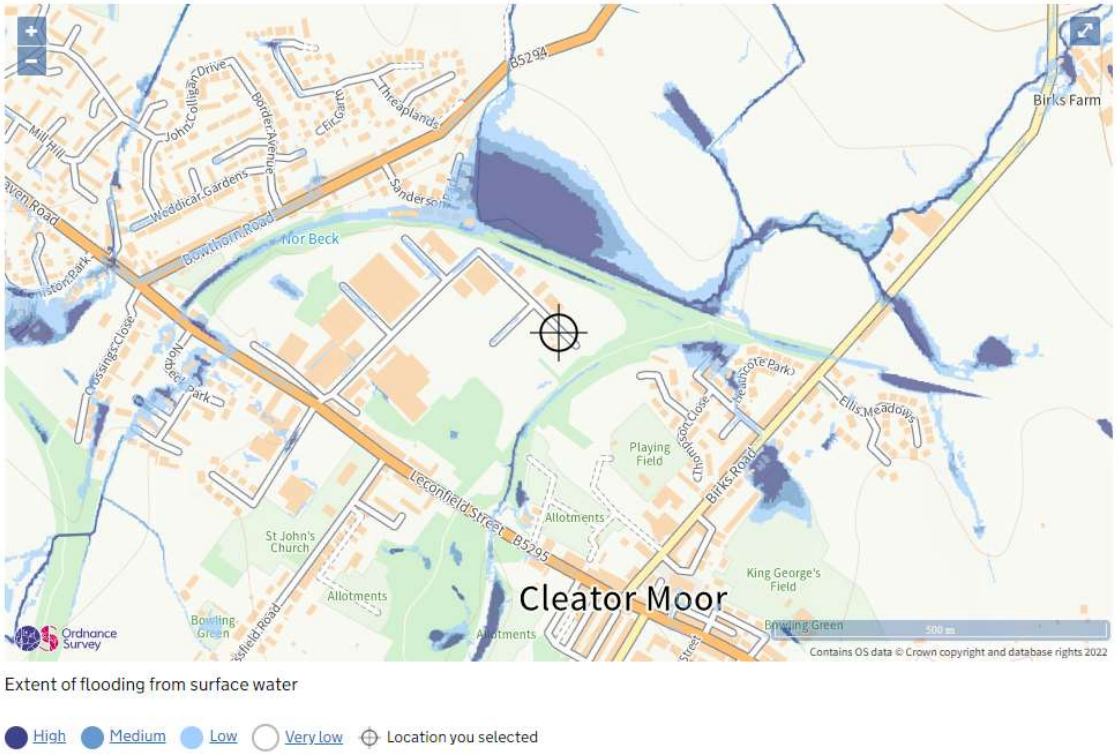

Figure 2 – Environment Agency Surface Water Flooding Map for Planning

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 areas of 'Low' risk evident within the existing site access road.

The site is relatively flat at an approximate level of between 83.1m and 82.9m AOD, falls existing within the existing storage yard to provide drainage falls to gullies.

The low risk area's of surface water flooding indicated within Figure 2 are as mentioned along the existing access road where gullies are located at low points. This level of surface water flooding likely occurs due to gullies not being maintained. It is anticipated that through the development of the site, cleaning of gullies and introduction of positive drainage systems throughout that these areas 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 2 Site Investigation' has been carried out by Solmek dated March 2022. (Report No. S220141). This has been carried out as part of the wider Leconfield Industrial Estate development. Exploratory locations BH07, BH08, BH09, TP13, TP14, TP15 and TP16 were investigated within the new hub building and car parking site boundary.

Made ground was relatively uniform across the site and was only penetrated within the boreholes, proven to a minimum depth of 1.30mbgl (BH06) and a maximum depth of 10.20mbgl (BH03). The made ground consisted of a variable surface covering generally of topsoil but locally comprising concrete or tarmac. This was then generally underlain by slag, initially in a granular form locally mixed with other granular materials (ash, brick, sandstone, clinker). This was in turn underlain by a fused slag which the excavator was unable to excavate through. Standard Penetration Tests within the slag each yielded N values of 50+ (refusal).

Infiltration testing was carried out within TP01 and TP03, the results of which are unavailable. In terms of the new hub development area 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 225-300mm diameter combined sewers drain from southeast to northwest along Leconfield Street in keeping with the topography of the highway.

A United Utilities 600mm diameter combined sewer is located just beyond the north western boundary, which drains southwest.

The overall existing site is currently served by wastewater systems through an existing network of separate private sewers. The surface water run off from the site currently discharges to the culverted Nor Beck watercourse in two locations, one to the west and the other to the northwest of the development site. The foul water flows from the site currently discharge to the existing 675mm diameter United Utilities sewer located to the west of site.

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	LOW	Development areas are located in Flood Zone 1. No mitigation required.	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 hub building with associated car parking on the brownfield site that was previously used as a storage yard. See Appendix A for the site location plan.

6.2. The proposed site layout within Appendix B shows the extents of the new building and car parking. The car park and building will be accessible via existing Leconfield Industrial Estate access roads.

6.3. The current use means that the surface water drainage discharge rate will need to be kept as close as practicable to Brownfield rates as per the Cumbria County Council SuDS Adoption Guidance for Major Developments.

6.4. 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 due to surface water being discharged to a watercourse.

6.5. Further details of the proposed drainage works are available in the 'Drainage Philosophy' report (21T2034 – Drainage Philosophy 005 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 hub building and car parking 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-05-XX-RP-C-FRA005

Report Title: Flood Risk Assessment – Cleator Moor Innovation Quarter – Hub Building

James Herbert – Design Engineer
Date: 23/03/2022

Jim Conway – Director
Date: 23/03/2022

For and on behalf of Billinghurst George & Partners

Appendix A

Site Location Plan

- DO NOT SCALE -

Issued for Planning	JJH	P01	JC	23.03.2022
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 - Hub	**Project No.** 21T2034	**Location** CMIQ	**Originator** BGP	**Volume** 05	**Level** XX	**Type** DR	**Role** C	**Unique No.** 05100	
Drawing Title Site Location Plan		**File Reference** CMIQ-BGP-05-XX-DR-C-90.4-05100							

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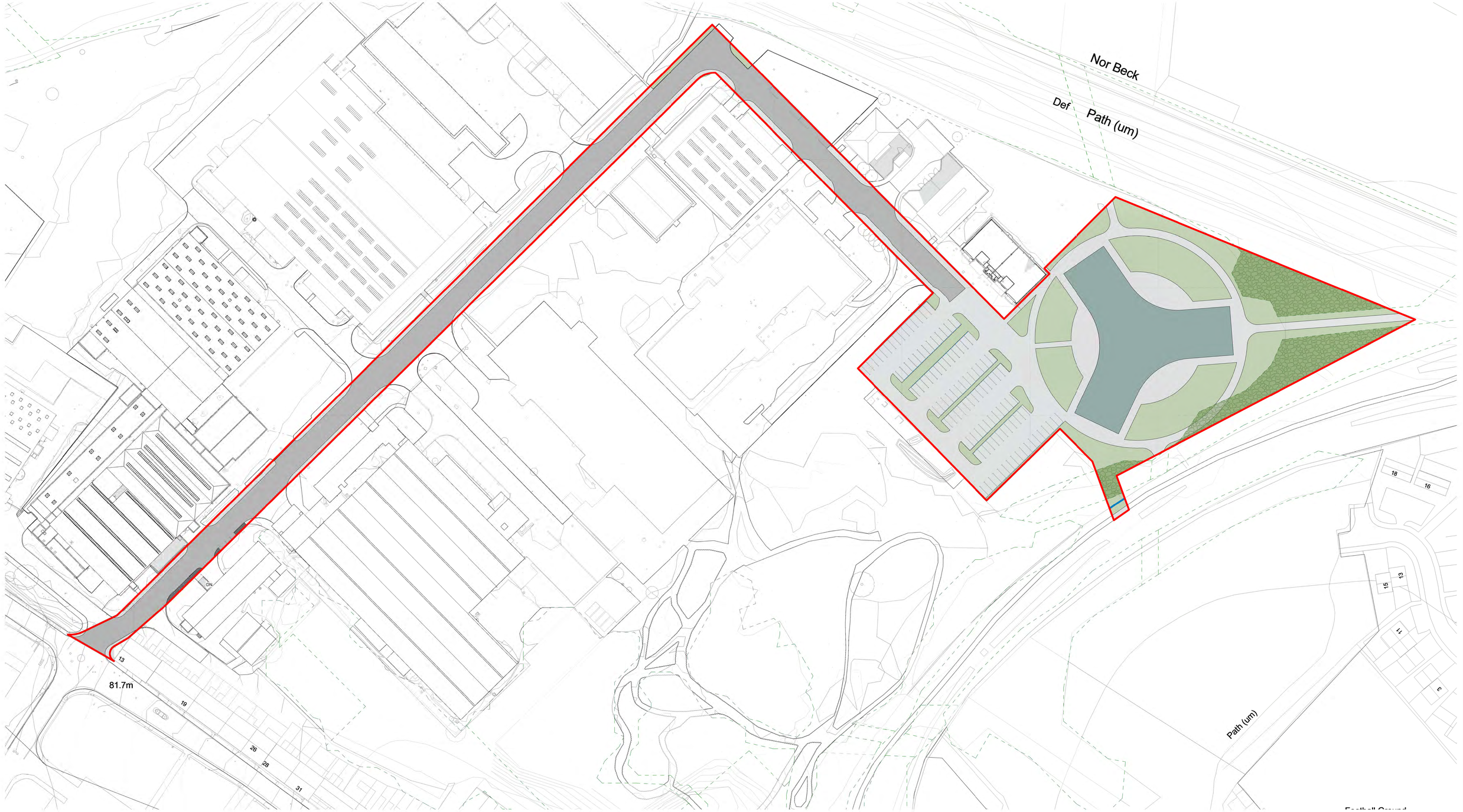
Appendix B

Proposed Site Layout



PROPOSED PLAN

SCALE: 1 : 500

- APPLICATION BOUNDARY
- ADDITIONAL LAND UNDER COUNCIL OWNERSHIP

Layout depicted represents a possible site layout to indicate a potential site use

- GRASS
- EXISTING TREES
- HARDSTANDING / FOOTPATH
- ROAD
- POTENTIAL BUILDING FOOTPRINT

0 2 4 6 10 20 m

DATE	REVISION	REV	DR	CH
20/01/22	REVISION 1	P01	JS	DS
04/03/22	AMENDED RED LINE	P02	JS	DK

Keyplan

North Arrow

True North

Consultants

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SET OFFICE INFORMATION

www.norr.com

Client Name: COPELAND BOROUGH COUNCIL

Project: CLEATOR MOOR INNOVATION QUARTER (HUB)

Drawing Title: SITE - PROPOSED PLAN

Drawn: JS	Date: 21-12-21	Sheet Status: S3 - FOR REVIEW	
Checked: DS	Date: 21-12-21	Project No.: IANC21-0043	
Scale: As indicated @ A0		Drawing No.: CMIQ-NOR-HUB-ZZ-DR-A-90002	Rev: P02

Appendix C

Environment Agency Flood Maps

Flood map for planning

Your reference	Location (easting/northing)	Created
<Unspecified>	**301798/515516**	**21 Mar 2022 16:10**

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.

Environment Agency

Flood map for planning

Your reference
<Unspecified>

Location (easting/northing)
301798/515516

Scale
1:10000

Created
21 Mar 2022 16:10

- 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

0 100 200 300m

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)

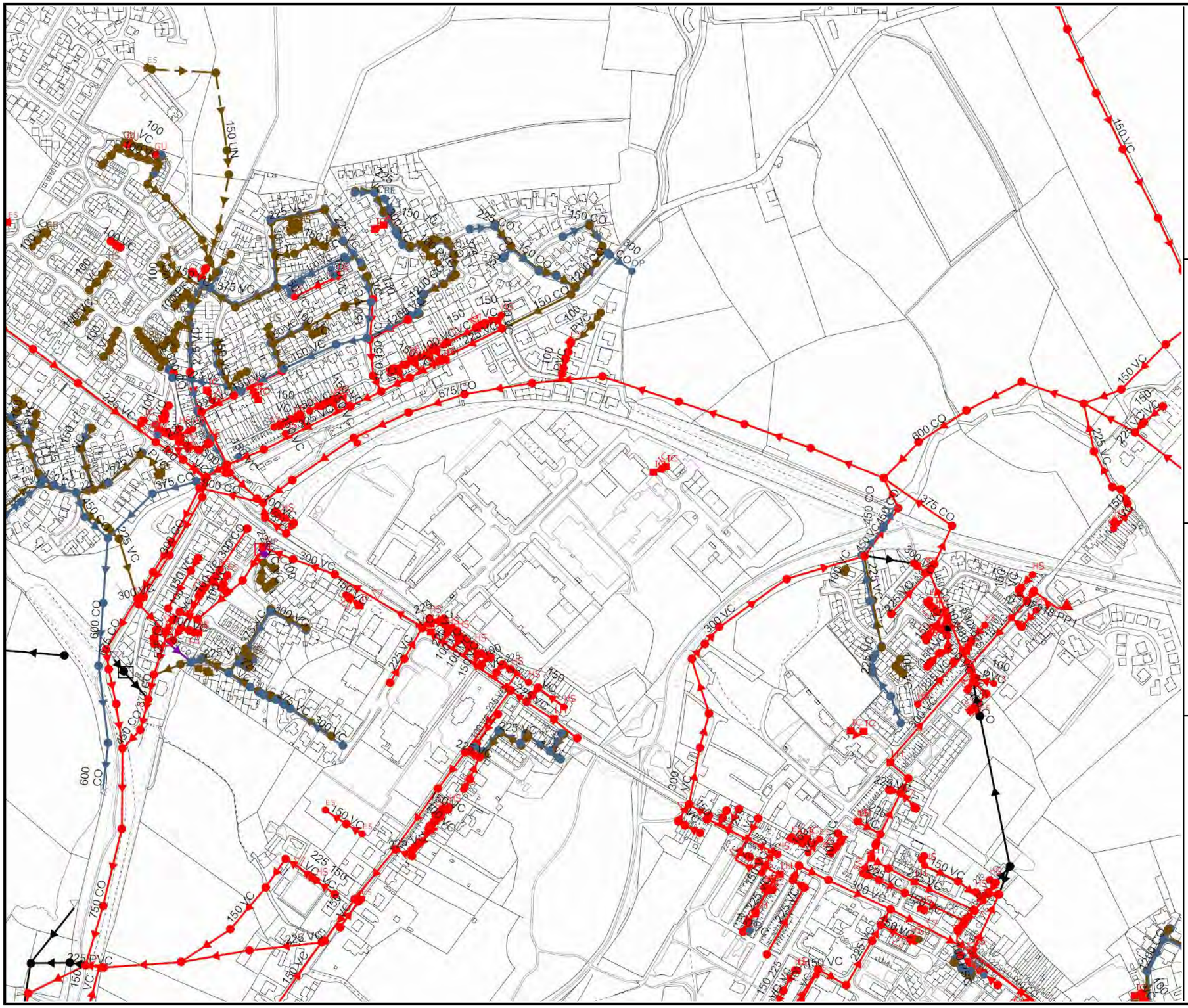
Over 900mm | 300 to 900mm | Below 300mm | Location you selected

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



United Utilities

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.

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