



Drainage Philosophy

21T2034 – Cleator Moor Innovation Quarter – Area 3

CMIQ-BGP-02-XX-RP-C-DP002

Billingham George & Partners

Civil & Structural Engineers, Building Surveyors

Wellington House, Wellington Court, Preston Farm, Stockton-on-Tees, TS18 3TA

T: 01642 876 470 E: consulting@bgp-teesside.co.uk  @BGPconsulting



Drainage Philosophy

Project: Cleator Moor Innovation Quarter – Area 3

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	05/11/2021	First Draft	JC
002	23/03/2022	Planning	JC

This document has been prepared solely as a Drainage Strategy for Copeland Borough Council regarding the proposed scheme on land off Bowthorn Road, 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.

Contents

1. Executive Summary / Project Background
2. Existing Site and Drainage
3. Proposed Site Description
4. Review of Surface Water Discharge Hierarchy
5. Proposed Surface Water Drainage Strategy
6. Proposed Foul Water Drainage Strategy
7. Conclusion

Appendices

Appendix A	Site Location Plan
Appendix B	Proposed Site Layout
Appendix C	Topographic Survey
Appendix D	United Utilities Sewer Records
Appendix E	Microdrainage Calculations
Appendix F	Proposed Drainage Philosophy Plans
Appendix G	Borehole Records
Appendix H	Flood Maps for Planning
Appendix I	United Utilities, LLFA and EA Predevelopment Correspondence

1. Executive Summary / Project Background

- 1.1. This Drainage Philosophy has been prepared to supplement the Proposed Drainage Scheme for planning for the proposed development on land off Bowthorn Road, Cleator Moor, Cumbria. See Appendix A for the site location plan.
- 1.2. The proposals are to construct light industrial, general industrial and storage and distribution units on the greenfield site that was previously used as agricultural grazing land.
- 1.3. United Utilities (UU) records have been obtained and the Cumbria SuDS Design Guidance has been followed.
- 1.4. A hierarchy for the appropriate disposal of surface water is included within Building Regulations Part H3 which states the following:

"Rainwater from a system provided ... shall discharge to one of the following, listed in order of priority:

- 1) *An adequate soakaway or some other adequate infiltration system; or, where this is not reasonably practicable,*
 - 2) *A watercourse; or, where that is not reasonably practicable,*
 - 3) *A surface water sewer.*
 - 4) *A combined sewer.*
- 1.5. The following Drainage Philosophy addresses each element of the above hierarchy and details how the surface water and foul water will be discharged from site.
- 1.6. BGP have prepared this report based on the current information available. This report is subject to change should new information be presented.

2. Existing Site & Drainage

2.1. Site Location

- 2.1.1 Site Name: Leconfield Industrial Estate
- 2.1.2 Site Address: Land off Bowthorn Road, Cleator Moor
- 2.1.3 OS Grid Reference: E: 301854, N: 515384
- 2.1.4 National Grid Reference: NY018153

2.2. Site Description

- 2.2.1 Site Area: 13.3 Ha
- 2.2.2 Existing Land Use: Agricultural grazing land
- 2.2.3 Proposed Land Use: Light industrial, general industrial and storage and distribution units
- 2.2.4 Local Planning Authority: Copeland Borough Council
- 2.2.5 Sewer Undertaker: United Utilities (UU)
- 2.2.6 At approximately 13.3 Ha in size the Greenfield site is located approximately 5.15km southeast of Whitehaven and approximately 18km southwest of Cockermouth. The site is currently an overgrown greenfield. The site is bound by fields to the north and eastern boundary, residential development to the south and Nor Beck to the west.

2.3. Site Levels

- 2.3.1 There is no available topographic survey for Area 3, as such Defra Lidar Survey data has been obtained. This can be viewed in Appendix C.
- 2.2.7 From the Defra Lidar Survey Data information available, Area 3 (southeast of Nor Beck) varies in level throughout. The level to the eastern boundary is approximately 87.0m AOD, this falls to the north-western extent adjacent Nor Beck at a level of 79.0m AOD. This equates to a gradient of approximately 1 in 25. The level from northern to southern extent is relatively level.
- 2.2.8 Area 3 (northwest of Nor Beck) varies in level throughout, with a gradual mound located towards the eastern extent adjacent Nor Beck. The highest point of this mound is 84.0m AOD, this falls southeast toward Nor Beck at a level of 79.0m AOD. This equates to a gradient of 1 in 19. The northern boundary adjacent Bowthorn Road varies significantly, falling from east to west from 85.0m AOD to 76.0m AOD. This equates to a gradient of 1 in 31. A large expanse of Area 3 is relatively level at 76.0m AOD to the southwestern boundary adjacent Nor Beck and Bowthorn Beck.

2.4. Existing Watercourses

- 2.4.1 The nearest named watercourse is Nor Beck, which is located to the sites southwestern boundary running from east to west through the site then along the southwestern boundary where it converges with Bowthorn Beck and is culverted. From the point it converges it is culverted and drains west through Area 1 then south ultimately converging with the River Keekle.
- 2.4.2 A further watercourse is located to the northwestern boundary, Bowthorn Beck. This drains north into site and west where it converges with Nor Beck.
- 2.4.3 There are no other named or unnamed watercourses within close proximity to site.

2.5. Existing Public and Private Drainage

- 2.4.4 See Appendix D for locations of existing United Utilities public drains.
- 2.4.5 A series of United Utilities combined drains and manholes are located throughout the site adjacent Nor Beck. Two combined sewers enter through the western boundary and one through the eastern boundary, they converge adjacent Nor Beck watercourse toward the centre of site. From the point the sewers converge the 600mm diameter United Utilities combined sewer flows west adjacent Nor Beck and offsite through the existing residential development beyond site.
- 2.4.6 The site is not currently served by wastewater systems.

2.6. Existing Ground Conditions

- 2.6.1. Discharge of the surface water to ground via infiltration is suited to sites which have ground conditions made up of gravel, sand or a mixture of the two. Sands and gravels permit rapid dispersion and infiltration of surface water which is necessary to ensure that overland flooding does not occur during intense rainfall periods.
- 2.6.2. A 'Phase 1 Desk Study' has been carried out by Solmek dated September 2021. (Report No. S210806).
- 2.6.3. The geology of the site and the wider area is complex – the majority of the site is shown to be underlain mostly by solid geology of Whitehaven Sandstone most likely comprising of cross-bedded sandstones with mudstone and siltstone with thin coal seams and limestone, however the southeast is underlain by Pennine Middle Coal Measures for mudstone, siltstone & sandstone.
- 2.6.4. The report states that 'BGS Borehole NY01NW463 is located in the northwest portion of the site and shows topsoil to a depth of 0.40m, underlain by firm organic sandy silty clay to a depth of 1.10m. This is shown to be underlain by stiff to very stiff sandy silty clay with fine to coarse gravel to a depth of 4.0m, underlain by moderately weathered thinly bedded fine grained moderately weak micaceous sandstone to a depth of 4.50m where the borehole was terminated'.
- 2.6.5. It is anticipated that given the underlying clays and sandstone infiltration testing will return poor results and be unable to receive the expansive impermeable areas proposed.

- 2.6.6. Due to the above findings it is confirmed that it would not be feasible to discharge the sites surface water to the ground via infiltration.

2.7. Existing Flood Risk Assessment

- 2.6.1 A site-specific 'Flood Risk Assessment' (20T2034 – Flood Risk Assessment 002 March 2022) has been carried out by Billinghurst George & Partners and is to be provided separately to support this planning application.
- 2.6.2 The report states that the new development area is within Flood Zone 1 and is at low risk of flooding from all sources of flood risk. Therefore, the proposed site is suitable 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' in accordance with the National Planning Policy Framework. It is noted that an area of site adjacent Nor Beck is within Flood Zone 3 however this area is to remain as status quo post development.
- 2.6.3 See Appendix H for Flood Maps for planning.

3. Proposed Site Description

3.1. Development Proposals

- 3.1.1. The proposals are to construct light industrial, general industrial and storage and distribution units on the brownfield site that was previously used for industrial purposes. See Appendix A for site location plan.
- 3.1.2. The proposed site layout within Appendix B shows the extents of access roads and building positions. The access roads may or may not be put up for highways adoption, if they remain private they will be maintained by a private management company. The buildings and car parking will be accessed directly off the new road.

4. Review of Surface Water Discharge Hierarchy

4.1. Existing Drainage Regime

- 4.1.1. A series of United Utilities combined drains and manholes are located throughout the site adjacent Nor Beck. Two combined sewers enter through the western boundary and one through the eastern boundary, they converge adjacent Nor Beck watercourse toward the centre of site. From the point the sewers converge the 600mm diameter United Utilities combined sewer flows west adjacent Nor Beck and offsite through the existing residential development beyond site.
- 4.1.2. The site is not currently served by wastewater systems.

4.2. Current Guidelines

- 4.2.1. In accordance with Building Regulations and NPPF the disposal of surface water has been considered in the following order of priority; discharge to ground, where not reasonably practicable, a watercourse, or where not reasonably practicable a sewer.

4.3. Discharge to Ground

- 4.3.1. Discharge of the surface water to ground via infiltration is suited to sites which have ground conditions made up of gravel, sand or a mixture of the two. Sands and gravels permit rapid dispersion and infiltration of surface water which is necessary to ensure that overland flooding does not occur during intense rainfall periods.
- 4.3.2. A 'Phase 1 Desk Study' has been carried out by Solmek dated September 2021. (Report No. S210806).
- 4.3.3. The geology of the site and the wider area is complex – the majority of the site is shown to be underlain mostly by solid geology of Whitehaven Sandstone most likely comprising of cross-bedded sandstones with mudstone and siltstone with thin coal seams and limestone, however the southeast is underlain by Pennine Middle Coal Measures for mudstone, siltstone & sandstone.
- 4.3.4. The report states that 'BGS Borehole NY01NW463 is located in the northwest portion of the site and shows topsoil to a depth of 0.40m, underlain by firm organic sandy silty clay to a depth of 1.10m. This is shown to be underlain by stiff to very stiff sandy silty clay with fine to coarse gravel to a depth of 4.0m, underlain by moderately weathered thinly bedded fine grained moderately weak micaceous sandstone to a depth of 4.50m where the borehole was terminated'.
- 4.3.5. The Envirocheck Report states that there is Limited Potential for Groundwater Flooding to Occur.
- 4.3.6. Infiltration testing was not carried out as part of the site investigation due to there being no access to site at the time of writing. Given the ground conditions it is anticipated that infiltration rates returned would be poor.
- 4.3.7. Due to the above findings it is confirmed that it would not be feasible to discharge the sites surface water to the ground via infiltration.

4.4. Discharge to a Watercourse

- 4.4.1. The nearest named watercourse is Nor Beck, which is located to the sites southwestern boundary running from east to west through the site then along the southwestern boundary where it converges with Bowthorn Beck and is culverted. From the point it converges it is culverted and drains west then south ultimately converging with the River Keekle.
- 4.4.2. A further watercourse is located to the north western boundary, Bowthorn Beck. This drains north into site and west where it converges with Nor Beck.
- 4.4.3. There are no other named or unnamed watercourses within close proximity to site.

4.5. Discharge to a Surface Water Sewer

- 4.5.1. Not required as discharging to watercourse.

4.6. Discharge to a Combined Sewer

- 4.6.1. Not required as discharging to watercourse.

5. Proposed Surface Water Drainage Strategy

- 5.1.1. It is expected that surface water discharge rates will be restricted to as close to Greenfield rates as per the Cumbria County Council SuDS Adoption Guidance for Major Developments.
- 5.1.2. See Appendix F for the Proposed Drainage Philosophy Plans and Impermeable areas.
- 5.1.3. See Appendix E for the Greenfield Runoff calculations which show that the rate for the site is **129.6 l/s**. The principal of this is acceptable, see Appendix I for Lead Local Flood Authority correspondence. The Environment Agency are to make comment on this through the planning application process.
- 5.1.4. The development is split into two areas by Nor Beck.
- 5.1.5. The attenuation for the northwest area is to provide storage and a 5.0 l/s restricted discharge rate on a plot by plot basis, volumes of which are detailed within the Drainage Plan. The final discharge rate for the overall northwest area is 100.0 l/s and attenuation provided to accommodate highway flows and the 5.0 l/s run off from each of the plots. It is proposed that volumes will be stored within various depth attenuation tanks.
- 5.1.6. The attenuation for the southeast area is to provide storage and a 5.0 l/s restricted discharge rate on a plot by plot basis, volumes of which are detailed within the Drainage Plan. The final discharge rate for the overall area is 29.6 l/s and attenuation provided to accommodate highway flows and the 5.0 l/s run off from each of the plots. It is proposed that volumes will be stored within various depth attenuation tanks.
- 5.1.7. The proposed Area 3 (within Appendix B) has limited available space to incorporate open SuDS features such as basins or ponds.
- 5.1.8. Due to the minimal amount of green open available space onsite it is deemed a suitable solution to provide the attenuation volume to retain the 1 in 100 year + 40% climate change flood event below ground within an attenuation tank in each area.
- 5.1.9. The surface water system consists of a network of pipes which are located throughout the plots service yards, car parks and circulation roads. The networks will drain via gravity to the Flow Control Unit located within each of the plots. Surface water will back up and utilise the attenuation structures when storm events exceeds the discharge rates noted above. The final connection to Nor Beck watercourse will be made via a gravity and restricted to each of the split greenfield run off rates, 100 l/s and 29.6 l/s respectively.
- 5.1.10. The MicroDrainage Calculations for the attenuation volumes are included within Appendix E.
- 5.1.11. No treatment is proposed for the roof drainage. However, it is recommended that a petrol interceptor is installed to treat all surface water flows from the service yards, car parks and circulation roads.
- 5.1.12. The proposed surface water systems have been designed in line with good practice which ensures each are separate from the foul.
- 5.1.13. The above surface water discharge rates are to be agreed with the Lead Local Flood Authority and the Environment Agency.

6. Proposed Foul Water Drainage Strategy

- 6.1. See Appendix F for the 'Proposed Drainage Philosophy Drawings'.
- 6.2. The foul drainage within site will remain private, the foul sewers from the northwest area will drain via gravity and connect to the existing United Utilities 600mm diameter combined sewer located within site adjacent Nor Beck watercourse.
- 6.3. The foul sewers from the southeast area will drain via gravity and connect to the existing United Utilities 375mm diameter combined sewer located within site adjacent Nor Beck watercourse.
- 6.4. The foul drainage within plot boundaries will remain private.
- 6.5. The connection locations have been agreed through return of a pre-development enquiry from United Utilities, see Appendix I for correspondence.
- 6.6. The foul water flows are currently unknown and are to be determined in the next stages of design development.

7. Conclusion

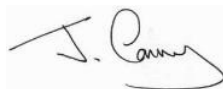
- 7.1. It is not possible or practicable to discharge the surface water to the ground via infiltration. Therefore, as per the hierarchy within Building Regulations Part H3, it is deemed necessary to discharge the surface water to a watercourse.
- 7.2. The proposals are to construct light industrial, general industrial and storage and distribution units on the greenfield site that was previously used for industrial purposes.
- 7.3. Underground attenuation volume is sufficient to provide storage for rainfall events up to and including the 1 in 100 year + 40% climate change.
- 7.4. A proposed drainage scheme has been included within Appendix F, with supporting calculations provided within Appendix E.
- 7.5. This statement has been prepared with reference to the information available at the time of writing. The details of the report may be revised upon receipt of additional or further information.

Report No: CMIQ-BGP-02-XX-RP-C-DP002

Report Title: Drainage Philosophy – Cleator Moor Innovation Quarter – Area 3



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	Project No. 21T2034	Location CMIQ	Originator BGP	Volume 00	Level XX	Type DR	Role C	Unique No. 00100	
Drawing Title Overall Site Location Plan		File Reference CMIQ-BGP-00-XX-DR-C-90.4-00100							



Billinghurst George & Partners

CIVIL & STRUCTURAL ENGINEERS | BUILDING SURVEYORS

1st Floor, Wellington House, Wellington Court, Stockton-on-Tees, TS18 3TA

T 01642 876 470 @BGPconsulting E consulting@bgp-teesside.co.uk - W www.bgp-consulting.co.uk



Appendix B

Proposed Site Layout

50 x 50 = 2500mm x 1000mm

PROPOSED SITE
PLAN



SITE PLAN - PROPOSED
SCALE: 1 : 1250

Ordnance Survey © Crown Copyright 2021. All rights reserved. Licence number: 100022432

0 10 20 30 40 50 m

DATE	REVISION	REV	DR	CH
03/11/21	FIRST ISSUE FOR PLANNING REVIEW	P01	JS	DS
09/11/21	REVISION 2	P02	JS	DS
10/12/21	Amended to Tetra Tech Comments	P03	JS	DS
11/01/22	UPDATED GRAPHICS	P04	JS	DS
25/01/22	UPDATED SITE NAMES AND PLOTS	P05	JS	DS
16/02/22	UPDATED PLOT 1.4 to E1a	P06	JS	DK

THIS DRAWING IS SUBJECT TO FULL VERIFICATION BY MEASURED AND SURVEYED DATA. ANY DISCREPANCIES BETWEEN THE DRAWING AND THE ACTUAL SITE SHALL BE THE RESPONSIBILITY OF THE CLIENT. THE DRAWING IS NOT TO BE USED FOR ANY OTHER PURPOSES WITHOUT THE WRITTEN PERMISSION OF NORR CONSULTANTS LIMITED.

PLEASE NOTE: THIS INFORMATION WAS SUPPLIED BY COPELAND BOROUGH COUNCIL AND ORDNANCE SURVEY. NORR AND ANY ACCEPTED LIABILITY FOR THE ACCURACY OF THIS INFORMATION OR THAT SUPPLIED BY THIRD PARTIES. THIS DRAWING IS SUBJECT TO FULL CONSULTATION WITH STATUTORY BODIES AND ASSOCIATED CONSENTS.

THIS IS DESIGN DEVELOPMENT YET TO TAKE PLACE THAT MAY AFFECT REPORTED LAND NUMBERS AND DRAWINGS. AND THEREFORE THESE DRAWINGS SHOULD BE TREATED AS APPROXIMATE. THEREFORE ANY DECISION TO BE MADE ON THE BASIS OF THESE PRELIMINARY DRAWINGS AS TO PLANNING, FUTURE EQUIPMENT ARRANGEMENT ON THE SITE SHOULD INCLUDE DUE CONSIDERATION FOR THE POSSIBLE INCREASE OR DECREASE IN THE DESIGN DEVELOPMENT AND BUILDING PROCESS. ALL AREAS ARE THEREFORE GIVEN AS APPROXIMATE ONLY AND SUBJECT TO DESIGN DEVELOPMENT.

ANY INFORMATION ON THESE DRAWINGS ARE TO BE HIGHLIGHTED TO THE RELEVANT IMMEDIATELY. DO NOT SCALE FROM THESE DRAWINGS IF IN DOUBT PLEASE REQUEST CLARIFICATION.

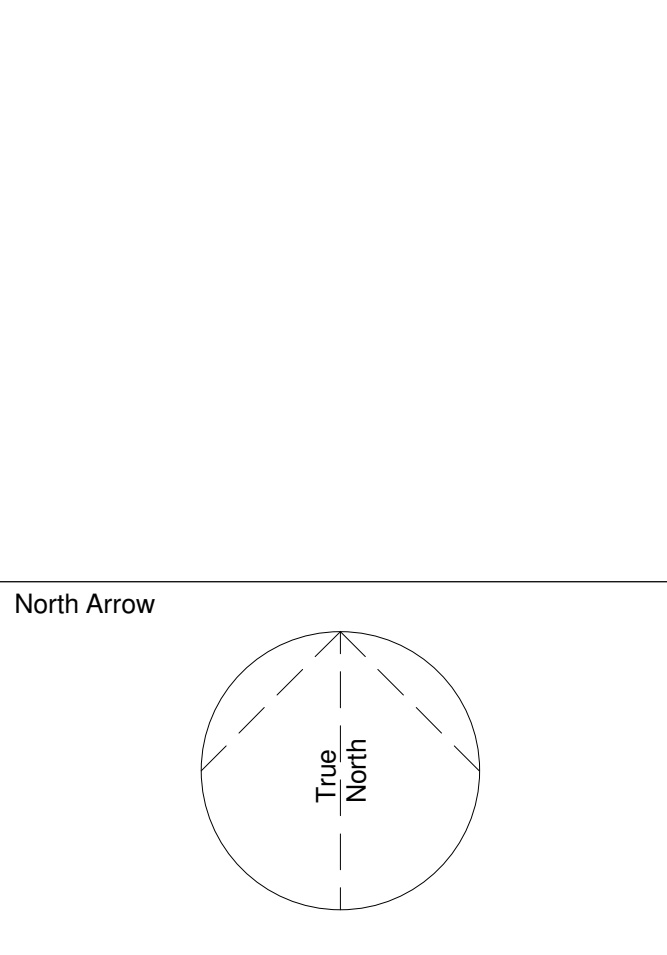
This drawing has been prepared solely for the use of COPELAND BOROUGH COUNCIL and there are no representations of any kind made by NORR Consultants Limited to any party with whom NORR Consultants Limited has not entered into a contract.

This drawing must not be used, reproduced or revised without written permission.

This drawing shall not be used for construction purposes until a 'As-APPROVED FOR STAGE X' status appears under the Sheet Status.

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

Keyplan



Consultants

NORR
NORR Consultants Limited.
An Ingenium International Company
Percy House, 8th Floor Percy Street,
Newcastle, NE1 4PW
England, UK
norr.com

Drawn: MCI Date: 01/09/21
Checked: RS Date: 01/09/21
Scale: 1 : 1250 @ A0

Client:
COPELAND BOROUGH COUNCIL

Project:
CLEATOR MOOR INNOVATION QUARTER

Drawing Title:
PROPOSED SITE PLAN

Sheet Status:
S3 - FOR REVIEW

Project No.: JANC21-0043

Drawing No.: CM1Q-NOR-MP-ZZ-DR-A-90002 Rev: P06



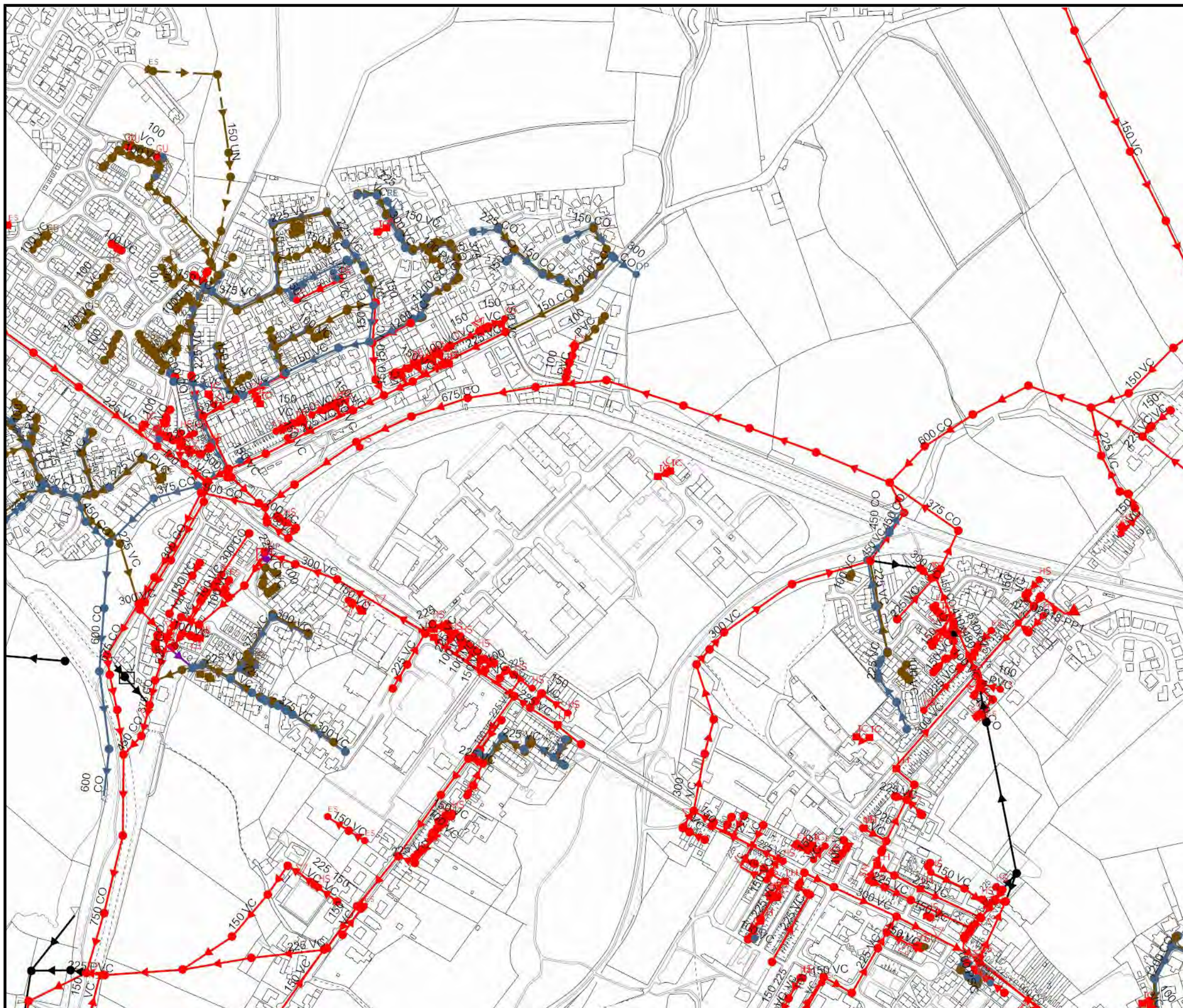
Appendix C

Topographical Survey



Appendix D

United Utilities Sewer 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.

Crown copyright and database rights 2017
Ordnance Survey 100022432. Unauthorised
reproduction will infringe these copyrights.



Appendix E

Microdrainage Calculations

BGP		Page 1
Wellington House, Wellington Court Preston Farm Stockton on Tees, TS18 3TA	Leconfield Industrial Estate SW Model - Area 3 North	
Date 23/03/2022 15:08 File SW MODEL.MDX	Designed by JJH Checked by JC	
XP Solutions	Network 2020.1.3	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales			
Return Period (years)	100	PIMP (%)	100
M5-60 (mm)	17.000	Add Flow / Climate Change (%)	0
Ratio R	0.257	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	1.000	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	2.245	4-8	2.380	8-12	0.005

Total Area Contributing (ha) = 4.630

Total Pipe Volume (m³) = 43.824

Network Design Table for Storm

« - Indicates pipe capacity < flow

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.000	73.027	0.509	143.5	0.109	4.00	0.0	0.600	o	225	Pipe/Conduit	
S1.001	22.326	0.179	124.7	0.021	0.00	0.0	0.600	o	225	Pipe/Conduit	
S2.000	5.000	0.050	100.0	0.728	4.00	0.0	0.600	o	150	Pipe/Conduit	
S2.001	5.000	0.050	100.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.000	50.00	5.12	79.652	0.109	0.0	0.0	0.0	1.09	43.3	19.7
S1.001	50.00	5.44	79.143	0.130	0.0	0.0	0.0	1.17	46.5	23.5
S2.000	50.00	4.08	79.500	0.728	0.0	0.0	0.0	1.00	17.8«	131.4
S2.001	50.00	4.17	79.450	0.728	0.0	0.0	0.0	1.00	17.8«	131.4

BGP		Page 2
Wellington House, Wellington Court Preston Farm Stockton on Tees, TS18 3TA	Leconfield Industrial Estate SW Model - Area 3 North	
Date 23/03/2022 15:08 File SW MODEL.MDX	Designed by JJH Checked by JC	
XP Solutions	Network 2020.1.3	

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S2.002	12.000	0.286	42.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
S1.002	14.930	0.119	125.5	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S3.000	5.000	0.050	100.0	0.979	4.00	0.0	0.600	o	150	Pipe/Conduit	
S3.001	5.000	0.050	100.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
S3.002	12.000	0.120	100.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
S4.000	5.000	0.050	100.0	0.520	4.00	0.0	0.600	o	150	Pipe/Conduit	
S4.001	5.000	0.050	100.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
S4.002	10.000	0.100	100.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
S1.003	186.723	1.494	125.0	0.230	0.00	0.0	0.600	o	375	Pipe/Conduit	
S5.000	5.000	0.050	100.0	0.931	4.00	0.0	0.600	o	150	Pipe/Conduit	
S5.001	5.000	0.050	100.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
S5.002	11.999	0.324	37.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
S1.004	8.722	0.070	124.6	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
S6.000	5.000	0.050	100.0	0.954	4.00	0.0	0.600	o	150	Pipe/Conduit	
S6.001	5.000	0.050	100.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S2.002	50.00	4.29	79.400	0.728	0.0	0.0	0.0	1.56	27.5«	131.4
S1.002	50.00	5.61	78.964	0.858	0.0	0.0	0.0	1.40	99.1«	154.9
S3.000	50.00	4.08	79.290	0.979	0.0	0.0	0.0	1.00	17.8«	176.8
S3.001	50.00	4.17	79.240	0.979	0.0	0.0	0.0	1.00	17.8«	176.8
S3.002	50.00	4.36	79.190	0.979	0.0	0.0	0.0	1.00	17.8«	176.8
S4.000	50.00	4.08	79.270	0.520	0.0	0.0	0.0	1.00	17.8«	93.9
S4.001	50.00	4.17	79.220	0.520	0.0	0.0	0.0	1.00	17.8«	93.9
S4.002	50.00	4.33	79.170	0.520	0.0	0.0	0.0	1.00	17.8«	93.9
S1.003	50.00	7.53	78.845	2.587	0.0	0.0	0.0	1.62	178.9«	467.1
S5.000	50.00	4.08	78.000	0.931	0.0	0.0	0.0	1.00	17.8«	168.1
S5.001	50.00	4.17	77.950	0.931	0.0	0.0	0.0	1.00	17.8«	168.1
S5.002	50.00	4.29	77.900	0.931	0.0	0.0	0.0	1.66	29.3«	168.1
S1.004	50.00	7.62	77.351	3.518	0.0	0.0	0.0	1.62	179.1«	635.2
S6.000	50.00	4.08	78.000	0.954	0.0	0.0	0.0	1.00	17.8«	172.2
S6.001	50.00	4.17	77.950	0.954	0.0	0.0	0.0	1.00	17.8«	172.2

BGP		Page 3
Wellington House, Wellington Court Preston Farm Stockton on Tees, TS18 3TA	Leconfield Industrial Estate SW Model - Area 3 North	
Date 23/03/2022 15:08 File SW MODEL.MDX	Designed by JJH Checked by JC	
XP Solutions	Network 2020.1.3	

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S6.002	12.000	0.394	30.5	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
S1.005	21.757	0.174	125.0	0.026	0.00	0.0	0.600	o	450	Pipe/Conduit	
S7.000	14.000	0.140	100.0	0.000	4.00	0.0	0.600	o	300	Pipe/Conduit	
S8.000	24.028	0.240	100.1	0.068	4.00	0.0	0.600	o	225	Pipe/Conduit	
S8.001	38.986	0.390	100.0	0.037	0.00	0.0	0.600	o	225	Pipe/Conduit	
S8.002	27.491	0.275	100.0	0.027	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.006	4.000	0.032	125.0	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
S1.007	42.742	0.500	85.5	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S6.002	50.00	4.28	77.900	0.954	0.0	0.0	0.0	1.83	32.4«	172.2
S1.005	50.00	7.82	77.206	4.498	0.0	0.0	0.0	1.82	289.0«	812.1
S7.000	50.00	4.15	77.322	0.000	0.0	0.0	0.0	1.57	111.1	0.0
S8.000	50.00	4.31	78.162	0.068	0.0	0.0	0.0	1.31	52.0	12.3
S8.001	50.00	4.80	77.922	0.105	0.0	0.0	0.0	1.31	52.0	19.0
S8.002	50.00	5.15	77.532	0.132	0.0	0.0	0.0	1.31	52.0	23.8
S1.006	50.00	7.86	77.032	4.630	0.0	0.0	0.0	1.82	289.0«	835.9
S1.007	50.00	8.18	77.000	4.630	0.0	0.0	0.0	2.20	349.9«	835.9

Manhole Schedules for Storm											
MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
SS1	81.163	1.511	Open Manhole	1200	S1.000	79.652	225				
SS2	80.912	1.769	Open Manhole	1200	S1.001	79.143	225	S1.000	79.143	225	
SS10 Null Tank	82.000	2.500	Open Manhole	1200	S2.000	79.500	150				
SS10 Hydrobrake	82.000	2.550	Open Manhole	1200	S2.001	79.450	150	S2.000	79.450	150	
SS10 Non-R Valve	82.000	2.600	Open Manhole	1200	S2.002	79.400	150	S2.001	79.400	150	
SS3	80.925	1.961	Open Manhole	1200	S1.002	78.964	300	S1.001	78.964	225	
								S2.002	79.114	150	
SS11 Null Tank	82.000	2.710	Open Manhole	1200	S3.000	79.290	150				
SS11 Hydrobrake	82.000	2.760	Open Manhole	1200	S3.001	79.240	150	S3.000	79.240	150	
SS11 Non-R Valve	82.000	2.810	Open Manhole	1200	S3.002	79.190	150	S3.001	79.190	150	
SS12 Null Tank	81.750	2.480	Open Manhole	1200	S4.000	79.270	150				
SS12 Hydrobrake	81.750	2.530	Open Manhole	1200	S4.001	79.220	150	S4.000	79.220	150	
SS12 Non-R Valve	81.750	2.580	Open Manhole	1200	S4.002	79.170	150	S4.001	79.170	150	
SS4	80.776	1.931	Open Manhole	1350	S1.003	78.845	375	S1.002	78.845	300	
								S3.002	79.070	150	
								S4.002	79.070	150	
SS13 Null Tank	82.000	4.000	Open Manhole	1200	S5.000	78.000	150				
SS13 Hydrobrake	82.000	4.050	Open Manhole	1200	S5.001	77.950	150	S5.000	77.950	150	
SS13 Non-R Valve	82.000	4.100	Open Manhole	1200	S5.002	77.900	150	S5.001	77.900	150	
SS5	79.622	2.271	Open Manhole	1350	S1.004	77.351	375	S1.003	77.351	375	
								S5.002	77.576	150	
SS14 Null Tank	81.500	3.500	Open Manhole	1200	S6.000	78.000	150				
SS14 Hydrobrake	81.500	3.550	Open Manhole	1200	S6.001	77.950	150	S6.000	77.950	150	
SS14 Non-R Valve	81.500	3.600	Open Manhole	1200	S6.002	77.900	150	S6.001	77.900	150	
SS6	79.731	2.525	Open Manhole	1350	S1.005	77.206	450	S1.004	77.281	375	
								S6.002	77.506	150	
SS15	80.000	2.678	Open Manhole	1200	S7.000	77.322	300				
SS16	79.243	1.081	Open Manhole	1200	S8.000	78.162	225				
SS17	79.007	1.085	Open Manhole	1200	S8.001	77.922	225	S8.000	77.922	225	
SS18	79.383	1.851	Open Manhole	1200	S8.002	77.532	225	S8.001	77.532	225	
SS7	79.932	2.900	Open Manhole	1350	S1.006	77.032	450	S1.005	77.032	450	
								S7.000	77.182	300	
								S8.002	77.257	225	
SS8	80.000	3.000	Open Manhole	2100	S1.007	77.000	450	S1.006	77.000	450	
SS9	77.000	0.500	Open Manhole	1200		OUTFALL		S1.007	76.500	450	

Manhole Schedules for Storm						
MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
SS1	301763.751	515921.151	301763.751	515921.151	Required	
SS2	301789.249	515852.720	301789.249	515852.720	Required	
SS10 Non-R Valve	301811.678	515840.913	301811.678	515840.913	Required	
SS3	301801.728	515834.207	301801.728	515834.207	Required	
SS11 Non-R Valve	301820.023	515828.533	301820.023	515828.533	Required	
SS12 Non-R Valve	301800.640	515818.504	301800.640	515818.504	Required	
SS4	301810.072	515821.826	301810.072	515821.826	Required	
SS13 Non-R Valve	301924.481	515673.544	301924.481	515673.544	Required	
SS5	301914.431	515666.989	301914.431	515666.989	Required	
SS14 Non-R Valve	301929.365	515666.298	301929.365	515666.298	Required	
SS6	301919.305	515659.757	301919.305	515659.757	Required	
SS15	301943.074	515649.540	301943.074	515649.540	Required	
SS16	301995.233	515579.686	301995.233	515579.686	Required	
SS17	301974.030	515590.990	301974.030	515590.990	Required	
SS18	301946.830	515618.919	301946.830	515618.919	Required	

BGP		Page 6
Wellington House, Wellington Court Preston Farm Stockton on Tees, TS18 3TA	Leconfield Industrial Estate SW Model - Area 3 North	
Date 23/03/2022 15:08 File SW MODEL.MDX	Designed by JJH Checked by JC	
XP Solutions	Network 2020.1.3	

Manhole Schedules for Storm

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
SS7	301931.465	515641.715	301931.465	515641.715	Required	
SS8	301928.148	515639.480	301928.148	515639.480	Required	
SS9	301911.366	515600.171			No Entry	

BGP		Page 7
Wellington House, Wellington Court Preston Farm Stockton on Tees, TS18 3TA	Leconfield Industrial Estate SW Model - Area 3 North	
Date 23/03/2022 15:08 File SW MODEL.MDX	Designed by JJH Checked by JC	
XP Solutions	Network 2020.1.3	

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	o	225	SS1	81.163	79.652	1.286	Open Manhole	1200
S1.001	o	225	SS2	80.912	79.143	1.544	Open Manhole	1200
S2.000	o	150	SS10 Null Tank	82.000	79.500	2.350	Open Manhole	1200
S2.001	o	150	SS10 Hydrobrake	82.000	79.450	2.400	Open Manhole	1200
S2.002	o	150	SS10 Non-R Valve	82.000	79.400	2.450	Open Manhole	1200
S1.002	o	300	SS3	80.925	78.964	1.661	Open Manhole	1200
S3.000	o	150	SS11 Null Tank	82.000	79.290	2.560	Open Manhole	1200
S3.001	o	150	SS11 Hydrobrake	82.000	79.240	2.610	Open Manhole	1200
S3.002	o	150	SS11 Non-R Valve	82.000	79.190	2.660	Open Manhole	1200
S4.000	o	150	SS12 Null Tank	81.750	79.270	2.330	Open Manhole	1200
S4.001	o	150	SS12 Hydrobrake	81.750	79.220	2.380	Open Manhole	1200
S4.002	o	150	SS12 Non-R Valve	81.750	79.170	2.430	Open Manhole	1200
S1.003	o	375	SS4	80.776	78.845	1.556	Open Manhole	1350
S5.000	o	150	SS13 Null Tank	82.000	78.000	3.850	Open Manhole	1200
S5.001	o	150	SS13 Hydrobrake	82.000	77.950	3.900	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	73.027	143.5	SS2	80.912	79.143	1.544	Open Manhole	1200
S1.001	22.326	124.7	SS3	80.925	78.964	1.736	Open Manhole	1200
S2.000	5.000	100.0	SS10 Hydrobrake	82.000	79.450	2.400	Open Manhole	1200
S2.001	5.000	100.0	SS10 Non-R Valve	82.000	79.400	2.450	Open Manhole	1200
S2.002	12.000	42.0	SS3	80.925	79.114	1.661	Open Manhole	1200
S1.002	14.930	125.5	SS4	80.776	78.845	1.631	Open Manhole	1350
S3.000	5.000	100.0	SS11 Hydrobrake	82.000	79.240	2.610	Open Manhole	1200
S3.001	5.000	100.0	SS11 Non-R Valve	82.000	79.190	2.660	Open Manhole	1200
S3.002	12.000	100.0	SS4	80.776	79.070	1.556	Open Manhole	1350
S4.000	5.000	100.0	SS12 Hydrobrake	81.750	79.220	2.380	Open Manhole	1200
S4.001	5.000	100.0	SS12 Non-R Valve	81.750	79.170	2.430	Open Manhole	1200
S4.002	10.000	100.0	SS4	80.776	79.070	1.556	Open Manhole	1350
S1.003	186.723	125.0	SS5	79.622	77.351	1.896	Open Manhole	1350
S5.000	5.000	100.0	SS13 Hydrobrake	82.000	77.950	3.900	Open Manhole	1200
S5.001	5.000	100.0	SS13 Non-R Valve	82.000	77.900	3.950	Open Manhole	1200

BGP		Page 8
Wellington House, Wellington Court Preston Farm Stockton on Tees, TS18 3TA	Leconfield Industrial Estate SW Model - Area 3 North	
Date 23/03/2022 15:08 File SW MODEL.MDX	Designed by JJH Checked by JC	
XP Solutions	Network 2020.1.3	

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S5.002	o	150	SS13 Non-R Valve	82.000	77.900	3.950	Open Manhole	1200
S1.004	o	375	SS5	79.622	77.351	1.896	Open Manhole	1350
S6.000	o	150	SS14 Null Tank	81.500	78.000	3.350	Open Manhole	1200
S6.001	o	150	SS14 Hydrobrake	81.500	77.950	3.400	Open Manhole	1200
S6.002	o	150	SS14 Non-R Valve	81.500	77.900	3.450	Open Manhole	1200
S1.005	o	450	SS6	79.731	77.206	2.075	Open Manhole	1350
S7.000	o	300	SS15	80.000	77.322	2.378	Open Manhole	1200
S8.000	o	225	SS16	79.243	78.162	0.856	Open Manhole	1200
S8.001	o	225	SS17	79.007	77.922	0.860	Open Manhole	1200
S8.002	o	225	SS18	79.383	77.532	1.626	Open Manhole	1200
S1.006	o	450	SS7	79.932	77.032	2.450	Open Manhole	1350
S1.007	o	450	SS8	80.000	77.000	2.550	Open Manhole	2100

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S5.002	11.999	37.0	SS5	79.622	77.576	1.896	Open Manhole	1350
S1.004	8.722	124.6	SS6	79.731	77.281	2.075	Open Manhole	1350
S6.000	5.000	100.0	SS14 Hydrobrake	81.500	77.950	3.400	Open Manhole	1200
S6.001	5.000	100.0	SS14 Non-R Valve	81.500	77.900	3.450	Open Manhole	1200
S6.002	12.000	30.5	SS6	79.731	77.506	2.075	Open Manhole	1350
S1.005	21.757	125.0	SS7	79.932	77.032	2.450	Open Manhole	1350
S7.000	14.000	100.0	SS7	79.932	77.182	2.450	Open Manhole	1350
S8.000	24.028	100.1	SS17	79.007	77.922	0.860	Open Manhole	1200
S8.001	38.986	100.0	SS18	79.383	77.532	1.626	Open Manhole	1200
S8.002	27.491	100.0	SS7	79.932	77.257	2.450	Open Manhole	1350
S1.006	4.000	125.0	SS8	80.000	77.000	2.550	Open Manhole	2100
S1.007	42.742	85.5	SS9	77.000	76.500	0.050	Open Manhole	1200

BGP		Page 9
Wellington House, Wellington Court Preston Farm Stockton on Tees, TS18 3TA	Leconfield Industrial Estate SW Model - Area 3 North	
Date 23/03/2022 15:08 File SW MODEL.MDX	Designed by JJH Checked by JC	
XP Solutions	Network 2020.1.3	

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S1.007	SS9	77.000	76.500	0.000	1200	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	1.000	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	0.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1
Number of Input Hydrographs	0	Number of Offline Controls	0
Number of Online Controls	11	Number of Storage Structures	6
		Number of Time/Area Diagrams	0
		Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	100	Cv (Summer)	1.000
Region	England and Wales	Cv (Winter)	1.000
M5-60 (mm)	17.000	Storm Duration (mins)	30
Ratio R	0.257		

BGP		Page 10
Wellington House, Wellington Court Preston Farm Stockton on Tees, TS18 3TA	Leconfield Industrial Estate SW Model - Area 3 North	
Date 23/03/2022 15:08 File SW MODEL.MDX	Designed by JJH Checked by JC	
XP Solutions	Network 2020.1.3	

Online Controls for Storm

Hydro-Brake® Optimum Manhole: SS10 Hydrobrake, DS/PN: S2.001, Volume (m³): 3.0

Unit Reference	MD-SHE-0105-5000-1000-5000
Design Head (m)	1.000
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	105
Invert Level (m)	79.450
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	5.0	Kick-Flo®	0.637	4.1
Flush-Flo™	0.296	5.0	Mean Flow over Head Range	-	4.3

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	3.6	0.800	4.5	2.000	6.9	4.000	9.6	7.000	12.5
0.200	4.8	1.000	5.0	2.200	7.2	4.500	10.1	7.500	12.9
0.300	5.0	1.200	5.4	2.400	7.5	5.000	10.6	8.000	13.3
0.400	4.9	1.400	5.8	2.600	7.8	5.500	11.1	8.500	13.7
0.500	4.7	1.600	6.2	3.000	8.4	6.000	11.6	9.000	14.1
0.600	4.3	1.800	6.6	3.500	9.0	6.500	12.1	9.500	14.5

Non Return Valve Manhole: SS10 Non-R Valve, DS/PN: S2.002, Volume (m³): 3.0

Hydro-Brake® Optimum Manhole: SS11 Hydrobrake, DS/PN: S3.001, Volume (m³): 3.2

Unit Reference	MD-SHE-0098-5000-1500-5000
Design Head (m)	1.500
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	98
Invert Level (m)	79.240
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Hydro-Brake® Optimum Manhole: SS11 Hydrobrake, DS/PN: S3.001, Volume (m³): 3.2

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.500	5.0	Kick-Flo®	0.878	3.9
Flush-Flo™	0.431	4.9	Mean Flow over Head Range	-	4.3

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	3.2	0.800	4.3	2.000	5.7	4.000	7.9	7.000	10.3
0.200	4.4	1.000	4.1	2.200	6.0	4.500	8.4	7.500	10.7
0.300	4.8	1.200	4.5	2.400	6.2	5.000	8.8	8.000	11.0
0.400	4.9	1.400	4.8	2.600	6.5	5.500	9.2	8.500	11.3
0.500	4.9	1.600	5.1	3.000	6.9	6.000	9.6	9.000	11.6
0.600	4.8	1.800	5.4	3.500	7.4	6.500	10.0	9.500	11.9

Non Return Valve Manhole: SS11 Non-R Valve, DS/PN: S3.002, Volume (m³): 3.2

Hydro-Brake® Optimum Manhole: SS12 Hydrobrake, DS/PN: S4.001, Volume (m³): 2.9

Unit Reference	MD-SHE-0105-5000-1000-5000
Design Head (m)	1.000
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	105
Invert Level (m)	79.220
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	5.0	Kick-Flo®	0.637	4.1
Flush-Flo™	0.296	5.0	Mean Flow over Head Range	-	4.3

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	3.6	0.800	4.5	2.000	6.9	4.000	9.6	7.000	12.5
0.200	4.8	1.000	5.0	2.200	7.2	4.500	10.1	7.500	12.9
0.300	5.0	1.200	5.4	2.400	7.5	5.000	10.6	8.000	13.3
0.400	4.9	1.400	5.8	2.600	7.8	5.500	11.1	8.500	13.7
0.500	4.7	1.600	6.2	3.000	8.4	6.000	11.6	9.000	14.1
0.600	4.3	1.800	6.6	3.500	9.0	6.500	12.1	9.500	14.5

BGP		Page 12
Wellington House, Wellington Court Preston Farm Stockton on Tees, TS18 3TA	Leconfield Industrial Estate SW Model - Area 3 North	
Date 23/03/2022 15:08 File SW MODEL.MDX	Designed by JJH Checked by JC	
XP Solutions	Network 2020.1.3	

Non Return Valve Manhole: SS12 Non-R Valve, DS/PN: S4.002, Volume (m³): 3.0

Hydro-Brake® Optimum Manhole: SS13 Hydrobrake, DS/PN: S5.001, Volume (m³): 4.6

Unit Reference MD-SHE-0098-5000-1500-5000
Design Head (m) 1.500
Design Flow (l/s) 5.0
Flush-Flo™ Calculated
Objective Minimise upstream storage
Application Surface
Sump Available Yes
Diameter (mm) 98
Invert Level (m) 77.950
Minimum Outlet Pipe Diameter (mm) 150
Suggested Manhole Diameter (mm) 1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.500	5.0	Kick-Flo®	0.878	3.9
Flush-Flo™	0.431	4.9	Mean Flow over Head Range	-	4.3

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	3.2	0.800	4.3	2.000	5.7	4.000	7.9	7.000	10.3
0.200	4.4	1.000	4.1	2.200	6.0	4.500	8.4	7.500	10.7
0.300	4.8	1.200	4.5	2.400	6.2	5.000	8.8	8.000	11.0
0.400	4.9	1.400	4.8	2.600	6.5	5.500	9.2	8.500	11.3
0.500	4.9	1.600	5.1	3.000	6.9	6.000	9.6	9.000	11.6
0.600	4.8	1.800	5.4	3.500	7.4	6.500	10.0	9.500	11.9

Non Return Valve Manhole: SS13 Non-R Valve, DS/PN: S5.002, Volume (m³): 4.7

Hydro-Brake® Optimum Manhole: SS14 Hydrobrake, DS/PN: S6.001, Volume (m³): 4.1

Unit Reference MD-SHE-0092-5000-2000-5000
Design Head (m) 2.000
Design Flow (l/s) 5.0
Flush-Flo™ Calculated
Objective Minimise upstream storage
Application Surface
Sump Available Yes
Diameter (mm) 92
Invert Level (m) 77.950
Minimum Outlet Pipe Diameter (mm) 150
Suggested Manhole Diameter (mm) 1200



Quick Storage Estimate



Variables

Results

Design

Overview 2D

Overview 3D

Vt

Variables

FSR Rainfall



Return Period (years)

100

Region

England and Wales



Map

M5-60 (mm)

17.000

Ratio R

0.257

Cv (Summer)

1.000

Cv (Winter)

1.000

Impermeable Area (ha)

1.110

Maximum Allowable Discharge (l/s)

26.9

Infiltration Coefficient (m/hr)

0.00000



Safety Factor

2.0

Climate Change (%)

40

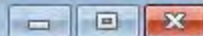
Analyse

OK

Cancel

Help

Select required Rainfall Model from the list



Variables

Results

Design

Overview 2D

Overview 3D

Vt

Results

Global Variables require approximate storage of between 529 m³ and 901 m³.

These values are estimates only and should not be used for design purposes.

$$(529 + 910) \times 0.5 = 715\text{m}^3$$

Analyse

OK

Cancel

Help

Select required Rainfall Model from the list

Calculated by:

Site name:

Site location:

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.

Site Details

Latitude:

Longitude:

Reference:

Date:

Runoff estimation approach

Site characteristics

Total site area (ha):

Methodology

Q_{BAR} estimation method:

SPR estimation method:

Soil characteristics	Default	Edited
SOIL type:	4	4
HOST class:	N/A	N/A
SPR/SPRHOST:	0.47	0.47

Hydrological characteristics	Default	Edited
SAAR (mm):	1276	1276
Hydrological region:	10	10
Growth curve factor 1 year:	0.87	0.87
Growth curve factor 30 years:	1.7	1.7
Growth curve factor 100 years:	2.08	2.08
Growth curve factor 200 years:	2.37	2.37

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.

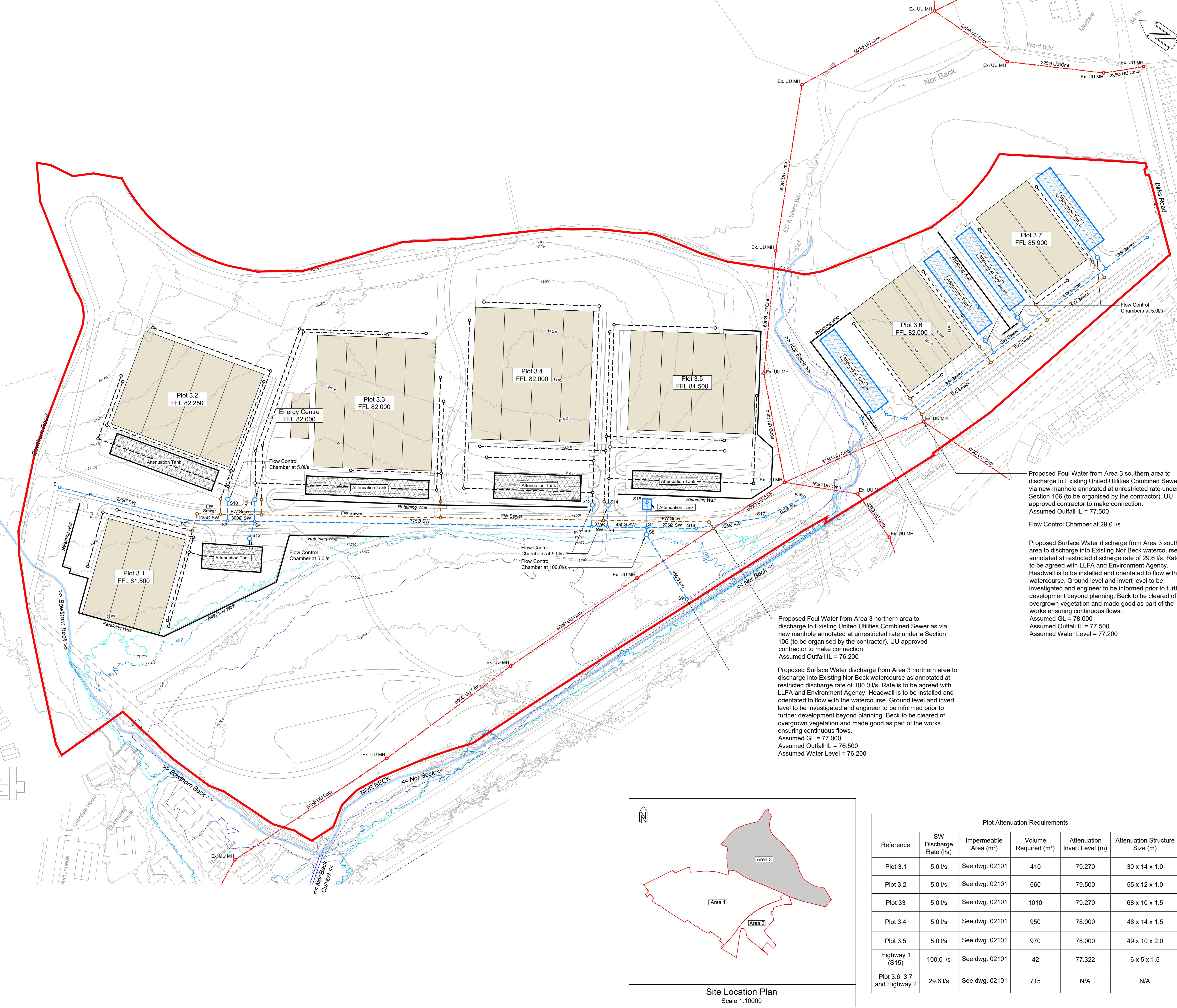
Greenfield runoff rates	Default	Edited
Q_{BAR} (l/s):	129.62	129.62
1 in 1 year (l/s):	112.77	112.77
1 in 30 years (l/s):	220.36	220.36
1 in 100 year (l/s):	269.62	269.62
1 in 200 years (l/s):	307.21	307.21

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.



Appendix F

Proposed Drainage Philosophy Plans



DO NOT SCALE

Notes

1.

All Information provided is for planning purposes only and should not be relied upon for either costing or construction.

2.

Proposed finished floor levels are indicative and are based on Lidar data. These will be reviewed upon receipt of a topographic survey.

3.

All drainage outfall levels are to be investigated and confirmed suitable prior to detailed design. Engineer to be informed of findings. Current design shown is indicative.

4.

All Surface water discharge rates and methods of discharge are to be agreed with the Lead Local Flood Authority and Environment Agency.

5.

All Foul water discharge rates are to be agreed with United Utilities through return of a predevelopment enquiry.

6.

All Existing sewer locations have been assumed from United Utilities records.

7.

All existing sewers to be surveyed to confirm depth, diameter, location and condition prior to detailed design.

Legend

Proposed SW Sewer

Proposed FW Sewer

Proposed Plot FW Sewer

Proposed Plot SW Sewer

Existing UU Combined Sewer

Area 3 Site Boundary

Flood Zone 2 Extent

Flood Zone 3 Extent

Flood Zone 3 Extent (77.470m AOD)(1.0 AEP undefended/ defended + 35% Climate Change)

Proposed Attenuation Tanks

Proposed Building

Additional Notes

Proposed Impermeable Area

=

46305m² (4.6305ha)

Assumed Discharge Rate

=

129.6 l/s

Storage Required

=

See Table

See Q-Bar Calculation for information.

Plot Attenuation Requirements					
Reference	SW Discharge Rate (l/s)	Impermeable Area (m²)	Volume Required (m³)	Attenuation Invert Level (m)	Attenuation Structure Size (m)
Plot 3.1	5.0 l/s	See dwg. 02101	410	79.270	30 x 14 x 1.0
Plot 3.2	5.0 l/s	See dwg. 02101	660	79.500	55 x 12 x 1.0
Plot 33	5.0 l/s	See dwg. 02101	1010	79.270	68 x 10 x 1.5
Plot 3.4	5.0 l/s	See dwg. 02101	950	78.000	48 x 14 x 1.5
Plot 3.5	5.0 l/s	See dwg. 02101	970	78.000	49 x 10 x 2.0
Highway 1 (S15)	100.0 l/s	See dwg. 02101	42	77.322	6 x 5 x 1.5
Plot 3.6, 3.7 and Highway 2	29.6 l/s	See dwg. 02101	715	N/A	N/A

Issued for Planning

JJH

P02

JC

23.03.2022

FIRST DRAFT

JJH

P01

JC

05.11.2021

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, Billingham 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.

bgp

Billingham George & Partners

CIVIL & STRUCTURAL ENGINEERS | BUILDING SURVEYORS

1st Floor, Wellington House, Wellington Court, Stockton-on-Tees, TS18 3TA

T 01642 876 470 @BGPconsulting E consulting@bgp-tees.co.uk - W www.bgp-consulting.co.uk

Client

Copeland Borough Council

Project

Cleator Moor Innovation Quarter

Project No.

21T2034

Drawing Title

Area 3 - Schematic Drainage Plan

Drawn

JJH

Date

Nov 2021

Checked

JC

Date

Nov 2021

Size

A1

Scale

1:1000

Class.

52

Rev.

P02

Location

CMIQ

Originator

BGP

Volume

02

Level

XX

Type

DR

Role

C

Unique No.

02130

File Reference

CMIQ-BGP-02-XX-DR-C-52-02130

DO NOT SCALE

1. Cover levels are approximate only and may vary on site. Covers to suit finished levels.
2. Contractor is responsible for positioning MHs so they do not compromise line or level of kerbing or other delineation at the juncture of two surface materials.
3. PPIC manhole diameters may vary and are dependant on manufactures specification and diameter of incoming / outgoing pipes.
4. Concrete manhole diameters are dependant on nominal internal diameter of largest pipe in manhole. See Table A on Typical Manhole Details drawing.

Surface Water Drainage Manhole Schedule											
MH Ref.	Cover Level	Invert Level	MH Type	MH Dia. (m)	Cover Type	D/S Pipe Length	Depth to Invert	Pipe Size (m)	Depth to Soffit	Gradient	Comments
S1	81.163	79.652	Conc.	1.200	D400	69.616	73.027	0.225	1.286	1:143.5	
S2	80.912	79.143	Conc.	1.200	D400	22.326	1.769	0.225	1.544	1:124.7	
S3	80.925	78.964	Conc.	1.200	D400	14.930	1.961	0.300	1.661	1:125.5	
S4	80.776	78.845	Conc.	1.350	D400	186.723	1.931	0.375	1.556	1:125	
S5	79.622	77.351	Conc.	1.350	D400	8.722	2.271	0.375	1.896	1:124.6	
S6	79.731	77.206	Conc.	1.350	D400	21.757	2.525	0.450	2.075	1:125.0	
S7	79.932	77.032	Conc.	1.350	D400	4.000	2.900	0.450	2.450	1:125.0	
S8	80.000	77.000	Conc.	2.100	D400	42.742	3.000	0.450	2.550	N/A	Flow Control Chamber at 100.0 I/s
S9	77.000	76.500	Conc.	1.200	D400	N/A	0.500	0.450	0.050	N/A	Headwall
S10	82.000	79.500	Conc.	1.200	D400	5.000	2.500	0.150	2.350	1:100	Flow Control Chamber at 5.0 I/s
S11	82.000	79.290	Conc.	1.200	D400	5.000	2.710	0.150	2.560	1:100	Flow Control Chamber at 5.0 I/s
S12	81.750	79.270	Conc.	1.200	D400	5.000	2.480	0.150	2.330	1:100	Flow Control Chamber at 5.0 I/s
S13	82.000	78.000	Conc.	1.200	D400	5.000	4.000	0.150	3.850	1:100	Flow Control Chamber at 5.0 I/s
S14	81.500	78.000	Conc.	1.200	D400	5.000	3.500	0.150	3.350	1:100	Flow Control Chamber at 5.0 I/s
S15	80.000	77.322	Conc.	1.200	D400	14.000	2.678	0.300	2.378	1:100	
S16	79.243	78.162	Conc.	1.200	D400	24.028	1.081	0.225	0.856	1:100.1	
S17	79.007	77.922	Conc.	1.200	D400	38.986	1.085	0.225	0.860	1:100	
S18	79.383	77.532	Conc.	1.200	D400	27.491	1.851	0.225	1.626	1:100	

Issued for Planning	JJH	P02	JC	23.03.2022
FIRST DRAFT	JJH	P01	JC	05.11.2021
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, Billingham George & Partners will consider that its product has been validated, unless in a period not exceeding 90 working days, the client advises to the contrary.



Billinghurst George & Partners

CIVIL & STRUCTURAL ENGINEERS | BUILDING SURVEYORS

1st Floor, Wellington House, Wellington Court, Stockton-on-Tees, TS18 3TA
T 01642 876 470 @BGPconsulting E consulting@bgp-teeside.co.uk - W www.bgp-consulting.co.uk

Client	Copeland Borough Council
---------------	--------------------------

Project Cleator Moor Innovation Quarter	Project No. 21T2034
---	-------------------------------

Drawing Title							
Area 3 - Manhole Schedule							
Drawn	Date	Checked	Date	Size	Scale	Class.	Rev.
JUH	Nov 2021	JC	Nov 2021	A1	1:1000	52	P02
Location	Originator	Volume	Level	Type	Role	Unique No.	
CMIQ	BGP	02	XX	DR	C	02131	

File Reference	CMIQ-BGP-02-XX-DR-C-52-02131
----------------	------------------------------



DO NOT SCALE

Legend - Area 3 North

	Pipe 1.000 Area = 1085m ² = (0.1085ha) Fall = 0.509m / Length = 73.027m
	Pipe 1.001 Area = 207m ² = (0.0207ha) Fall = 0.179m / Length = 22.326m
	Pipe 1.002 Area = 0m ² = (0.0ha) Fall = 0.119m / Length = 14.930m
	Pipe 1.003 Area = 2032m ² = (0.2302ha) Fall = 1.494m / Length = 186.723m
	Pipe 1.004 Area = 0m ² = (0.0ha) Fall = 0.070m / Length = 8.722m
	Pipe 1.005 Area = 262m ² = (0.0262ha) Fall = 0.174m / Length = 21.757m
	Pipe 1.006 Area = 0m ² = (0.0ha) Fall = 0.032m / Length = 4.000m
	Pipe 1.007 Area = 0m ² = (0.0ha) Fall = 0.500m / Length = 42.742m
	Pipe 2.000 Area = 7280m ² = (0.7280ha) Fall = 0.050m / Length = 5.000m
	Pipe 3.000 Area = 9791m ² = (0.9791ha) Fall = 0.050m / Length = 5.000m
	Pipe 4.000 Area = 5208m ² = (0.5208ha) Fall = 0.050m / Length = 5.000m
	Pipe 5.000 Area = 9307m ² = (0.9307ha) Fall = 0.050m / Length = 5.000m
	Pipe 6.000 Area = 9538m ² = (0.9538ha) Fall = 0.050m / Length = 5.000m
	Pipe 7.000 Area = 0m ² = (0.0ha) Fall = 0.140m / Length = 14.000m
	Pipe 8.000 Area = 682m ² = (0.0682ha) Fall = 0.240m / Length = 24.028m
	Pipe 8.001 Area = 376m ² = (0.0376ha) Fall = 0.390m / Length = 38.986m
	Pipe 8.002 Area = 267m ² = (0.0267ha) Fall = 0.275m / Length = 27.491m

Impermeable Areas Total = 46305m² = (4.6305ha)

Legend - Area 3 South

	Impermeable Areas Total Area = 11103m ² = (1.1103ha)
-------------	--

Issued for Planning	JJH	P02	JC	23.03.2022
FIRST DRAFT	JJH	P01	JC	05.11.2021
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, Billingham 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.



Billingham George & Partners

CIVIL & STRUCTURAL ENGINEERS | BUILDING SURVEYORS

1st Floor, Wellington House, Wellington Court, Stockton-on-Tees, TS18 3TA

T 01642 876 470 @BGPconsulting E consulting@bgp-teeside.co.uk W www.bgp-consulting.co.uk

Client	Copeland Borough Council
--------	--------------------------

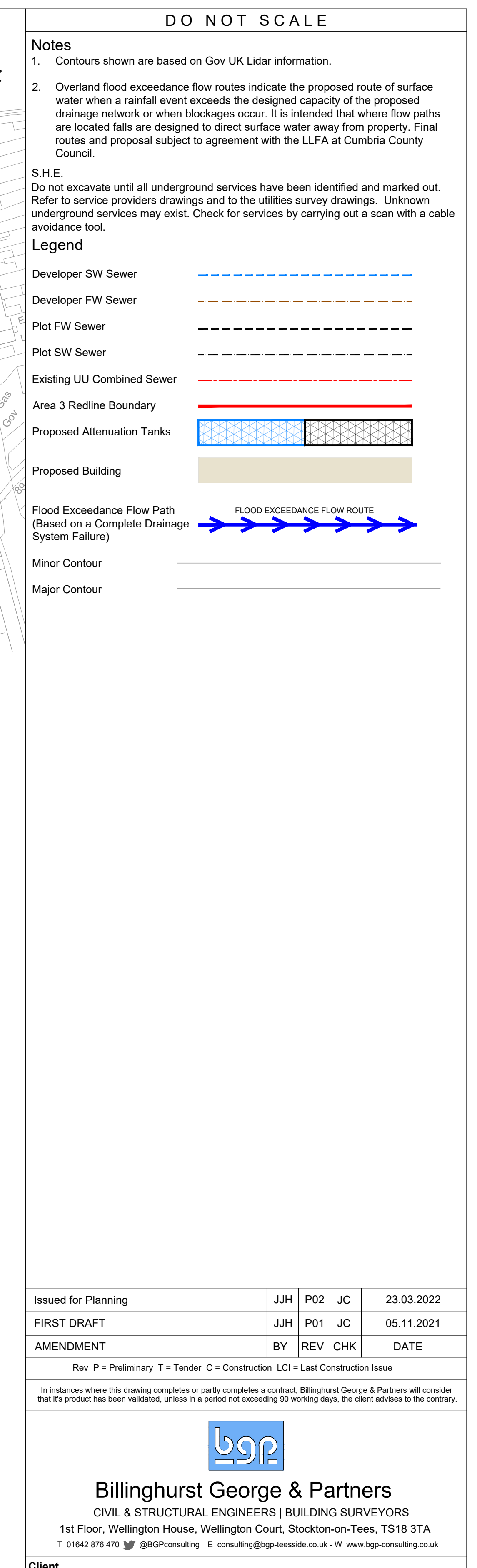
Project	Cleator Moor Innovation Quarter	Project No.	21T2034
---------	---------------------------------	-------------	---------

Drawing Title	Area 3 - Impermeable Areas Plan
---------------	---------------------------------

Drawn	Date	Checked	Date	Size	Scale	Class.	Rev.
JJH	Nov 2021	JC	Nov 2021	A1	1:1000	52	P02

Location	Originator	Volume	Level	Type	Role	Unique No.
CMIQ	BGP	02	XX	DR	C	02101

File Reference	CMIQ-BGP-02-XX-DR-C-52-02101
----------------	------------------------------



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 its product has been validated, unless in a period not exceeding 90 working days, the client advises to the contrary.


Billinghurst George & Partners
CIVIL & STRUCTURAL ENGINEERS | BUILDING SURVEYORS
1st Floor, Wellington House, Wellington Court, Stockton-on-Tees, TS18 3TA
T 01642 876 470  @BGPConsulting E consulting@bgp-leeside.co.uk W www.bgp-consulting.co.uk

Client Copeland Borough Council								
Project Cleator Moor Innovation Quarter						Project No. 21T2034		
Drawing Title Area 3 - Flood Exceedance Flow Path								
Drawn JJH	Date Nov 2021	Checked JC	Date Nov 2021	Size A1	Scale 1:1000	Class. 52	Rev. P02	
Location CMIQ	Originator BGP	Volume 02	Level XX	Type DR	Role C	Unique No. 02102		
File Reference CMIQ-BGP-02-XX-DR-C-52-02102								



Appendix G

Borehole Logs



Appendix H

Flood Maps for Planning

Flood map for planning

Your reference
Site B

Location (easting/northing)
301913/515763

Created
27 Oct 2021 11:02

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

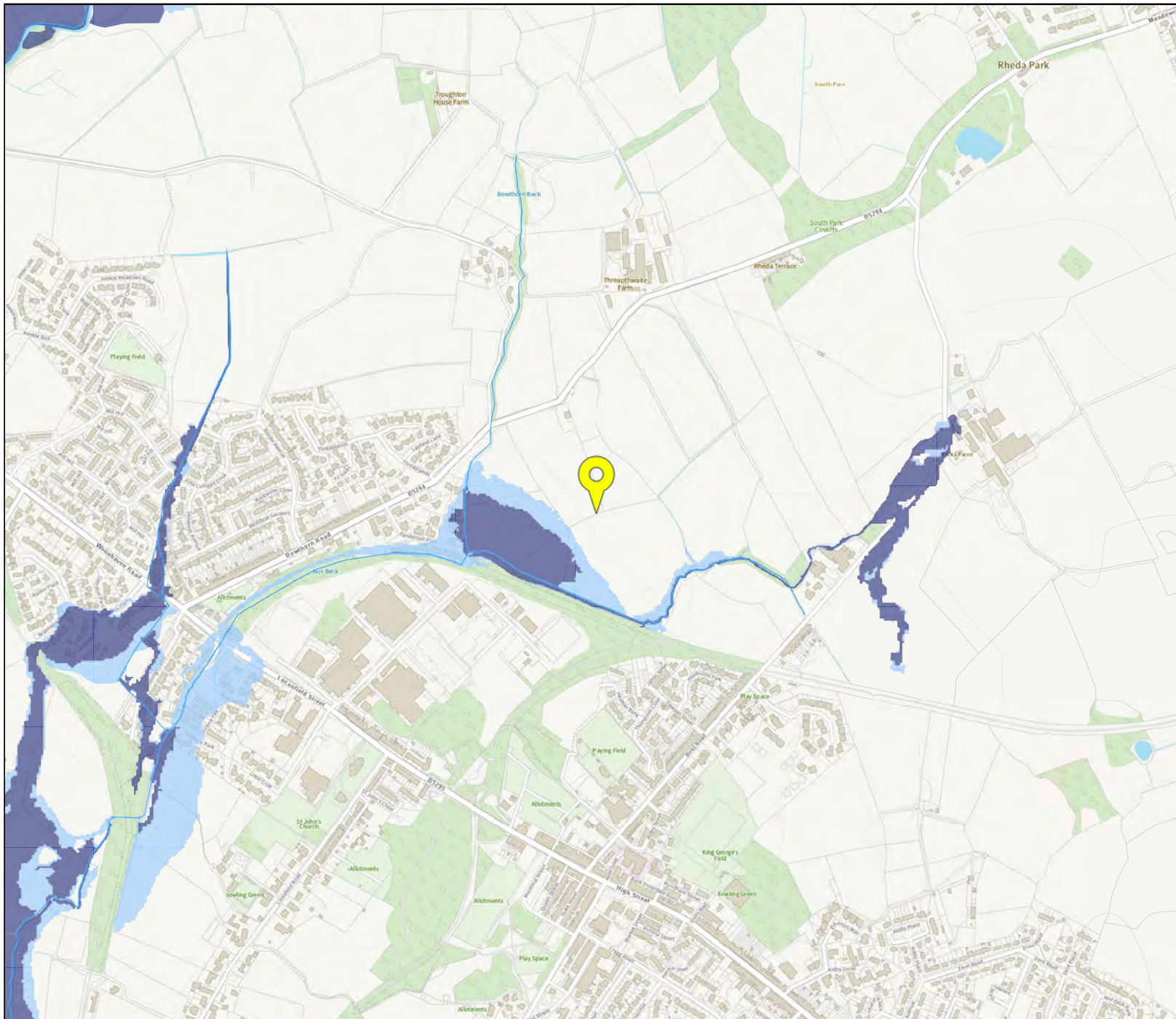
Notes

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

Site B

Location (easting/northing)

301913/515763

Scale

1:10000

Created

27 Oct 2021 11:02

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


0 100 200 300m



Appendix I

United Utilities, LLFA and EA Predevelopment Correspondence

James Herbert

From: Wastewater Developer Services <WastewaterDeveloperServices@uuplc.co.uk>
Sent: 28 October 2021 15:41
To: James Herbert
Cc: Wastewater Developer Services
Subject: {Disarmed} Pre Development Enquiry for: Leconfield Industrial Estate UU Reference Number : 4200044472

Good afternoon James,

Pre Development Enquiry for: Leconfield Industrial Estate UU Reference Number : 4200044472

We have carried out an assessment of your application which is based on the information provided. This pre-development advice on your drainage strategy will be valid for 12 months. Your drainage strategy will need to be reviewed by other competent authorities as part of the planning process, and we advise that you carry out the necessary site investigations to confirm the viability of your proposals.

If your investigations require access to our public sewer network, we ask that you contact our network engineers with a request for an access certificate via our main contact telephone number 0345 3723223 or refer to the link below:

<https://www.unitedutilities.com/builders-developers/working-near-our-assets/>

Foul Water

Foul flow from this site will be allowed to drain into the public foul water/combined sewer system.

For Site A : Our preferred point of discharge would be to the 675mm diameter public combined sewer within the vicinity of the site located to the North of your proposed development at an unrestricted rate.

For Site B : Our preferred point of discharge would be to the 600mm diameter public combined sewer within the vicinity of the site located to the West of your proposed development at an unrestricted rate.

For Site C : Our preferred point of discharge would be to the 300mm diameter public combined sewer within the site boundary located to the North of your proposed development at an unrestricted rate.

Please ensure all proposed manhole chambers cover levels and finished floor levels are higher than the receiving public sewer.

If you are able to identify an alternative, more suitable point of discharge, we request that you contact us at your earliest convenience so that we can assess suitability.

In accordance with our infrastructure plans we may ask you to change your point of connection. Therefore please contact us when you are ready to formalise your drainage proposals, we would suggest before you submit for Full Planning.

Surface Water

All surface water flow from the proposed development should drain in-line with the drainage hierarchy, as outlined in Paragraph 80, (Reference ID: 7-080-20150323), of the National Planning Practice Guidance. We also recommend you prioritise the use of multi-functional sustainable drainage systems for the management of surface water in accordance with national planning policy.

Generally, the aim should be to discharge surface run off as high up the following hierarchy of drainage options as reasonably practicable.

This is outlined as follows, in order of priority:

- 1. into the ground (infiltration);**
- 2. to a surface waterbody;**
- 3. to a surface water sewer or highway drain;**
- 4. to a combined sewer.**

For guidance, The **North West SuDS Pro-Forma** provides information on the appropriate evidence required at each stage of the hierarchy, to demonstrate how each level has been discounted.

The Lead Local Flood Authority has responsibility for all surface water drainage concerns and their input to your proposal is critical. You should also consider whether it is necessary to discuss your proposal with the Environment Agency, or Internal Drainage Board (if operating in your area).

The Local Planning Authority are the determining authority for any application for planning permission and the appropriate authority for determining cost viability of a proposed drainage scheme, such assessments are outside of the jurisdiction of United Utilities.

Infiltration

Surface water runoff generated from this development should discharge to the ground via infiltration system where feasible.

A detailed evidence based feasibility assessment must be carried out in line with Chapter 25 of the CIRIA SuDS Manual 2015 to determine whether infiltration is a suitable method of surface water disposal.

Particular attention must be paid to Ground Water Source Protection Zones to ensure that the risk of pollution to these valuable resources is not compromised. Details can be obtained from the government website:

<https://www.gov.uk/guidance/groundwater-source-protection-zones-spzs#find-groundwater-spzs>

If your site is in a Groundwater Source Protection Zone, you should have regard to the Environment Agency's approach to Groundwater Protection. Information on this is available via the link below:

<https://www.gov.uk/government/publications/groundwater-protection-position-statements>

Please note that such a location could have implications for the principle of your development and the need for additional mitigating measures to protect the groundwater environment and public water supply in the detailed design of your site.

Waterbody

If an evidence based assessment has been carried out and confirms that infiltration is not feasible, we recommend that you contact the Lead Local Flood Authority and/or Environment Agency to discuss a point of discharge to the open ordinary watercourse Norbeck (with onward flow) located in the site boundary of the proposed site.

We would encourage you to identify and engage with any third party landowner and riparian owner to agree access and discharge rights to the water body if this is not in your ownership.

Highway Drainage

If an evidence based assessment has been carried out and confirms that infiltration is not feasible, we recommend that you investigate the possibility of draining surface water to the highway drain where this ultimately discharges to a watercourse, by contacting the relevant Highway Authority.

Public Sewer

In accordance with the hierarchy of drainage options within the National Planning Practice Guidance, both discharge to ground via infiltration and discharge to a waterbody should be discounted prior to consideration of discharging surface water to the public sewer system. Evidence should be provided to demonstrate how these have been discounted, as outlined in the North West SuDS pro-forma.

Once evidence is provided as outlined above, For site C, United Utilities will consider a connection to the 300mm diameter public combined sewer within the site boundary located North of the proposed site at a pass forward flow to be agreed by the Lead Local Flood Authority. United Utilities request that any agreed rate does not exceed 5l/s.

As a Water Company, we have no obligation to accept highway drainage into our public sewer network. However, should your proposals include runoff from highways, we would request that consideration is given to SuDS components that deliver source control are incorporated within the design of the scheme to reduce the volume and frequency of discharges of these flows to the public sewer.

Levels

For low-lying sites, (where the ground level of the site or the level of a basement is below the ground level at the point where the drainage connects to the public sewer), care should be taken to ensure that the property is not at increased risk of flooding. If these circumstances exist, we recommend that you contact us to discuss further. It could affect the detailed design of your site and result in the need to incorporate appropriate mitigating measures in your drainage scheme.

Land drainage / Overland flows / track drainage

United Utilities have no obligation, and furthermore we do not accept land drainage, overland flows or track drainage into the public sewerage network under any circumstances

SuDS

If your development proposal incorporates any SuDS component(s) which interact with a sewer network you plan on offering for adoption to United Utilities; contact should be made with our technical team at your earliest convenience, please complete the 'Section 104 pre-application form : ' and include as much relevant detail as you can. These discussions can help prevent delays later in the development process.

Section 104 Pre application form (1b)

As per the sewerage sector guidance, all SuDS should be designed in accordance with the standards within the Design & construction guidance & the CIRIA SuDS manual (C753)

Existing Wastewater Assets Crossing the Site

According to our public sewer records there are public sewers located within your site boundary. We will require unrestricted access to the sewer for maintenance purposes, we would ask that you maintain a minimum clearance of 6m which is measured 3m from the centre line of the pipe unless there happens to be a formal easement agreement in place, in which case the specified easement width would apply. If you cannot achieve this then you may wish to consider diverting and or abandoning the public sewer.

Please refer to the link below to obtain full details of the processes involved with sewer diversions:

<https://www.unitedutilities.com/builders-developers/larger-developments/wastewater/sewer-diversions/>

Existing Water Assets Crossing the Site

It is the developer responsibility to identify utilities on-site. Where clean water assets are shown on our records, we recommend that you contact our Water Pre-Development Team, via the following email address:

DeveloperServicesWater@uuplc.co.uk. Further information for this service can be found on our website via the link below:

<https://www.unitedutilities.com/builders-developers/larger-developments/pre-development/water-pre-dev/>

Connection Application

Although we may discuss and agree discharge points and rates in principle, please be aware that you will have to apply for a formal sewer connection. This is so that we can assess the method of construction, Health & Safety requirements and to ultimately inspect the connection when it is made. Details of the application process and the form itself can be obtained from our website by following the link below:

<https://www.unitedutilities.com/builders-developers/larger-developments/wastewater/sewer-connections/>

We recommend that the detailed design should confirm the locations of all utilities in the area and ensure that any proposed drainage solution considers routing and clash checks where required.

If we can be of any further assistance please don't hesitate to contact us further.

Kind regards,



Mohammed Aljafarawi

Developer Engineer
Developer Services & Metering
Customer Services

Email: Mohammed.Aljafarawi@uuplc.co.uk
[unitedutilities.com](https://www.unitedutilities.com)

If you have received a great service today why not tell us?

Visit: [unitedutilities.com/wow](https://www.unitedutilities.com/wow)

Did you know we now have a live chat facility available to you Mon to Friday 8 -5pm. You just click on the orange live chat box on our webpage and one of our advisors will be ready to chat to you and help you with your enquiry <https://www.unitedutilities.com/builders-developers/> or you can email us at developerserviceswater@uuplc.co.uk

Barbara Vernon

For the attention of Barbara Vernon

Date: 22 September 2021
Our reference: PPA/2021/2180

Dear Barbara Vernon

PRE-PLANNING APPLICATION ADVICE

Pre-App Reference No. PPA/2021/2180

Site Location: Leconfield Industrial Estate, Cleator Moor, Cleator Moor, CA25 5QB

Proposal: Site A (re-develop existing) = 6 New Buildings with associated parking/service yards.

Site B (Greenfield) = 5 New Buildings with associated parking/service yards.

Site C (Greenfield) = 4 New Buildings with associated parking

Thank you once again for your request for pre-planning application advice in respect of the above proposed development. Cumbria County Council, in its capacity as the Lead Local Flood Authority (LLFA) has carefully reviewed your proposal and our advice and findings are detailed below.

Overview

In principle the proposals are acceptable, i would note the following observations.

- In looking back through our records, Norbeck is a main river which is controlled by the Environment Agency so discharge rates will require confirming with them and i would advise contact be made with the EA prior to any submission.
- River flooding levels in regard to site B and confirmation of acceptability of 1.0% AEP undefended/defended +35% CC will be from the EA.
- For all proposed sites the drainage hierarchy must be considered.
- I would suggest early pre-application advice is obtained from the EA, United Utilities and Sustrans.

Lead Local Flood Authority Advice and Comments

Existing Flood Risks:

- Site A - Shows minor areas affected by 1in100 year events
- Site B - Shows a significant portion to be affected at a 1in30 & 100 year event this area is also within flood zone 3.

- Site C - Shows flooding two areas affected by 1in3 & 100 year events.

Drainage Strategy/Design:

Site A - As this is an existing site which is to be expanded on, providing further new buildings the applicant is proposing a reduction in Brownfield of 50% if a existing outfall cannot be established to Norbeck in principle this is acceptable.

Should a discharge point be confirmed to Norbeck then the applicant needs to consider any new drainage in the northern area of the site being connected into the new drainage system at the southern end allowing it to out fall to Norbeck at a rate agreed with by the EA, the applicant needs to consider treatment of the surface water before out falling to main river.

Site B - The drainage hierarchy needs to be considered, infiltration testing to BRE365 should be undertaken to determine if land is suitable for infiltration. The proposed QBar discharge is acceptable to the LLFA however this should be agreed with the EA as the discharge point is main river.

Site C - As this land has previous use as allotment gardens it must be considered a greenfield site, again the drainage hierarchy must be considered, infiltration testing undertaken, there is local surface water drainage in the vicinity of the site in the form of the old railway drainage on the cyclepath to the north west boundary this should be explored further. Sustrans manage the cycle-way i would suggest contact be made with them.

Should investigations prove that the combined system in this area is the only available discharge point then it is likely that United Utilities would only accept the surface water into the combined system at a forward pass rate of 5L/s for all storm events.

Opportunities:

- Should an outfall to Norbeck not exist the applicant needs to consider establishing a new outfall to Norbeck for surface water from Site A with the agreement of the EA
- There is opportunity if the outfall to Norbeck can be confirmed then the northern part of site A needs to be configured to connect to the southern area drainage allowing surface water to discharge to main river if agreement can be obtained from the EA.
- Can the pre-existing part of Site A be retro fitted allowing for full separation of foul and surface water within this site?
- There requires consideration for treatment of surface water before out falling to the main river, has there been consideration of above ground storage that could incorporate treatment? Has permeable surfaces been considered within car parking areas that would allow for attenuation and also treatment of surface water to remove pollutants?

Information Necessary to Support a Planning Application

The following documents would be required to support a planning application:-

- Flood Risk Assessment
- Drainage Strategy
- CCTV survey information of existing drainage
- Management & Maintenance Plan for drainage that will remain private.

Proviso

The views and/or opinions expressed in the above advice are given in good faith and to the best of ability. They are based on existing guidance, standards and planning policies; and are given without prejudice to the consideration of any future planning application. The County Council cannot guarantee that new issues will not be raised following submission and evaluation of a planning application. Consequently County Council officers cannot give guarantees in respect of the recommendation it will make to the Local Planning Authority upon any future planning application subsequently lodged. This pre-planning application advice will be referred back to and considered by the County Council in preparing its technical recommendation, but it is subject to the proviso that circumstances and information may change or come to light that could alter the advice and/or position set out above. If there has been a significant delay in submitting your planning application after the pre-application advice was given then there will be a greater chance that there will have been a material change in national, regional or local policy and guidance or local circumstances. As you are no doubt aware, the final decision on a planning application will be taken by the relevant local planning authority, and not by the county council in its capacity as a statutory consultee.

I trust that the above is of assistance. Should you have any queries in respect of any aspect of the above then please do not hesitate to contact me.

Yours sincerely

Pieter Barnard

Lead Officer - Flood & Development Management 01228221331

James Herbert

From: NWNorthPlanning <CLPlanning@environment-agency.gov.uk>
Sent: 18 October 2021 17:27
To: James Herbert
Subject: {Disarmed} RE: New Development : Leconfield Industrial Estate, Cleator-Moor (Site B)

Dear Sir,

Thank you for your email.

In order for us to provide comprehensive answers to your questions, I would normally suggest that you use our Charged Advice service. Following the preparation and acceptance of a quote setting out what we could provide, we would expect to provide advice from the relevant technical teams at a rate of £100/hour plus VAT.
This service is provided to complement our statutory planning duty to provide comment on planning consultations.

However, due to staff shortages I regret that we are currently unable to provide any non-statutory support for planning applications, and hence unable to answer your questions in detail.

In the absence of more detailed advice I have sought some brief guidance from the relevant flood risk management team, and can provide the following comments – added in red text to your email below, that I hope will go some way in answering your questions.

Regards,

Liz Locke

Planning Advisor Sustainable Places, Cumbria and Lancashire.

Environment Agency | Ghyll Mount, Penrith 40 Business Park, Penrith, Cumbria, CA11 9BP

Liz.locke@environment-agency.gov.uk

External: | Mobile: 07795 968515
Working days: Monday to Thursday



From: James Herbert [mailto:James.Herbert@bgp-teesside.co.uk]
Sent: 05 October 2021 16:25
To: NWNorthPlanning <CLPlanning@environment-agency.gov.uk>
Subject: New Development : Leconfield Industrial Estate, Cleator-Moor (Site B)

FAO Flood Risk Department

SCHEME: Re-development of Leconfield Industrial Estate and new development of surrounding sites.