



Drainage Philosophy

21T2034 – Cleator Moor Innovation Quarter – Hub Building
CMIQ-BGP-05-XX-RP-C-DP005

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Drainage Philosophy

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
002	03/10/2022	Planning	JC

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

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1. 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 Leconfield Street, Cleator Moor. See Appendix A for the site location plan.
- 1.2. 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.
- 1.3. 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 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: 1.2625 Ha
- 2.2.2 Site Area to be developed: 1.2625 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 1.2625 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. Site Levels

- 2.3.1 A topographical survey was carried out by White Young Green in November 2019. This can be viewed in Appendix C.
- 2.3.2 The site is relatively flat at an approximate level of between 83.1m and 82.9m AOD, falls existing within the existing adjacent storage yard to provide drainage falls to gullies.

2.4. Existing Watercourses

- 2.4.1 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 northeast of site and runs southeast into Leconfield Industrial Estate and through to Leconfield Street. Nor Beck culvert continues southeast through Norbeck Park and adjacent fields ultimately converging with the River Keekle.
- 2.4.2 There are no other named or unnamed watercourses within close proximity to site.

2.5. Existing Public and Private Drainage

- 2.5.1 See Appendix D for locations of existing United Utilities public drains.
- 2.5.2 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.
- 2.5.3 A United Utilities 675mm diameter combined sewer is located just beyond the north western boundary, which drains southwest.
- 2.5.4 The 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 as mentioned previously. The foul water flows from the site currently discharge to the existing 675mm diameter United Utilities sewer located to the northwest of site.

2.6. Existing Ground Conditions

- 2.6.1 A 'Phase 2 Site Investigation' have been carried out by Solmek dated March 2022. (Report No. S220141).
- 2.6.2 The Phase 2 Site Investigation reveals that 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).
- 2.6.3 Perched groundwater was noted within TP06 at 0.40mbgl with groundwater strikes noted within the boreholes between 4.70 and 17.10mbgl.

2.7. Existing Flood Risk Assessment

- 2.6.1 A site-specific 'Flood Risk Assessment' (21T2034 – Flood Risk Assessment 005 Revision 002) 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 site is within Flood Zone 1 and is at low risk of flooding from all sources of flood risk post development. 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.
- 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 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.
- 3.1.2. The proposed site layout within Appendix B shows the extents of the building and car parking. The car parking and building will be accessible via existing Leconfield Industrial Estate access road.

4. Review of Surface Water Discharge Hierarchy

4.1. Existing Drainage Regime

- 4.1.1. 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.
- 4.1.2. A United Utilities 600mm diameter combined sewer is located just beyond the north western boundary, which drains southwest.
- 4.1.3. The 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 as mentioned previously. The foul water flows from the site currently discharge to the existing 675mm diameter United Utilities sewer located to the northwest of site.

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 2 Site Investigation' have been carried out by Solmek dated March 2022. (Report No. S220141).
- 4.3.3. The Phase 2 Site Investigation reveals that 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).
- 4.3.4. Perched groundwater was noted within TP06 at 0.40mbgl with groundwater strikes noted within the boreholes between 4.70 and 17.10mbgl.
- 4.3.5. 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.
- 4.3.6. It is anticipated that given the ground conditions 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 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.
- 4.4.2. The watercourse is within close proximity to the site and accessible via an existing connection therefore, as per the hierarchy within Building Regulations Part H3, it is deemed necessary to discharge the surface water to a nearby watercourse.

4.5. Discharge to a Surface Water Sewer

- 4.5.1. Not required as discharging to a watercourse.

4.6. Discharge to a Combined Sewer

- 4.6.1. Not required as discharging to a 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 Brownfield rates as per the Cumbria County Council SuDS Adoption Guidance for Major Developments.
- 5.1.2. The proposed Hub building and car parking forms part of a wider plan to re-develop the Leconfield Industrial Estate. A Brownfield discharge rate has been calculated for the re-developed area the new hub and car parking is within and is determined as 127.4 l/s. The Brownfield run off rate allocated for the proposed hub and car parking is **42.4 l/s**, this leaves 85.0 l/s for the next phase of works which is covered under a separate planning application.
- 5.1.3. See Appendix F for the Proposed Drainage Philosophy Plans and Impermeable areas.
- 5.1.4. The new hub building proposes to discharge surface water flows to the Nor Beck culverted watercourse passing through the wider Leconfield site via an existing connection. Surface water flows are to be restricted to a brownfield run off rate of 42.4 l/s, this rate is to be agreed with the Lead Local Flood Authority and Environment Agency.
- 5.1.5. The attenuation is to provide storage for approximately 230m³, this volume is based on the total impermeable surface area and restricted discharge rate of 42.4 l/s. It is proposed that volumes will be stored within a 1.0m deep attenuation tank.
- 5.1.6. The proposed site (within Appendix B) has no available space to incorporate open SuDS features such as basins or ponds.
- 5.1.7. Due to the absence of green open available space onsite it is deemed a suitable solution to provide the attenuation volume to retain the 1 in 100 year + 50% climate change flood event below ground within an attenuation tank.
- 5.1.8. The surface water system consists of a network of pipes which are located throughout the service yard, car park and landscaped surroundings. The network will drain via gravity to the flow control manhole, surface water will back up and utilise the attenuation structure when storm events exceeds the 42.4 l/s discharge rate noted above. The final connection to Nor Beck watercourse will be made indirectly through existing surface water sewers via gravity.
- 5.1.9. The Microdrainage Calculations for the attenuation volumes are included within Appendix E.
- 5.1.10. It is recommended that permeable paving be utilised within the car parking to treat all surface water flows from this area.
- 5.1.11. The proposed surface water system has been designed in line with good practice which ensures each are separate from the foul.
- 5.1.12. The above surface water discharge rate is 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 proposed foul drainage will remain private within site. The foul sewers are to drain via gravity to the foul water pumping station adjacent the service road. The pumped rising main beyond is to connect into an existing private foul water sewer. Thereafter the existing private sewer drains northwest ultimately discharging into the existing United Utilities 675mm diameter combined sewer.
- 6.3. The foul water connection location has been agreed with United Utilities through return of a pre-development enquiry, see Appendix I for details. The foul water discharge rate of the pumping station is to be determined during detailed design stage.

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 a hub building with associated car parking on the brownfield 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 + 50% 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-05-XX-RP-C-DP005

Report Title: Drainage Philosophy – Cleator Moor Innovation Quarter – Hub Building


James Herbert – Design Engineer

Date: 03/10/2022


Jim Conway –

Date: 03/10/2022

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, 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.				

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



Appendix C

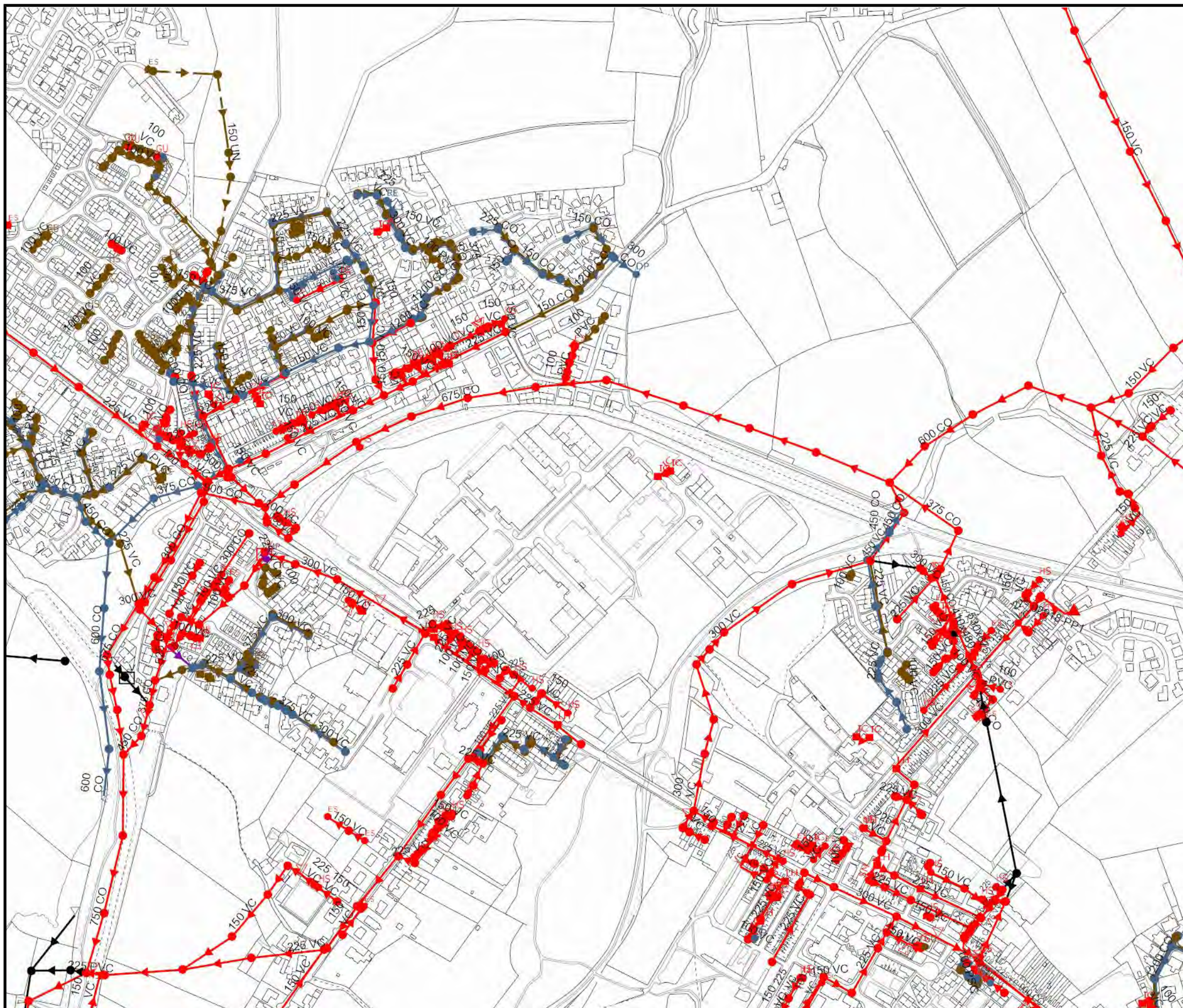
Topographical Survey





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.

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Appendix E

Microdrainage Calculations

BGP		Page 1
Wellington House, Wellington Court	SW Model	
Preston Farm	Hub	
Stockton On Tees TS18 3TA		
Date 20/09/2022 08:46	Designed by JJH	
File SW MODEL - 42.4 LS.MDX	Checked by JC	
Innovyze	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)	16.000	Add Flow / Climate Change (%)	0
Ratio R	0.258	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.	0.750	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	0.242	4-8	0.549	8-12	0.002

Total Area Contributing (ha) = 0.793

Total Pipe Volume (m³) = 80.750

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
1.000	28.777	0.060	479.6	0.065	4.00	0.0	0.600	o	600	Pipe/Conduit	
1.001	33.640	0.070	480.6	0.078	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.002	30.688	0.061	503.1	0.177	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.003	30.412	0.061	498.6	0.094	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.004	9.281	0.018	515.6	0.173	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.005	42.833	0.090	475.9	0.040	0.00	0.0	0.600	o	600	Pipe/Conduit	
2.000	28.776	0.230	125.1	0.051	4.00	0.0	0.600	o	225	Pipe/Conduit	
2.001	33.802	0.230	147.0	0.076	0.00	0.0	0.600	o	300	Pipe/Conduit	
2.002	20.328	0.090	225.9	0.039	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.006	73.760	0.150	491.7	0.000	0.00	0.0	0.600	o	600	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)
1.000	50.00	4.43	81.210	0.065	0.0	0.0	0.0	1.11	312.5	8.8
1.001	50.00	4.94	81.150	0.143	0.0	0.0	0.0	1.10	312.2	19.4
1.002	50.00	5.42	81.080	0.320	0.0	0.0	0.0	1.08	305.0	43.3
1.003	50.00	5.88	81.019	0.414	0.0	0.0	0.0	1.08	306.4	56.1
1.004	50.00	6.03	80.958	0.587	0.0	0.0	0.0	1.07	301.3	79.5
1.005	50.00	6.67	80.940	0.627	0.0	0.0	0.0	1.11	313.7	84.9
2.000	50.00	4.41	81.775	0.051	0.0	0.0	0.0	1.17	46.4	6.9
2.001	50.00	4.85	81.470	0.127	0.0	0.0	0.0	1.29	91.5	17.2
2.002	50.00	5.17	81.240	0.166	0.0	0.0	0.0	1.04	73.7	22.5
1.006	50.00	7.80	80.850	0.793	0.0	0.0	0.0	1.09	308.6	107.4

BGP		Page 2
Wellington House, Wellington Court	SW Model	
Preston Farm	Hub	
Stockton On Tees TS18 3TA		
Date 20/09/2022 08:46	Designed by JJH	
File SW MODEL - 42.4 LS.MDX	Checked by JC	
Innovyze	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
1.007	16.512	0.035	471.8	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.008	8.457	0.135	62.6	0.000	0.00	0.0	0.600	o	300	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)
1.007	50.00	8.05	80.700	0.793	0.0	0.0	0.0	1.11	315.1	107.4
1.008	50.00	8.12	80.665	0.793	0.0	0.0	0.0	1.99	140.7	107.4

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)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
S1	83.050	1.840	Open Manhole	1500	1.000	81.210	600				
S2	83.050	1.900	Open Manhole	1500	1.001	81.150	600	1.000	81.150	600	
S3	83.050	1.970	Open Manhole	1500	1.002	81.080	600	1.001	81.080	600	
S4	83.050	2.031	Open Manhole	1500	1.003	81.019	600	1.002	81.019	600	
S5	83.050	2.092	Open Manhole	1500	1.004	80.958	600	1.003	80.958	600	
S6	83.050	2.110	Open Manhole	1800	1.005	80.940	600	1.004	80.940	600	
S10	83.050	1.275	Open Manhole	1200	2.000	81.775	225				
S11	83.050	1.580	Open Manhole	1200	2.001	81.470	300	2.000	81.545	225	
S12	83.050	1.810	Open Manhole	1200	2.002	81.240	300	2.001	81.240	300	
S7	83.050	2.200	Open Manhole	1800	1.006	80.850	600	1.005	80.850	600	
								2.002	81.150	300	
S8	82.850	2.150	Open Manhole	1500	1.007	80.700	600	1.006	80.700	600	
S9	82.850	2.185	Open Manhole	2100	1.008	80.665	300	1.007	80.665	600	
Ex SW MH17	82.850	2.320	Open Manhole	0		OUTFALL		1.008	80.530	300	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S1	301882.334	515511.821	301882.334	515511.821	Required	
S2	301853.558	515512.066	301853.558	515512.066	Required	
S3	301836.590	515483.019	301836.590	515483.019	Required	
S4	301810.147	515498.592	301810.147	515498.592	Required	
S5	301795.711	515525.359	301795.711	515525.359	Required	
S6	301789.148	515531.922	301789.148	515531.922	Required	
S10	301882.617	515541.952	301882.617	515541.952	Required	
S11	301853.843	515542.261	301853.843	515542.261	Required	
S12	301837.371	515571.778	301837.371	515571.778	Required	
S7	301819.435	515562.210	301819.435	515562.210	Required	
S8	301767.275	515614.362	301767.275	515614.362	Required	

Manhole Schedules for Storm

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S9	301752.455	515621.643	301752.455	515621.643	Required	
Ex SW MH17	301744.865	515625.372			No Entry	

BGP		Page 5
Wellington House, Wellington Court Preston Farm Stockton On Tees TS18 3TA	SW Model Hub	
Date 20/09/2022 08:46 File SW MODEL - 42.4 LS.MDX	Designed by JJH Checked by JC	
Innovyze Network 2020.1.3		

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.065	0.065	0.065
1.001	-	-	100	0.078	0.078	0.078
1.002	-	-	100	0.177	0.177	0.177
1.003	-	-	100	0.094	0.094	0.094
1.004	-	-	100	0.173	0.173	0.173
1.005	-	-	100	0.040	0.040	0.040
2.000	-	-	100	0.051	0.051	0.051
2.001	-	-	100	0.076	0.076	0.076
2.002	-	-	100	0.039	0.039	0.039
1.006	-	-	100	0.000	0.000	0.000
1.007	-	-	100	0.000	0.000	0.000
1.008	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.793	0.793	0.793

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)
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1.008	Ex SW MH17	82.850	80.530	1.200	0	0
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Simulation Criteria for Storm

Volumetric Runoff Coeff	1.000	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	0.000
Hot Start (mins)	0	Inlet Coefficient	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 Time/Area Diagrams	0
Number of Online Controls	1	Number of Storage Structures	1	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)	16.000	Storm Duration (mins)	30
Ratio R	0.258		

Online Controls for Storm

Hydro-Brake® Optimum Manhole: S9, DS/PN: 1.008, Volume (m³): 11.7

Unit Reference	MD-SHE-0269-4240-1500-4240
Design Head (m)	1.500
Design Flow (l/s)	42.4
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	269
Invert Level (m)	80.665
Minimum Outlet Pipe Diameter (mm)	300
Suggested Manhole Diameter (mm)	1800

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.500	42.4	Kick-Flo®	1.053	35.8
Flush-Flo™	0.489	42.4	Mean Flow over Head Range	-	36.0

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	8.5	0.800	40.8	2.000	48.7	4.000	68.1	7.000	89.4
0.200	27.6	1.000	37.6	2.200	51.0	4.500	72.1	7.500	92.5
0.300	40.7	1.200	38.1	2.400	53.2	5.000	75.9	8.000	95.4
0.400	42.1	1.400	41.0	2.600	55.3	5.500	79.5	8.500	98.3
0.500	42.4	1.600	43.7	3.000	59.2	6.000	82.9	9.000	101.0
0.600	42.1	1.800	46.3	3.500	63.8	6.500	86.2	9.500	103.8

Storage Structures for Storm

Tank or Pond Manhole: S6, DS/PN: 1.005

Invert Level (m) 81.050

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	230.0	1.000	230.0	1.001	0.0

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor 1.000

Additional Flow - % of Total Flow 0.000

Hot Start (mins) 0

MADD Factor * 10m³/ha Storage 0.000

Hot Start Level (mm) 0

Inlet Coeffiecient 0.800

Manhole Headloss Coeff (Global) 0.500

Flow per Person per Day (l/per/day) 0.000

Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0

Number of Offline Controls 0

Number of Time/Area Diagrams 0

Number of Online Controls 1

Number of Storage Structures 1

Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 16.000

Cv (Summer) 1.000

Region England and Wales

Ratio R 0.258

Cv (Winter) 1.000

Margin for Flood Risk Warning (mm) 300.0

Analysis Timestep 2.5 Second Increment (Extended)

DTS Status OFF

DVD Status ON

Inertia Status ON

Profile(s) Summer and Winter

Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440

Return Period(s) (years) 1, 30, 100

Climate Change (%) 0, 0, 50

									Water	Surcharged	Flooded		
	US/MH			Return	Climate	First (X)	First (Y)	First (Z)	Overflow	Level	Depth	Volume	Flow /
PN	Name	Storm	Period	Change		Surcharge	Flood	Overflow	Act.	(m)	(m)	(m³)	Cap.
1.000	S1	15 Summer		1	+0%	100/60 Summer				81.309	-0.501	0.000	0.03
1.001	S2	30 Summer		1	+0%	100/15 Winter				81.286	-0.464	0.000	0.05
1.002	S3	30 Summer		1	+0%	100/60 Summer				81.262	-0.418	0.000	0.12
1.003	S4	30 Summer		1	+0%	100/30 Summer				81.227	-0.392	0.000	0.15
1.004	S5	30 Summer		1	+0%	100/30 Summer				81.194	-0.364	0.000	0.33
1.005	S6	30 Summer		1	+0%	100/30 Summer				81.102	-0.438	0.000	0.13
2.000	S10	15 Summer		1	+0%	100/60 Summer				81.835	-0.165	0.000	0.16
2.001	S11	15 Summer		1	+0%	100/15 Summer				81.555	-0.215	0.000	0.17
2.002	S12	15 Summer		1	+0%	100/15 Summer				81.350	-0.190	0.000	0.29
1.006	S7	60 Summer		1	+0%	100/15 Summer				81.024	-0.426	0.000	0.15
1.007	S8	60 Summer		1	+0%	100/15 Summer				80.944	-0.356	0.000	0.20
1.008	S9	60 Summer		1	+0%	30/15 Summer				80.926	-0.039	0.000	0.42

Half Drain Pipe					
PN	US/MH Name	Overflow (l/s)	Time (mins)	Flow (l/s)	Level Exceeded Status
1.000	S1			8.6	OK
1.001	S2			14.2	OK
1.002	S3			29.8	OK
1.003	S4			37.1	OK
1.004	S5			51.4	OK
1.005	S6			34.9	OK
2.000	S10			7.0	OK
2.001	S11			14.6	OK
2.002	S12			18.7	OK
1.006	S7			40.9	OK
1.007	S8			38.6	OK
1.008	S9			38.4	OK

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor 1.000

Additional Flow - % of Total Flow 0.000

Hot Start (mins) 0

MADD Factor * 10m³/ha Storage 0.000

Hot Start Level (mm) 0

Inlet Coefficient 0.800

Manhole Headloss Coeff (Global) 0.500

Flow per Person per Day (l/per/day) 0.000

Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0

Number of Offline Controls 0

Number of Time/Area Diagrams 0

Number of Online Controls 1

Number of Storage Structures 1

Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 16.000

Cv (Summer) 1.000

Region England and Wales

Ratio R 0.258

Cv (Winter) 1.000

Margin for Flood Risk Warning (mm) 300.0

Analysis Timestep 2.5 Second Increment (Extended)

DTS Status OFF

DVD Status ON

Inertia Status ON

Profile(s) Summer and Winter

Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440

Return Period(s) (years) 1, 30, 100

Climate Change (%) 0, 0, 50

									Water	Surcharged	Flooded		
	US/MH			Return	Climate	First (X)	First (Y)	First (Z)	Overflow	Level	Depth	Volume	Flow /
PN	Name	Storm		Period	Change	Surcharge	Flood	Overflow	Act.	(m)	(m)	(m³)	Cap.
1.000	S1	30 Summer		30	+0%	100/60 Summer				81.488	-0.322	0.000	0.07
1.001	S2	30 Summer		30	+0%	100/15 Winter				81.477	-0.273	0.000	0.12
1.002	S3	15 Summer		30	+0%	100/60 Summer				81.447	-0.233	0.000	0.29
1.003	S4	15 Summer		30	+0%	100/30 Summer				81.417	-0.202	0.000	0.37
1.004	S5	15 Summer		30	+0%	100/30 Summer				81.382	-0.176	0.000	0.84
1.005	S6	60 Summer		30	+0%	100/30 Summer				81.294	-0.246	0.000	0.23
2.000	S10	15 Summer		30	+0%	100/60 Summer				81.872	-0.128	0.000	0.39
2.001	S11	15 Summer		30	+0%	100/15 Summer				81.620	-0.150	0.000	0.49
2.002	S12	15 Summer		30	+0%	100/15 Summer				81.451	-0.089	0.000	0.82
1.006	S7	60 Summer		30	+0%	100/15 Summer				81.273	-0.177	0.000	0.30
1.007	S8	60 Summer		30	+0%	100/15 Summer				81.223	-0.077	0.000	0.27
1.008	S9	60 Summer		30	+0%	30/15 Summer				81.191	0.226	0.000	0.46

Half Drain Pipe					
PN	US/MH Name	Overflow (l/s)	Time (mins)	Flow (l/s)	Status
1.000	S1			18.2	OK
1.001	S2			31.0	OK
1.002	S3			72.6	OK
1.003	S4			92.1	OK
1.004	S5			131.5	OK
1.005	S6			63.4	OK
2.000	S10			16.7	OK
2.001	S11			41.0	OK
2.002	S12			53.0	OK
1.006	S7			84.1	OK
1.007	S8			51.2	OK
1.008	S9			42.3	SURCHARGED

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor 1.000

Additional Flow - % of Total Flow 0.000

Hot Start (mins) 0

MADD Factor * 10m³/ha Storage 0.000

Hot Start Level (mm) 0

Inlet Coefficient 0.800

Manhole Headloss Coeff (Global) 0.500

Flow per Person per Day (l/per/day) 0.000

Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0

Number of Offline Controls 0

Number of Time/Area Diagrams 0

Number of Online Controls 1

Number of Storage Structures 1

Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model

FSR M5-60 (mm) 16.000

Cv (Summer) 1.000

Region England and Wales

Ratio R 0.258

Cv (Winter) 1.000

Margin for Flood Risk Warning (mm)

300.0

Analysis Timestep 2.5 Second Increment (Extended)

DTS Status

OFF

DVD Status

ON

Inertia Status

ON

Profile(s)

Summer and Winter

Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440

Return Period(s) (years) 1, 30, 100

Climate Change (%) 0, 0, 50

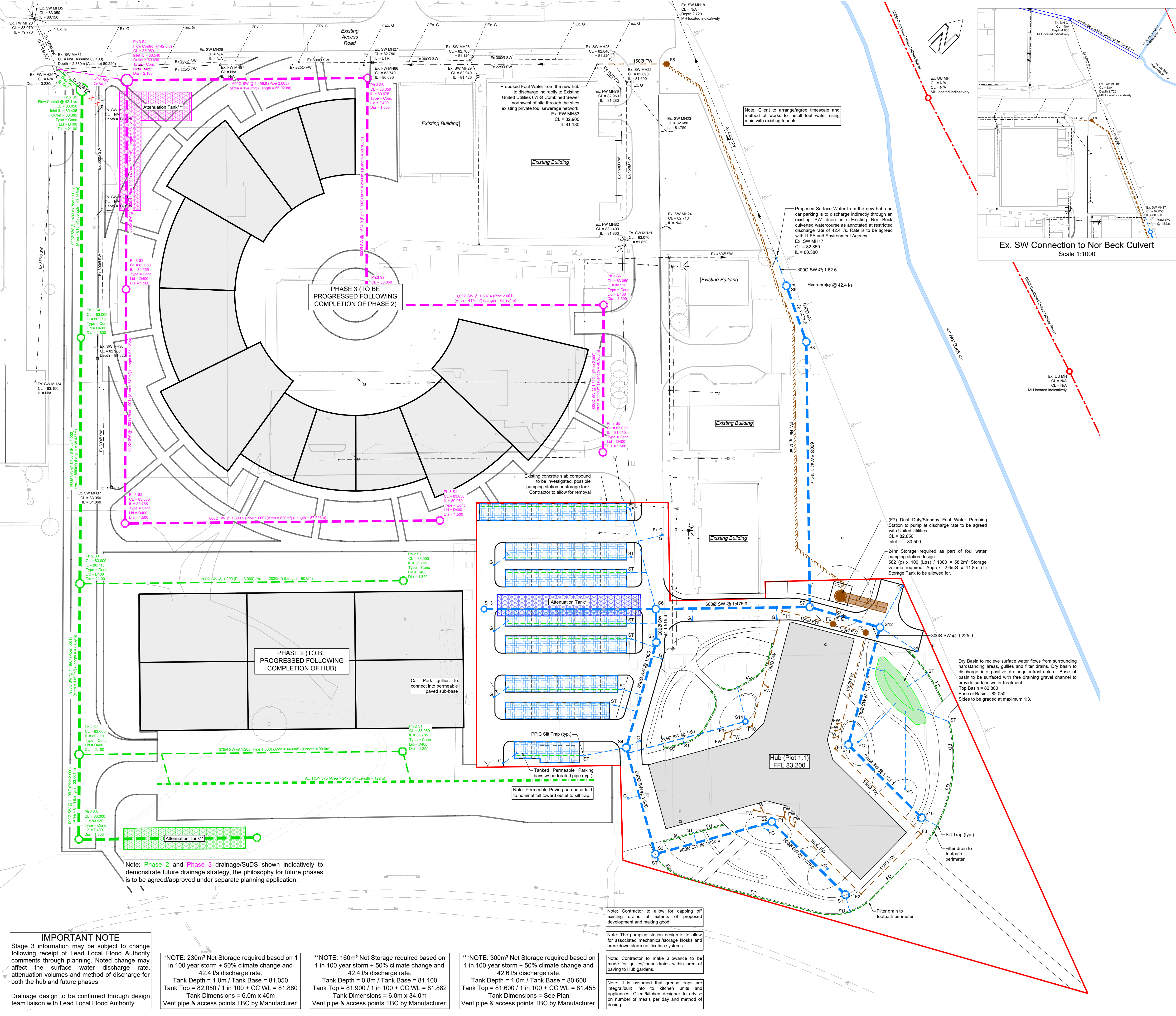
											Water	Surcharged	Flooded
		US/MH	Return	Climate	First (X)	First (Y)	First (Z)	Overflow			Level	Depth	Volume
PN	Name	Storm	Period	Change	Surcharge	Flood	Overflow	Act.			(m)	(m)	(m³)
1.000	S1	120 Summer	100	+50%	100/60 Summer						81.905	0.095	0.000
1.001	S2	120 Summer	100	+50%	100/15 Winter						81.903	0.153	0.000
1.002	S3	120 Summer	100	+50%	100/60 Summer						81.900	0.220	0.000
1.003	S4	120 Summer	100	+50%	100/30 Summer						81.894	0.275	0.000
1.004	S5	120 Summer	100	+50%	100/30 Summer						81.887	0.329	0.000
1.005	S6	120 Summer	100	+50%	100/30 Summer						81.880	0.340	0.000
2.000	S10	120 Summer	100	+50%	100/60 Summer						82.098	0.098	0.000
2.001	S11	120 Summer	100	+50%	100/15 Summer						82.102	0.332	0.000
2.002	S12	120 Summer	100	+50%	100/15 Summer						82.082	0.542	0.000
1.006	S7	120 Summer	100	+50%	100/15 Summer						82.078	0.628	0.000
1.007	S8	120 Summer	100	+50%	100/15 Summer						82.273	0.973	0.000
1.008	S9	120 Summer	100	+50%	30/15 Summer						82.275	1.310	0.000

					Half Drain	Pipe		
		US/MH	Flow /	Overflow	Time	Flow	Level	
PN	Name	Cap.	(l/s)	(mins)	(l/s)	Status	Exceeded	
1.000	S1	0.08			20.7	SURCHARGED		
1.001	S2	0.15			39.9	SURCHARGED		
1.002	S3	0.37			91.7	SURCHARGED		
1.003	S4	0.47			116.5	SURCHARGED		
1.004	S5	1.08			170.0	SURCHARGED		
1.005	S6	0.56			151.6	SURCHARGED		
2.000	S10	0.39			16.9	SURCHARGED		
2.001	S11	0.50			42.0	SURCHARGED		
2.002	S12	0.85			54.6	SURCHARGED		
1.006	S7	0.45			127.3	SURCHARGED		
1.007	S8	0.40			77.0	SURCHARGED		
1.008	S9	0.46			42.3	SURCHARGED		



Appendix F

Proposed Drainage Philosophy Plans



DO NOT SCALE

Notes

1. All works to be carried out in accordance with:

1.1 Design and Construction Guidance (DCG) and Sewerage Sector Guidance (SSG) for all sewers proposed to be offered for adoption. (note - the SSG replaces Sewers for Adoption (SfA) for all new developments)

1.2 BS EN 752 - 'Drain and Sewer Systems Outside Buildings'

1.3 Current applicable Building Regulations

1.4 BGP Specifications

1.5 Manufacturer installation guidance and requirements

2. All levels shown are in metres and are relative to Ordnance datum (m AOD).

3. Invert levels of all existing chambers and connection points are to be confirmed and engineer advised prior to commencement of any Drainage Works.

4. Where proposed sewers connect into existing sewers, the existing sewers must be checked for line, level and condition preferably by a CCTV survey

5. Concrete bed and surround is required to all gully leads and to all pipes in highways/hardstanding where cover to pipe <1200mm

6. All pipes to be either extra strength V.C. to BS 85 or PVC certified to WIS 4-35-01 and BS/EN13476 'UPONOR ULTRARIB' or concrete pipes Class 120 to BS/EN 1916/BS5911-1 2002.

7. Existing sewer positions are indicative and are not to be used in conjunction with design. Contractor to confirm location.

8. Contractor is responsible for positioning MHs so they do not compromise line or level of kerbing or other delineation at the junction of two surface materials.

9. Cover levels shown are indicative and may vary on site. The contractor should adjust levels to suit site conditions

10. Other services are not shown on this drawing, however their presence must be anticipated. The contractor is to confirm prior to commencing any works, the location and depth of all services that may affect the works the manufacturers requirements and recommendations.

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

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

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

S.H.E.

Do not excavate until all underground services have been identified and marked out. Refer to service providers drawings and to the utilities survey drawings. Unknown underground services may exist. Check for services by carrying out a scan with a cable avoidance tool.

Legend

Proposed SW Sewer

Proposed FW Sewer

Nor Beck (Culverted)

Existing SW Sewer

Existing FW Sewer

Existing UU Combined Sewer

Hub Site Boundary

Proposed Attenuation Tank

Permeable Paved Paving with perf. pipe (Tankd)

Filter Drain

Yard Gully

Highway Gully fitted with Naylor Smart Gully Adapter (or similar approved by LLFA)

Phase 2 Drainage

Phase 3 Drainage

Note: Phase 2 and Phase 3 drainage/SuDS shown indicatively to demonstrate future drainage strategy, the philosophy for future phases is to be agreed/approved under separate planning application.

Issued for Stage 3	JJH	P04	JC	03.10.2022
Issued for Stage 3	JJH	P03	JC	08.09.2022
Issued for Stage 3	JJH	P02	JC	29.07.2022
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, 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.

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Client

Copeland Borough Council

Project

Cleator Moor Innovation Quarter

Project No.

21T2034

Drawing Title

Hub - Drainage Plan

Drawn	Date	Checked	Date	Size	Scale	Class.	Rev.
JJH	March 2022	JC	March 2022	A1	1:500	52	P04

Location	Originator	Volume	Level	Type	Role	Unique No.
CMIQ	BGP	05	XX	DR	C	05130

File Reference

CMIQ-BGP-05-XX-DR-C-52-05130

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 - Hub											
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	83.050	81.210	Conc.	1.500	D400	28.777	1.840	0.600	1.240	1:479.6	
S2	83.050	81.150	Conc.	1.500	D400	33.640	1.900	0.600	1.300	1:480.6	
S3	83.050	81.080	Conc.	1.500	D400	30.688	1.970	0.600	1.370	1:500	
S4	83.050	81.019	Conc.	1.500	D400	30.412	2.031	0.600	1.431	1:500	
S5	83.050	80.958	Conc.	1.500	D400	9.281	2.092	0.600	1.492	1:515.6	
S6	83.050	80.940	Conc.	1.800	D400	42.833	2.110	0.600	1.510	1:475.9	
S7	83.050	80.850	Conc.	1.500	D400	73.760	2.200	0.600	1.600	1:491.7	
S8	82.850	80.700	Conc.	1.500	D400	16.512	2.150	0.600	1.550	1:471.8	
S9	82.850	80.665 (Inlet) 80.615 (Outlet)	Conc.	2.100	D400	8.457	-	0.300	-	1:62.6	Hydrobrake @ 42.4l/s
S10	83.050	81.775	Conc.	1.200	D400	28.776	1.275	0.225	1.050	1:125.1	
S11	83.050	81.470	Conc.	1.200	D400	33.802	1.580	0.300	1.280	1:147	
S12	83.050	81.240	Conc.	1.200	D400	20.328	1.810	0.300	1.510	1:225.9	
S13	83.050	81.200	Conc.	1.500	D400	46.598	1.850	0.600	1.250	1:200	
S14	83.050	81.625	Conc.	1.200	D400	33.919	1.425	0.225	1.200	1:50	
ST	-	-	PPIC	0.450	B125	-	0.700	0.100	0.600	Varies	700mm Depth Silt Trap

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 junction 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.

Foul Water Drainage Manhole Schedule - Hub											
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
F1	83.050	82.135	PPIC	0.450	B125	30.289	0.915	0.150	0.765	1:60	
F2	83.050	81.630	PPIC	0.450	B125	23.616	1.420	0.150	1.270	1:80	
F3	83.050	81.335	PPIC	0.450	B125	33.522	1.715	0.150	1.565	1:80	
F4	83.050	81.000	PPIC	0.450	B125	33.400	2.050	0.150	1.900	1:100	
F5	83.050	80.665	Conc	1.200	D400	9.450	2.385	0.150	2.235	1:100	
F6	83.050	80.570	Conc	1.200	D400	7.000	2.480	0.150	2.330	1:100	
⚠ F7	82.850	80.500 (Inlet)	Specialist	2.600	D400	165.663	#####	0.150 (HDPE Rising Main TBC by Specialist)	N/A	1: -116.25	
F8	83.050	81.925	Conc	1.200	D400	19.163	1.125	0.150	0.975	1:25	
F9	83.050	82.275	PPIC	0.450	B125	7.719	0.775	0.150	0.625	1:40	
F10	83.050	82.080	PPIC	0.450	B125	33.080	0.970	0.150	0.820	1:60	
F11	83.050	81.665	PPIC	0.450	B125	14.597	1.385	0.150	1.235	1:13	
FW	83.050	82.350	PPIC	0.450	B125	-	0.700	0.100	0.600	Varies	700mm Depth

△ All Pumping Station information is subject to change upon detailed design stage. The pumping station is to be designed to accommodate 24hr breakdown storage.

Issued for Stage 3	JJH	P04	JC	03.10.2022
Issued for Stage 3	JJH	P03	JC	08.09.2022
Issued for Stage 3	JJH	P02	JC	29.07.2022
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, 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.



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Client
Copeland Borough Council

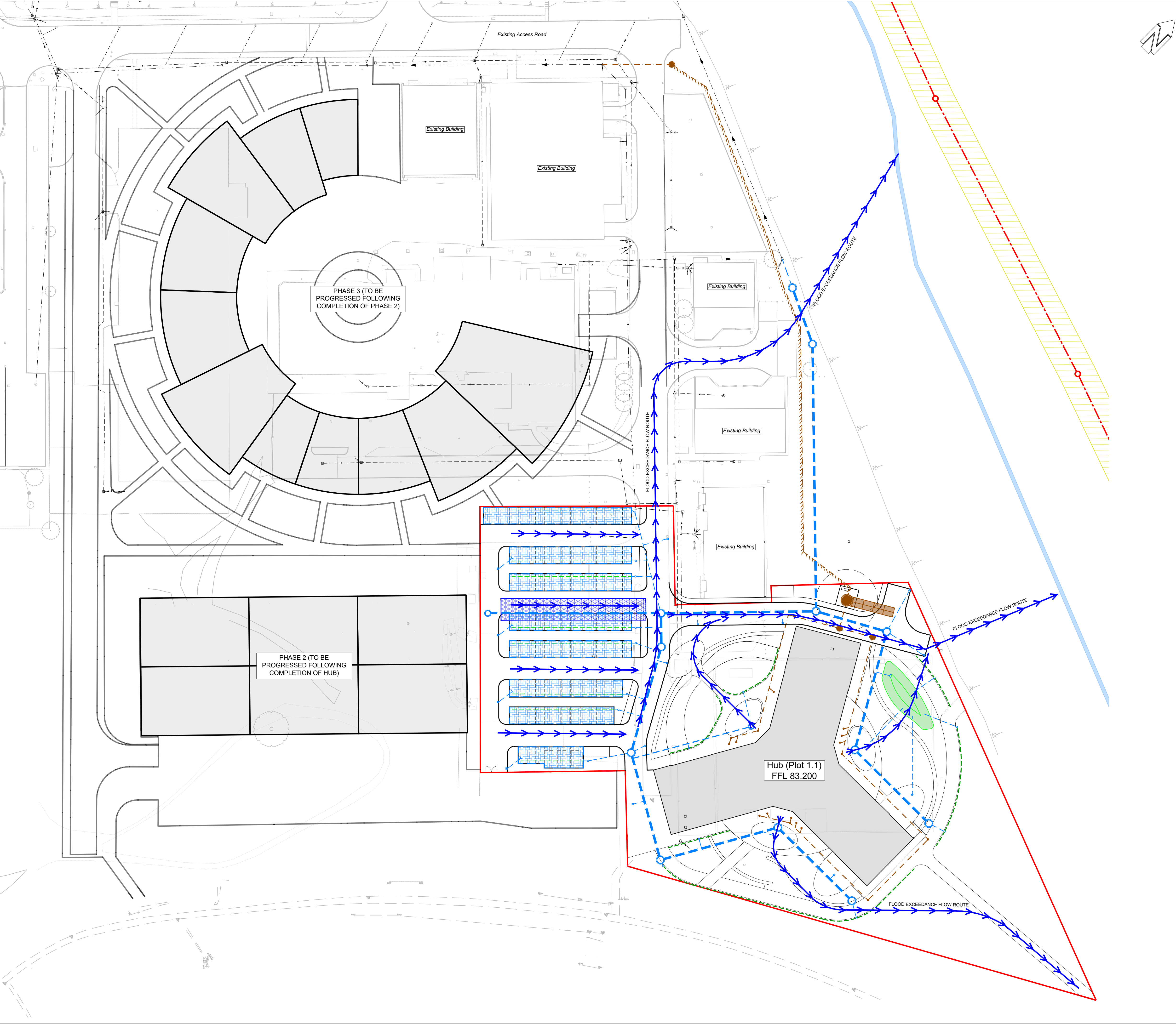
Project	Project No.
Cleator Moor Innovation Quarter	21T2034

Drawing Title
Hub - Manhole Schedule

Drawn	Date	Checked	Date	Size	Scale	Class.	Rev.
JJH	March 2021	JC	March 2021	A1	1:1000	52	P04

Location	Originator	Volume	Level	Type	Role	Unique No.
CMIQ	BGP	05	XX	DR	C	05131

File Reference
CMIQ-BGP-05-XX-DR-C-52-05131



DO NOT SCALE

Notes

- 1. Routes shown are based on White Young Green topographic survey.
- 2. Overland flood exceedance flow routes indicate the proposed route of surface water when a rainfall event exceeds the designed capacity of the proposed drainage network or when blockages occur. It is intended that where flow paths are located falls are designed to direct surface water away from property. Final routes and proposal subject to agreement with the LLFA at Cumbria County Council.

S.H.E.
Do not excavate until all underground services have been identified and marked out. Refer to service providers drawings and to the utilities survey drawings. Unknown underground services may exist. Check for services by carrying out a scan with a cable avoidance tool.

Legend

- Proposed SW Sewer
- Proposed FW Sewer
- Nor Beck (Culverted)
- Existing SW Sewer
- Existing FW Sewer
- Existing UU Combined Sewer
- Hub Redline Boundary
- Proposed Attenuation Tank
- Tanked Permeable Paved Parking Bays with perf. pipe
- Flood Exceedance Flow Path (Based on a Complete Drainage System Failure)

Issued for Stage 3	JJH	P04	JC	03.10.2022
Issued for Stage 3	JJH	P03	JC	08.09.2022
Issued for Stage 3	JJH	P02	JC	29.07.2022
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, 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

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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 Hub - Flood Exceedance Flow Path							
Drawn JJH	Date March 2022	Checked JC	Date March 2022	Size A1	Scale 1:500	Class. 52	Rev. P04
Location CMIQ	Originator BGP	Volume 05	Level XX	Type DR	Role C	Unique No. 05102	

File Reference
CMIQ-BGP-05-XX-DR-C-52-05102



Appendix G

Borehole Logs

1 EXECUTIVE SUMMARY

Site Address	Leconfield Industrial Estate, Cleator Moor
Proposed Development	The site is outlined for development of a storage yard in the west and a new building in the east..
Fieldwork	• 9no rotary open-hole/cored boreholes (BH01 to RBH09 inclusive to a maximum depth of 40.00mbgl with 2no monitoring pipes in BHs 07 & 08. • 2no days slit trenching, 1 day in the area of each shaft (301515-006 & 301515-008) including anomaly A2. • 16no machine excavated trial pits (TP01 to TP16) were dug to a maximum depth of 1.10mbgl.
Ground Conditions	• Made ground was encountered to depths of between 1.30mbgl and 10.20mbgl. • Firm to stiff consistency sandy gravelly medium to high strength encountered (0.90-5.00m thick). • Locally underlain by dense sands and gravels (1.60-10.90m thick). • Rockhead between 7.30 & 18.00mbgl, generally comprising sandstones and mudstones with thin intact coal bands. • Groundwater was noted locally between 0.40 and 17.10m.
Contamination Testing Results	• 13no made ground samples tested. • Results will be added as an addendum to this report.
Contamination Analysis	• Interim Conceptual Model provided based on encountered ground conditions and historic WYG works. • Updated Conceptual Model to be issued once outstanding contamination testing results are received.
Geotechnical Testing Results	• Cohesive deposits medium to high strength based on SPT N values. • Granular deposits locally loose generally medium dense to very dense based on SPT N values. • CBRs within made ground ranged from 3-15%. • Remaining geotechnical results to be provided within an updated report.
Mining Assessment	• Similarly to the historic WYG report (12no boreholes), no voids/workings were recorded within the rotary drilling (additional 9no boreholes). • No evidence of the shafts based on historical geophysics and slit trenching. • Recommended to construct storage yard with structural precautions to mitigate against risks from the off-site shafts.
Geotechnical Analysis & Foundation Recommendations	• Storage yard to be constructed 450mm thick (recommended reinforced) atop compacted granular fill atop the competent fused slag. • For the proposed building, piled foundations are recommended – this report should be made available to a competent piling contractor. • Settlements within 25mm. • Normal earthworks plant for excavations.



12-16 Yarm Road, Stockton on Tees, TS18 3NA
Tel: 01642 607083 Email: info@solmek.com

Figure Title

Exploratory Hole Location Plan

Project Number

S220141

Project Name

Site A, Leconfield, Cleator Moor

Client

Copeland Borough Council

Date

March 2022

DRG Number

Figure 2

Scale

1:3000 @ A4 [DO NOT SCALE]

Legend Key

- Locations By Type - Empty
- ⊕ Locations By Type - CP+RC
- Locations By Type - RO
- ⊕ Locations By Type - SCP
- ⊕ Locations By Type - TP
- ▭ Project Bounds - Project Bounds



Contains Maps® Imagery ©Google 2022

Title
Development Location Plan
Project
Site A, Leconfield Industrial Estate, Cleator Moor
Client
Copeland Borough Council
Date
March 2022
Fig No.
Figure 3
Scale
Do not Scale
Key
Approx. Area of Proposed Yard Approx. Area of Proposed Building
N
Solmek Ltd. 12 Yarm Road Stockton-on-Tees TS18 3NA Tel: +44 (0) 1642 607083 Fax: +44 (0) 1642 612355 e-mail: south@solmek.com www.solmek.com
SOLMEK



Figure 4: BH04 13.50-16.50m



Figure 5: BH04 16.50-19.50m

Title
Core Photographs
Project
Site A, Leconfield Industrial Estate, Cleator Moor
Client
Copeland Borough Council
Date
March 2022
Fig No.
Figures 4 & 5
Scale

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Figure 6: BH07 12.00-15.00m



Figure 7: BH07 15.00-18.00m

Title
Core Photographs
Project
Site A, Leconfield Industrial Estate, Cleator Moor
Client
Copeland Borough Council
Date
March 2022
Fig No.
Figures 6 & 7
Scale

Solmek Ltd.
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[illegible]



Figure 10: Area of slit trenching around Shaft 006.



Figure 11: Area of slit trenching around Shaft 006.

Title	Date	Solmek Ltd. 12 Yarm Road Stockton-on-Tees TS18 3NA Tel: +44 (0) 1642 607083 Fax: +44 (0) 1642 612355 e-mail: south@solmek.com www.solmek.com  SOLMEK
Figures 10 & 11	March 2022	
Project		
Site A, Leconfield Industrial Estate, Cleator Moor		
Client		
Copeland Borough Council		



Figure 12: Area of slit trenching around Shaft 008.



Figure 13: Area of slit trenching around Shaft 008.

Title	Date
Figures 12 & 13	March 2022
Project	
Site A, Leconfield Industrial Estate, Cleator Moor	
Client	
Copeland Borough Council	

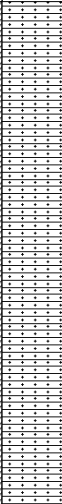
Solmek Ltd.
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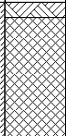
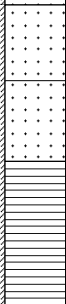


APPENDIX B:
Borehole Logs & Trial Pit Logs

 12-16 Yarm Road Stockton on Tees TS18 3NA 01642 607083 info@solmek.com				Rotary Open Hole Log						Scale 1:150 Sheet 1 of 2					
				BH02											
Contract no: S220141				Site: Site A, Leconfield, Cleator Moor				Driller: Bainbridge Brothers Ltd				GL (AOD): 81.30m			
								Plant used: Beretta T59/Symmetrex				Easting: 301371.93			
Client: Copeland Borough Council								Started: 01/03/2022				Northing: 515580.54			
Method: Rotary Openhole								Ended: 01/03/2022				Logged: KW			
								Backfilled: 01/03/2022				Status: DRAFT			
Backfill / Installation	Legend	Depth (m)	Level (m AOD)	Stratum Description	Samples and Insitu Testing			Coring / Fractures							
					Depth (m)	Type	Results	TCR (%)	SCR (%)	RQD (%)	Fracture				
		0.40	80.90	MADE GROUND: Grass over dark brown slightly clayey very gravelly topsoil. Gravel is fine to medium subrounded to angular of sandstone, brick and slag.											
		1.30	80.00	MADE GROUND: Bluish grey slag.											
				MADE GROUND: Reddish brown sandy gravelly clay (reworked).											
		4.60	76.70	MADE GROUND: Bluish grey slag.											
		10.20	71.10	Brown very sandy gravelly CLAY.											
		11.40	69.90	Soft black silty CLAY.											
		11.90	69.40	MUDSTONE.											
		16.40	64.90	COAL Intact.											
		17.80	63.50	MUDSTONE.											
		19.40	61.90	Solid drilling noted by driller, however no flush returns so unable to log rock.											

 12-16 Yarm Road Stockton on Tees TS18 3NA 01642 607083 info@solmek.com				Rotary Open Hole Log							Scale 1:150 Sheet 2 of 2								
				BH02															
Contract no: S220141				Site: Site A, Leconfield, Cleator Moor				Driller: Bainbridge Brothers Ltd				GL (AOD): 81.30m							
								Plant used: Beretta T59/Symmetrex				Easting: 301371.93							
Client: Copeland Borough Council								Started: 01/03/2022				Northing: 515580.54							
Method: Rotary Openhole								Ended: 01/03/2022				Logged: KW							
								Backfilled: 01/03/2022				Status: DRAFT							
Backfill / Installation	Legend	Depth (m)	Level (m AOD)	Stratum Description	Samples and Insitu Testing			Coring / Fractures											
					Depth (m)	Type	Results	TCR (%)	SCR (%)	RQD (%)	Fracture								
		40.00	41.30	Solid drilling noted by driller, however no flush returns so unable to log rock.															
				End of Borehole at 40.000m															

 SOLMEK 12-16 Yarm Road Stockton on Tees TS18 3NA 01642 607083 info@solmek.com		Rotary Open Hole Log						Scale 1:150 Sheet 1 of 1		BH03						
Contract no: S220141		Site: Site A, Leconfield, Cleator Moor				Driller: Bainbridge Brothers Ltd Plant used: Beretta T151/Symmetrex Started: 16/02/2022 Ended: 16/02/2022 Backfilled: 16/02/2022		GL (AOD): 82.98m Easting: 301632.92 Northing: 515561.21 Logged: KW Status: DRAFT								
Client: Copeland Borough Council																
Method: Rotary Openhole																
Backfill / Installation	Legend	Depth (m)	Level (m AOD)	Stratum Description	Samples and Insitu Testing			Coring / Fractures								
					Depth (m)	Type	Results	TCR (%)	SCR (%)	RQD (%)	Fracture					
		0.50	82.48	MADE GROUND: Grass over dark brown clayey topsoil with rootlets. MADE GROUND: Bluish grey slag.												
		2.30	80.68	Orangish brown very sandy gravelly CLAY.												
		4.80	78.18	Reddish brown sandy gravelly CLAY.												
		7.30	75.68	Highly weathered SANDSTONE very fractured.												
		10.40	72.58	COAL intact no loss of flush.												
		10.50	72.48	MUDSTONE.												
		17.10	65.88	COAL intact no loss of flush.												
		17.90	65.08	MUDSTONE.												
		19.40	63.58	COAL intact no loss of flush.												
		20.00	62.98	MUDSTONE.												
		30.00	52.98	End of Borehole at 30.000m												
		Hole Diameter		Casing Depths		General Remarks		Flush Returns				Ground Water				
		Depth Base (m)	Diameter (mm)	Depth Base (m)	Diameter (mm)			From (m)	To (m)	Flush Type	Flush (%)	Depth Strike (m)	Depth Casing (m)	Depth Sealed (m)	Time Elapsed (min)	Water Level (m)
		10.50	102	10.50	102							5.90	5.90	7.50		
		30.00	150			1.2m hand excavated inspection pit. Inferred groundwater encountered at 5.90m.										

 SOLMEK 12-16 Yarm Road Stockton on Tees TS18 3NA 01642 607083 info@solmek.com		Cable Percussive with Rotary Core Follow-on Log										Scale 1:150 Sheet 1 of 2		
Contract no: S220141		Site: Site A, Leconfield, Cleator Moor					Driller: Bainbridge Brothers Ltd			GL (AOD): 83.08m				
							Plant used: Beretta T59/Symmetrex			Easting: 301730				
Client: Copeland Borough Council							Started: 18/02/2022			Northing: 515566				
Method: Rotary Openhole/Coring							Ended: 18/02/2022			Logged: KW				
							Backfilled: 18/02/2022			Status: DRAFT				
Backfill / Installation	Legend	Depth (m)	Level (m AOD)	Stratum Description	Samples and Insitu Testing									
					Depth (m)		Type	Results						
		0.30	82.78	MADE GROUND: Grass over brown gravelly topsoil. Gravel is fine to medium subrounded to subangular of sandstone. MADE GROUND: Bluish grey slag.	1.20 - 1.23		SPT (S)	N=50+ (25 for 8mm/50 for 20mm)						
					2.00 - 2.04		SPT (S)	N=50+ (25 for 9mm/50 for 30mm)						
		2.70	80.38	MADE GROUND: Sandy gravel. Gravel of slag, sandstone and mudstone.	3.00 - 3.03		SPT (S)	N=50+ (25 for 7mm/50 for 25mm)						
					4.00 - 4.04		SPT (S)	N=50+ (25 for 10mm/50 for 35mm)						
					5.00 - 5.04		SPT (S)	N=50+ (25 for 15mm/50 for 25mm)						
					6.50 - 6.55		SPT (S)	N=50+ (25 for 12mm/50 for 35mm)						
		8.20	74.88	Firm consistency reddish brown very sandy gravelly CLAY.	8.00 - 8.45		SPT (S)	N=15 (15,3/4,4,4,3)						
		9.10	73.98	Dense brown sandy GRAVEL.	9.50 - 9.95		SPT (S)	N=32 (7,8/8,7,8,9)						
					11.00 - 11.45		SPT (S)	N=36 (8,9/9,8,9,10)						
					12.50 - 12.80		SPT (S)	N=50+ (9,11/15,20,15 for 5mm)						
		13.50	69.58	Weak to medium strong light red/pink very thinly laminated partially weathered to distinctly weathered SANDSTONE. Fractures are inclined (45 degrees) to subvertical, planar and rough. 14.40-14.50m: Recovered as gravel.	13.50 - 14.50	C								
		15.00	68.08	Medium strong like red/pink very thinly laminated slightly weathered SANDSTONE. Fractures are sub horizontal to horizontal undulating and clean.	14.50 - 15.50	C								
		16.60	66.48	Fractures are closely spaced sub horizontal to sub vertical (recovered as gravel 14.40-14.50m) Weak dark reddish brown very thinly laminated partially unweathered MUDSTONE. Fractures are inclined to subvertical undulating rough & clean.	15.50 - 16.50	C								
					16.50 - 17.50	C								
					17.50 - 18.50	C								
					18.50 - 19.50	C								
		19.50	63.58	SANDSTONE with MUDSTONE bands.										
		24.70	58.38	COAL. No loss of flush.										
		26.50	56.58	SANDSTONE with MUDSTONE bands.										
Hole Diameter		Casing Depths		General Remarks			Chiselling			Ground Water				
Depth Base (m)	Diameter (mm)	Depth Base (m)	Diameter (mm)	1.2m hand excavated inspection pit. Inferred groundwater encountered at 9.10m and 16.40m.			From (m)	To (m)	Time (hr)	Depth Strike (m)	Depth Casing (m)	Depth Sealed (m)	Time Elapsed (min)	Water Level (m)
13.50	102	13.50	102							9.10	9.10	10.50		
19.50	102									16.40	13.50			
30.00	150													

Cable Percussive with Rotary Core Follow-on Log

Scale 1:150 Sheet 2 of 2

BH04

Contract no: S220141

Site: Site A, Leconfield, Cleator Moor

Driller:	Bainbridge Brothers Ltd
-----------------	-------------------------

Plant used: Beretta T59/Symmetrex

Started: 18/02/2022

Ended: 18/02/2022

Backfilled:	18/02/2022
--------------------	------------

GL (AOD):	83.08m
-----------	--------

Easting: 301730

Northing: 515566

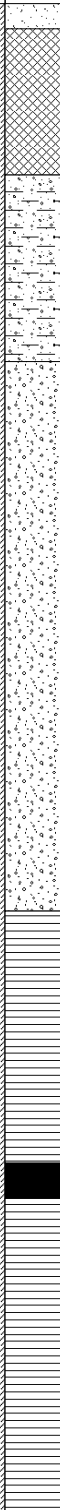
Logged: KW

Status: DRAFT

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

Method:	Rotary Openhole/Coring
----------------	------------------------

[illegible]

 12-16 Yarm Road Stockton on Tees TS18 3NA 01642 607083 info@solmek.com				Rotary Open Hole Log						Scale 1:150 Sheet 1 of 2		BH05		
Contract no: S220141				Site: Site A, Leconfield, Cleator Moor				Driller: Bainbridge Brothers Ltd		GL (AOD): 83.04m				
								Plant used: Beretta T151/Symmetrex		Easting: 301677.34				
Client: Copeland Borough Council								Started: 17/02/2022		Northing: 515490.63				
Method: Rotary Openhole								Ended: 17/02/2022		Logged: KW				
								Backfilled: 17/02/2022		Status: DRAFT				
Backfill / Installation	Legend	Depth (m)	Level (m AOD)	Stratum Description	Samples and Insitu Testing			Coring / Fractures						
					Depth (m)	Type	Results	TCR (%)	SCR (%)	RQD (%)	Fracture			
		0.50	82.54	MADE GROUND: Grey concrete.										
				MADE GROUND: Very dense bluish grey slag.										
					1.20 - 1.22	SPT (S)	N=50+ (25 for 5mm/50							
					1.20 - 1.65	D	for 10mm)							
					2.00 - 2.03	SPT (S)	N=50+ (25 for							
					2.00 - 2.45	D	10mm/50 for 20mm)							
					3.00 - 3.04	SPT (S)	N=50+ (25 for							
					3.00 - 3.45	D	10mm/50 for 35mm)							
		3.40	79.64	Firm to stiff consistency brown sandy gravelly high strength CLAY becoming reddish brown at 4.30m.	4.00 - 4.45	SPT (S)	N=13 (2,2/3,3,3,4)							
					4.00 - 4.45	D								
					5.00 - 5.45	SPT (S)	N=16 (1,2/3,4,4,5)							
					5.00 - 5.45	D								
					6.00 - 6.45	SPT (S)	N=15 (2,3/2,4,4,5)							
					6.00 - 6.45	D								
		7.10	75.94	Medium dense to very dense reddish brown SAND and GRAVELS. Gravel is medium to coarse subangular to subrounded of sandstone and mudstone.	7.50 - 7.95	SPT (S)	N=29 (4,7/10,6,5,8)							
					7.50 - 7.95	D								
					9.00 - 9.33	SPT (S)	N=50+ (10,12/16,23,11							
					9.00 - 9.45	D	for 30mm)							
					10.50 - 10.51	SPT (S)	N=50+ (25 for 5mm/50							
					10.50 - 10.95	D	for 5mm)							
					12.00 - 12.00	SPT (S)	N=50+ (25 for 0mm/50							
					12.00 - 12.45	D	for 5mm)							
					13.50 - 13.95	SPT (S)	N=30 (4,6/6,8,8,8)							
					13.50 - 13.95	D								
					15.00 - 15.45	SPT (S)	N=28 (5,7/10,6,5,7)							
					15.00 - 15.45	D								
					16.50 - 16.95	SPT (S)	N=38 (4,5/6,7,10,15)							
					16.50 - 16.95	D								
		18.00	65.04	Highly weathered weak clayey MUDSTONE.										
23.00		60.04	COAL intact no loss of flush.											
23.70		59.34	MUDSTONE.											
Hole Diameter		Casing Depths		General Remarks		Flush Returns				Ground Water				
Depth Base (m)	Diameter (mm)	Depth Base (m)	Diameter (mm)	1.2m hand excavated inspection pit. Inferred groundwater encountered at 5.90m and 17.10m.		From (m)	To (m)	Flush Type	Flush (%)	Depth Strike (m)	Depth Casing (m)	Depth Sealed (m)	Time Elapsed (min)	Water Level (m)
18.00	102	18.00	102							5.90	5.90			
40.00	150									17.10	17.10			

 SOLMEK 12-16 Yarm Road Stockton on Tees TS18 3NA 01642 607083 info@solmek.com		Rotary Open Hole Log						Scale 1:150 Sheet 2 of 2					
Contract no: S220141		Site: Site A, Leconfield, Cleator Moor				Driller: Bainbridge Brothers Ltd		GL (AOD): 83.04m					
						Plant used: Beretta T151/Symmetrex		Easting: 301677.34					
Client: Copeland Borough Council						Started: 17/02/2022		Northing: 515490.63					
Method: Rotary Openhole						Ended: 17/02/2022		Logged: KW					
						Backfilled: 17/02/2022		Status: DRAFT					
Backfill / Installation	Legend	Depth (m)	Level (m AOD)	Stratum Description	Samples and Insitu Testing			Coring / Fractures					
					Depth (m)	Type	Results	TCR (%)	SCR (%)	RQD (%)	Fracture		
		36.20 36.50	46.84 46.54	MUDSTONE.									
				COAL intact no loss of flush.									
				MUDSTONE.									
		40.00	43.04	End of Borehole at 40.000m									
Hole Diameter		Casing Depths		General Remarks	Flush Returns				Ground Water				
Depth Base (m)	Diameter (mm)	Depth Base (m)	Diameter (mm)		From (m)	To (m)	Flush Type	Flush (%)	Depth Strike (m)	Depth Casing (m)	Depth Sealed (m)	Time Elapsed (min)	Water Level (m)
18.00	102	18.00	102						5.90	5.90			
40.00	150			1.2m hand excavated inspection pit. Inferred groundwater encountered at 5.90m and 17.10m.					17.10	17.10			



Rotary Open Hole Log

BH06

GL (AOD):	82.91m
Easting:	301732.72
Northing:	515444.99
Logged:	KW
Status:	DRAFT

Method:	Rotary Openhole
----------------	-----------------

Logged: KW

Status: DRAFT

[illegible]

12-16 Yarm Road Stockton on Tees TS18 3NA 01642 607083 info@solmek.com SOLMEK				Cable Percussive with Rotary Core Follow-on Log										Scale 1:150 Sheet 1 of 2 BH07																			
Contract no: S220141				Site: Site A, Leconfield, Cleator Moor						Driller: Bainbridge Brothers Ltd Beretta T151/Symmetrex/Beretta T59/Symmetrex 23/02/2022 Plant used: T59/Symmetrex 23/02/2022 Started: 25/02/2022 Ended: 25/02/2022 Backfilled: 25/02/2022				GL (AOD): 82.83m Easting: 301824 Northing: 515557 Logged: KW Status: DRAFT																			
Client: Copeland Borough Council				Method: Rotary Openhole/Coring																													
Backfill / Installation	Legend	Depth (m)	Level (m AOD)	Stratum Description						Samples and Insitu Testing																							
										Depth (m)		Type		Results																			
		7.10	75.73	MADE GROUND: Very dense bluish grey slag.						1.20 - 1.23		SPT (S)		N=50+ (25 for 10mm/50 for 15mm) N=50+ (25 for 10mm/50 for 20mm) N=50+ (25 for 15mm/50 for 10mm) N=50+ (25 for 20mm/50 for 10mm) N=50+ (25 for 10mm/50 for 15mm) N=50+ (25 for 10mm/50 for 15mm) N=50+ (25 for 10mm/50 for 20mm)																			
										1.20 - 1.65		D																					
										2.00 - 2.03		SPT (S)																					
										2.00 - 2.45		D																					
										3.00 - 3.02		SPT (S)																					
										3.00 - 3.45		D																					
										4.00 - 4.03		SPT (S)																					
										4.00 - 4.45		D																					
										5.00 - 5.03		SPT (S)																					
										5.00 - 5.45		D																					
										6.00 - 6.03		SPT (S)																					
										6.00 - 6.45		D																					
										7.50 - 7.95		SPT (S)				N=8 (1,2/1,2,2,3)																	
										7.50 - 7.95		D																					
										9.00 - 9.45		SPT (S)						N=9 (1,0/1,2,2,4)															
9.00 - 9.45		D																															
10.50 - 10.95		SPT (S)		N=16 (2,3/3,3,4,6)																													
10.50 - 10.95		D																															
11.50		71.33		SANDSTONE.						12.00 - 13.00		C																					
12.00		70.83		Very weak to weak light reddish brown thinly bedded to thinly laminated distinctly weathered MUDSTONE. Fractures are subhorizontal to subvertical medium to closely spaced planar rough to clean.						12.00 - 13.00		C		75		70		65		NI													
										13.00 - 14.00		C		70		60		40		NI													
										14.00 - 15.00		C		60		30		10		NI													
15.00		67.83								14.60-15.00m: Recovered as gravel. Weak to medium strong reddish grey very thinly laminated moderately weathered micaceous SANDSTONE (coarse grained) Fractures are closely spaced planar rough clean subhorizontal (vertical 15-15.15m). 16.40-16.60m: Recovered as gravel.						15.00 - 16.00		C		80		50		40		NI							
																16.00 - 17.00		C		75		60		25		NI							
17.00		65.83														Medium strong light grey thinly bedded to thickly laminated moderately weathered siliceous SANDSTONE (coarse grained) fractures are medium to closely spaced undulating rough clean subhorizontal to horizontal. SANDSTONE.						17.00 - 18.00		C		70		55		50		NI	
18.00		64.83																				17.00 - 18.00		C		70		55		50		NI	
																						17.00 - 18.00		C		70		55		50		NI	
																						17.00 - 18.00		C		70		55		50		NI	
																						17.00 - 18.00		C		70		55		50		NI	
																						17.00 - 18.00		C		70		55		50		NI	
																						17.00 - 18.00		C		70		55		50		NI	
																						17.00 - 18.00		C		70		55		50		NI	
																						17.00 - 18.00		C		70		55		50		NI	
																						17.00 - 18.00		C		70		55		50		NI	
				17.00 - 18.00		C		70														55		50		NI							
				17.00 - 18.00		C		70														55		50		NI							
				17.00 - 18.00		C		70														55		50		NI							
				17.00 - 18.00		C		70		55		50		NI																			
20.80		62.03		MUDSTONE.																													

Rotary Open Hole Log

Scale 1:150 Sheet 1 of 2

BH08

Contract no: S220141

Site: Site A, Leconfield, Cleator Moor

Driller:	Bainbridge Brothers Ltd
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Plant used: Beretta T59/Symmetrex

Started: 21/02/2022

Ended:	21/02/2022
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Backfilled: 21/02/2022

GL (AOD): 82.92m

Easting: 301843.16

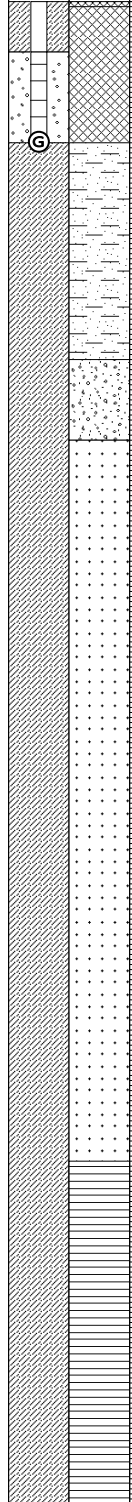
Northing: 515494.72

Logged: KW

Status: DRAFT

Client:	Copeland Borough Council
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Method:	Rotary Openhole
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Backfill / Installation	Legend	Depth (m)	Level (m AOD)	Stratum Description	Samples and Insitu Testing			Coring / Fractures			
					Depth (m)	Type	Results	TCR (%)	SCR (%)	RQD (%)	Fracture
		0.10	82.82	MADE GROUND: Tarmac. MADE GROUND: Bluish grey slag.							
		2.80	80.12	Reddish brown very sandy CLAY.							
		7.10	75.82	Brown SAND and GRAVELS.							
		8.70	74.22	SANDSTONE with thin beds of MUDSTONE.							
				MUDSTONE.							
		30.00	52.92								

Hole Diameter		Casing Depths		General Remarks	Flush Returns				Ground Water				
Depth Base (m)	Diameter (mm)	Depth Base (m)	Diameter (mm)		From (m)	To (m)	Flush Type	Flush (%)	Depth Strike (m)	Depth Casing (m)	Depth Sealed (m)	Time Elapsed (min)	Water Level (m)
9.00 30.00	102 150	9.00	102		1.2m hand excavated inspection pit. Inferred groundwater encountered at 17.10m.					17.10	9.00		



12-16 Yarm Road
Stockton on Tees
TS18 3NA
01642 607083
info@solmek.com

Rotary Open Hole Log

Scale 1:150 Sheet 2 of 2

BH08

Contract no: S220141

Site: Site A, Leconfield, Cleator Moor

Driller:	Bainbridge Brothers Ltd
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Plant used: Beretta T59/Symmetrex

Started: 21/02/2022

Ended: 21/02/2022

Backfilled: 21/02/2022

GL (AOD): 82.92m

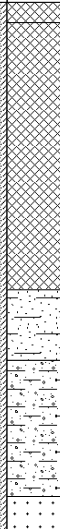
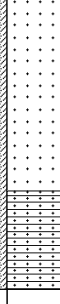
Easting: 301843.16

Northing: 515494.72

Logged: KW

Status: DRAFT

[illegible]

 SOLMEK 12-16 Yarm Road Stockton on Tees TS18 3NA 01642 607083 info@solmek.com		Cable Percussive with Rotary Core Follow-on Log										Scale 1:150 Sheet 1 of 2		BH09	
Contract no: S220141		Site: Site A, Leconfield, Cleator Moor					Driller: Bainbridge Brothers Ltd Plant used: Beretta T59/Symmetrex Started: 21/02/2022 Ended: 21/02/2022 Backfilled: 21/02/2022					GL (AOD): 83.11m Easting: 301873 Northing: 515542 Logged: KW Status: DRAFT			
Client: Copeland Borough Council															
Method: Rotary Openhole/Coring															
Backfill / Installation	Legend	Depth (m)	Level (m AOD)	Stratum Description					Samples and Insitu Testing						
									Depth (m)		Type	Results			
		0.40	82.71	MADE GROUND: Grass over reddish brown sandy clay. MADE GROUND: Very dense bluish grey slag.					1.20 - 1.52		SPT (S)	N=50+ (10,12/15,21,14 for 25mm) N=50+ (25 for 15mm/50 for 40mm) N=50+ (25 for 10mm/50 for 20mm) N=50+ (25 for 10mm/50 for 10mm) N=50+ (25 for 25mm/50 for 10mm) N=9 (1,2/2,2,2,3)			
									1.20 - 1.65		D				
									2.00 - 2.28		SPT (S)				
									2.00 - 2.45		D				
									3.00 - 3.26		SPT (S)				
									3.00 - 3.45		D				
									4.00 - 4.24		SPT (S)				
									4.00 - 4.45		D				
									5.00 - 5.26		SPT (S)				
									5.00 - 5.45		D				
		5.70	77.41	Loose light brown slightly clayey SAND.					6.00 - 6.45		SPT (S)				
									6.00 - 6.45		D				
		7.10	76.01	Stiff consistency reddish brown slightly sandy gravelly high strength CLAY.					7.50 - 7.95		SPT (S)	N=16 (2,2/3,4,4,5)			
									7.50 - 7.95		D				
		9.80	73.31	SANDSTONE.					9.00 - 9.45		SPT (S)	N=24 (3,4/4,5,7,8)			
									9.00 - 9.45		D				
		10.50	72.61	Weak to medium strong dark reddish to greyish brown thinly bedded to thickly laminated partially unweathered to distinctly weathered accleceaus SANDSTONE. Fractures are subhorizontal closely spaced undulating rough clean.			10.50 - 11.50	C	10.50 - 11.50		C	85	55	40	NI
							11.50 - 12.50	C				60	50	45	NI
				<u>11.00-11.10m: Recovered as gravel.</u>			12.50 - 13.50	C				80	60	50	NI
				<u>11.80-12.00m: Recovered as gravel.</u>			13.50 - 14.50	C				90	85	80	NI
				<u>12.30-12.80m: Recovered as gravel.</u>			14.50 - 15.50	C				70	60	50	NI
							15.50 - 16.50	C				70	55	10	NI
		16.50	66.61	<u>16.20-16.50m: Recovered as gravel.</u> SANDSTONE with thin beds of MUDSTONE.											
		22.10	61.01	COAL intact no loss of flush.											
		22.40	60.71	SANDSTONE with thin beds of MUDSTONE.											
															
		27.80	55.31	Solid drilling noted by driller, however no flush returns so unable to log rock.											
Hole Diameter		Casing Depths		General Remarks				Chiselling			Ground Water				
Depth Base (m)	Diameter (mm)	Depth Base (m)	Diameter (mm)	1.2m hand excavated inspection pit. Inferred groundwater encountered at 15.20m.				From (m)	To (m)	Time (hr)	Depth Strike (m)	Depth Casing (m)	Depth Sealed (m)	Time Elapsed (min)	Water Level (m)
10.50	102	10.50	102								15.20	10.50			
40.00	150														



Scale 1:150 Sheet 2 of 2

BH09

Contract no: S220141

Site: Site A, Leconfield, Cleator Moor

Driller:	Bainbridge Brothers Ltd
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Plant used: Beretta T59/Symmetrex

Started: 21/02/2022

Ended:	21/02/2022
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Backfilled: 21/02/2022

GL (AOD):	83.11m
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Easting: 301873

Northing: 515542

Logged: KW

Status: DRAFT

Client:	Copeland Borough Council
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Method:	Rotary Openhole/Coring
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[illegible]

 SOLMEK Solmek Ltd 12-16 Yarm Road Stockton on Tees TS18 3NA Tel: 01642 607083 Email: info@solmek.com				Trial Pit Log				TrialPit No TP01 Sheet 1 of 1	
Project Name: Site A, Leconfield, Cleator Moor				Project No. S220141		Co-ords: 301399E - 515582N Level:		Date 16/02/2022	
Plant Used: JCB 3CX				Dimensions (m): Depth 0.50 1.20 1.40				Scale 1:26	
Client: Copeland Borough Council						Logged KW			
Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
	Depth	Type	Results						
	0.10 - 0.20	B+ES		0.20			MADE GROUND: Grass over dark brown slightly clayey very gravelly topsoil. Gravel is fine to medium subrounded to angular of sandstone, brick and slag.		
	0.30 - 0.40	B+ES		0.40			MADE GROUND: Brown slightly sandy gravel of low cobble content. Gravel is fine to coarse subangular to angular of brick, wood, slag and metal. Occasional cobbles of slag up to 30cm.		
	0.50	CBR	15%	0.50			MADE GROUND: Grey blue fused slag recovered as gravel. Gravel is medium to coarse angular of slag. End of Pit at 0.500m		
								1	
								2	
								3	
								4	
								5	
Remarks: No groundwater encountered. Unable to excavate through slag. Sulphurous odour noted within slag.									
Stability: Pit walls stable									

 SOLMEK Solmek Ltd 12-16 Yarm Road Stockton on Tees TS18 3NA Tel: 01642 607083 Email: info@solmek.com				Trial Pit Log				TrialPit No TP02 Sheet 1 of 1	
Project Name: Site A, Leconfield, Cleator Moor				Project No. S220141		Co-ords: 301372E - 515606N Level:		Date 16/02/2022	
Plant Used: JCB 3CX				Dimensions (m): Depth 0.30 1.80 1.50				Scale 1:26	
Client: Copeland Borough Council						Logged KW			
Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
	Depth	Type	Results						
	0.20 - 0.30	B+ES		0.10			MADE GROUND: Grass over orangey brown slightly clayey very gravelly topsoil. Gravel is coarse angular of plastic, brick and sandstone.		
	0.30	CBR	15%	0.30			MADE GROUND: Brown slightly sandy gravel of low cobble content. Gravel is fine to coarse subangular to angular of brick, wood, slag and metal. Occasional cobbles of slag up to 30cm.		
							Greyish blue fused slag obstruction - unable to excavate through.		
							End of Pit at 0.300m		
									1
									2
									3
									4
									5
Remarks: No groundwater encountered. Unable to excavate through slag. Sulphurous odour noted within slag.									
Stability: Pit walls stable									



SOLMEK

Solmek Ltd
12-16 Yarm Road
Stockton on Tees
TS18 3NA
Tel: 01642 607083
Email: info@solmek.com

Trial Pit Log

Trial Pit No
TP03
Sheet 1 of 1

Project Name:	Site A, Leconfield, Cleator Moor	Project No.	S220141	Co-ords:	301406E - 515607N	Date	16/02/2022
Plant Used:	JCB 3CX	Level:		Dimensions (m):	1.00	Scale	1:26
Client:	Copeland Borough Council	Depth	0.70			Logged	KW

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.10 - 0.20	B+ES					MADE GROUND: Grass over dark brown slightly clayey very gravelly topsoil. Gravel is fine to medium subrounded to angular of sandstone, brick and slag.	
	0.20 - 0.30	B+ES		0.20			MADE GROUND: Soft consistency brown black slightly sandy very gravelly clay of low cobble and boulder content. Gravel is fine to medium subangular to angular of slag. Cobbles/boulders of angular to subangular slag.	
	0.50 - 0.60	B+ES		0.40			MADE GROUND: Grey blue fused slag recovered as gravel. Gravel is medium to coarse angular of slag.	
	0.60	CBR	15%	0.70			End of Pit at 0.700m	
								1
								2
								3
								4
								5

Remarks: Surface water run off.
Unable to excavate through slag.
Sulphurous odour noted within slag.

Stability: Pit walls stable



TrialPit No
TP04
Sheet 1 of 1

Date
16/02/2022

Scale
1:26

Logged
KW

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.00 - 0.20	B+ES	15%				MADE GROUND: Grass over dark brown slightly clayey very gravelly topsoil. Gravel is fine to medium subrounded to angular of sandstone, brick and slag.
	0.20 - 0.30	B+ES		0.20			MADE GROUND: Grey blue fused slag recovered as gravel. Gravel is medium to coarse angular of slag.
	0.30	CBR		0.30			End of Pit at 0.300m

Stability: Pit walls stable

Trial Pit Log

TrialPit No
TP05
Sheet 1 of 1

Project Name: Site A, Leconfield, Cleator Moor

Project No.	S220141
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Co-ords: 301426E - 515613N
Level:

Date
16/02/2022

Plant Used:	JCB 3CX
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Dimensions
(m):

0 80

Scale
1:26

Client: Copeland Borough Council

Depth
0.10

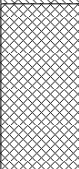
0.60

Logged
KW

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.00 - 0.10 0.10	B+ES CBR	15%	0.10		MADE GROUND: Grass over dark brown slightly clayey very gravelly topsoil. Gravel is fine to medium subrounded to angular of sandstone, brick and slag. Greyish blue fused slag obstruction - unable to excavate through. End of Pit at 0.100m	

Remarks:	Surface water run off. Unable to excavate through slag. Sulphurous odour noted within slag.
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Stability: Pit walls stable

 SOLMEK Solmek Ltd 12-16 Yarm Road Stockton on Tees TS18 3NA Tel: 01642 607083 Email: info@solmek.com				Trial Pit Log				TrialPit No TP06 Sheet 1 of 1	
Project Name: Site A, Leconfield, Cleator Moor				Project No. S220141		Co-ords: 301633E - 515544N Level:		Date 15/02/2022	
Plant Used: JCB 3CX				Dimensions (m): Depth 0.70 1.30				Scale 1:26	
Client: Copeland Borough Council				Depth 0.80				Logged KW	
Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
	Depth	Type	Results						
▼	0.10 - 0.20	B+ES	4.0%	0.20			MADE GROUND: Grass over dark brown slightly clayey very gravelly topsoil. Gravel is fine to medium subrounded to angular of sandstone, brick and slag.		
	0.30	CBR					MADE GROUND: Black/brown slightly sandy gravel. Sand is medium to coarse. Gravel is coarse and angular of brick, slag, ash, clinker and metal. Very strong sulphurous odour noted.		
	0.40 - 0.60	B+ES							
	0.60	CBR	6.0%	0.80			Greyish blue fused slag obstruction - unable to excavate through.		
	0.70 - 0.80	B+ES					End of Pit at 0.800m		
1 2 3 4 5									
Remarks: Groundwater seepage at 0.40m. Unable to excavate through slag. Sulphurous odour noted within slag.									
Stability: Pit walls stable									

**SOLMEK**

Solmek Ltd
12-16 Yarm Road
Stockton on Tees
TS18 3NA
Tel: 01642 607083
Email: info@solmek.com

Trial Pit Log

Trial Pit No
TP07
Sheet 1 of 1

Project Name:	Site A, Leconfield, Cleator Moor	Project No.	S220141	Co-ords:	301650E - 515511N	Date	15/02/2022
Plant Used:	JCB 3CX	Level:		Dimensions (m):	1.00	Scale	1:26
Client:	Copeland Borough Council	Depth	1.10			Logged	KW

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.30	CBR	3.0%	0.10			MADE GROUND: Grass over dark brown slightly clayey very gravelly topsoil. Gravel is fine to medium subrounded to angular of sandstone, brick and slag.	
	0.50 - 0.60	B+ES					MADE GROUND: Firm consistency dark brown slightly sandy very gravelly clay of low cobble content. Gravel is medium to coarse subrounded to angular of brick, wood, slag and clinker. Occasional rounded cobbles of sandstone up to 30cm.	
	0.60	CBR	4.0%					
	0.80 - 0.90	B+ES		0.70			MADE GROUND: Fused slag recovered as multicoloured gravel. Gravel is medium to coarse angular of slag, ash and clinker.	1
				1.10			End of Pit at 1.100m	2
								3
								4
								5

Remarks: No groundwater encountered.
Unable to excavate through slag.
Sulphurous odour noted within slag.

Stability: Pit walls stable

 SOLMEK Solmek Ltd 12-16 Yarm Road Stockton on Tees TS18 3NA Tel: 01642 607083 Email: info@solmek.com				Trial Pit Log				TrialPit No TP08 Sheet 1 of 1	
Project Name: Site A, Leconfield, Cleator Moor				Project No. S220141		Co-ords: 301709E - 515523N Level:		Date 16/02/2022	
Plant Used: JCB 3CX				Dimensions (m): 1.20		Scale 1:26		Logged KW	
Client: Copeland Borough Council				Depth 0.35		0.60			
Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
	Depth	Type	Results						
	0.20 0.20 - 0.30 0.35	B+ES B+ES CBR	15%	0.05 0.10 0.35		  	MADE GROUND: Red brick. MADE GROUND: Orange coarse paving sand. MADE GROUND: Orange/pink very sandy gravel. Gravel is medium to coarse subangular to angular of brick and slag.		
							End of Pit at 0.350m		
1 2 3 4 5									
Remarks: No groundwater encountered. Unable to excavate through slag. Sulphurous odour noted within slag.									
Stability: Pit walls stable									

 SOLMEK Solmek Ltd 12-16 Yarm Road Stockton on Tees TS18 3NA Tel: 01642 607083 Email: info@solmek.com				Trial Pit Log				TrialPit No TP09 Sheet 1 of 1	
Project Name: Site A, Leconfield, Cleator Moor				Project No. S220141		Co-ords: 301687E - 515545N Level:		Date 17/02/2022	
Plant Used: JCB 3CX				Dimensions (m): 0.70 1.10				Scale 1:26	
Client: Copeland Borough Council				Depth 0.30				Logged KW	
Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
	Depth	Type	Results						
	0.20 - 0.30	B+ES	15%	0.15			MADE GROUND: Concrete with rebar overlaying plastic membrane.		
	0.30	CBR				MADE GROUND: Grey/pink very sandy gravel. Gravel is medium to coarse angular of dolomite and brick.			
						Greyish blue fused slag obstruction - unable to excavate through.			
	End of Pit at 0.300m								
									1
									2
									3
									4
									5
Remarks: No groundwater encountered. Unable to excavate through slag. Sulphurous odour noted within slag.									
Stability: Pit walls stable									



TrialPit No
TP10
Sheet 1 of 1

Date
17/02/2022

Scale
1:26

Depth	0.20
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Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.00 - 0.10	B+ES	15%	0.20			MADE GROUND: Grass over light brown slightly sandy very gravelly topsoil. Gravel is fine angular of sandstone and shale.
	0.20	CBR					Greyish blue fused slag obstruction - unable to excavate through.
							End of Pit at 0.200m

Stability: Pit walls stable



TrialPit No
TP11
Sheet 1 of 1

Date
17/02/2022

Scale
1:26

0.60

Logged
KW

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.10	B+ES	15%	0.30			MADE GROUND: Grass over light brown very gravelly topsoil. Gravel is fine to medium angular of sandstone, shale and slag.
	0.20	B+ES					
	0.30	CBR					Greyish blue fused slag obstruction - unable to excavate through. End of Pit at 0.300m

Stability: Pit walls stable

Trial Pit Log

TrialPit No
TP12
Sheet 1 of 1

Project Name: Site A, Leconfield, Cleator Moor

Project No.
S220141

Co-ords: 301758E - 515480N
Level:

Date
17/02/2022

Plant Used:	JCB 3CX
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Dimensions
(m):

0.50

Scale
1:26

Client: Copeland Borough Council

Depth
0.20

0.60

Logged
KW

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.10	B+ES	15%	0.20			MADE GROUND: Grass over light brown slightly clayey very gravelly topsoil. Gravel is fine to medium subangular to angular of sandstone, slag and shale.
	0.20	CBR					Greyish blue fused slag obstruction - unable to excavate through. End of Pit at 0.200m

Remarks:	No groundwater encountered. Unable to excavate through slag. Sulphurous odour noted within slag.
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Stability: Pit walls stable



TrialPit No
TP13
Sheet 1 of 1

Date
17/02/2022

Scale
1:26

Logged
KW

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.00 - 0.10	B+ES	15%	0.20 0.30			MADE GROUND: Grass over dark brown slightly sandy very gravelly topsoil. Gravel is fine to coarse angular to subangular of brick and slag.
	0.20	B+ES					MADE GROUND: Fused slag recovered as grey/blue medium to coarse subangular to angular gravel.
	0.30	CBR					End of Pit at 0.300m

Stability: Pit walls stable

Trial Pit Log

TrialPit No
TP14
Sheet 1 of 1

Project Name: Site A, Leconfield, Cleator Moor

Project No.
S220141

Co-ords: 301846E - 515570N
Level:

Date
17/02/2022

Plant Used:	JCB 3CX
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Dimensions
(m):

0.70

Scale
1:26

Client: Copeland Borough Council

Depth
0.20

0.60

Logged
KW

[illegible]

Remarks:	No groundwater encountered. Unable to excavate through slag. Sulphurous odour noted within slag.
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Stability: Pit walls stable

 SOLMEK Solmek Ltd 12-16 Yarm Road Stockton on Tees TS18 3NA Tel: 01642 607083 Email: info@solmek.com				Trial Pit Log				TrialPit No TP15 Sheet 1 of 1	
Project Name: Site A, Leconfield, Cleator Moor				Project No. S220141		Co-ords: 301870E - 515564N Level:		Date 18/02/2022	
Plant Used: JCB 3CX				Dimensions (m): 0.60		Scale 1:26		Logged KW	
Client: Copeland Borough Council				Depth 0.60					
Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
	Depth	Type	Results						
	0.10 - 0.20	B+ES		0.05			MADE GROUND: Grass over brown very sandy topsoil. MADE GROUND: Black slightly sandy gravel. Gravel is coarse and angular of clinker and slag.		
	0.30	CBR	4.0%						
	0.40 - 0.50	B+ES							
	0.60	CBR	15%	0.60					
							Greyish blue fused slag obstruction - unable to excavate through. End of Pit at 0.600m		
1 2 3 4 5									
Remarks: No groundwater encountered. Unable to excavate through slag. Sulphurous odour noted within slag.									
Stability: Pit walls stable									



TrialPit No
TP16
Sheet 1 of 1

Date
18/02/2022

Scale
1:26

Logged
KW

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				0.05			MADE GROUND: Grass over dark brown slightly gravelly topsoil. Gravel is fine to medium subangular to angular of sandstone and shale.
	0.30	B+ES					MADE GROUND: Firm consistency red/brown slightly sandy very gravelly clay of low cobble content. Gravel is fine to medium subrounded to angular of sandstone, shale and slag. Cobbles of full red bricks.
	0.30	CBR	3.0%				
	0.50	HV	62kPa				
	0.60	B+ES					
	0.60	CBR	4.5%				
				0.70			Greyish blue fused slag obstruction - unable to excavate through.
							End of Pit at 0.700m

Stability: Pit walls stable



TrialPit No
SHAFT-006
Sheet 1 of 1

Date
15/02/2022

Scale
1:26

Logged
KW

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				0.30			MADE GROUND: Grass over slightly gravelly slightly clayey topsoil. Gravel is subangular to subrounded fine to medium of sandstone, mudstone and slag.
							Greyish blue fused slag obstruction - unable to excavate through. End of Pit at 0.300m

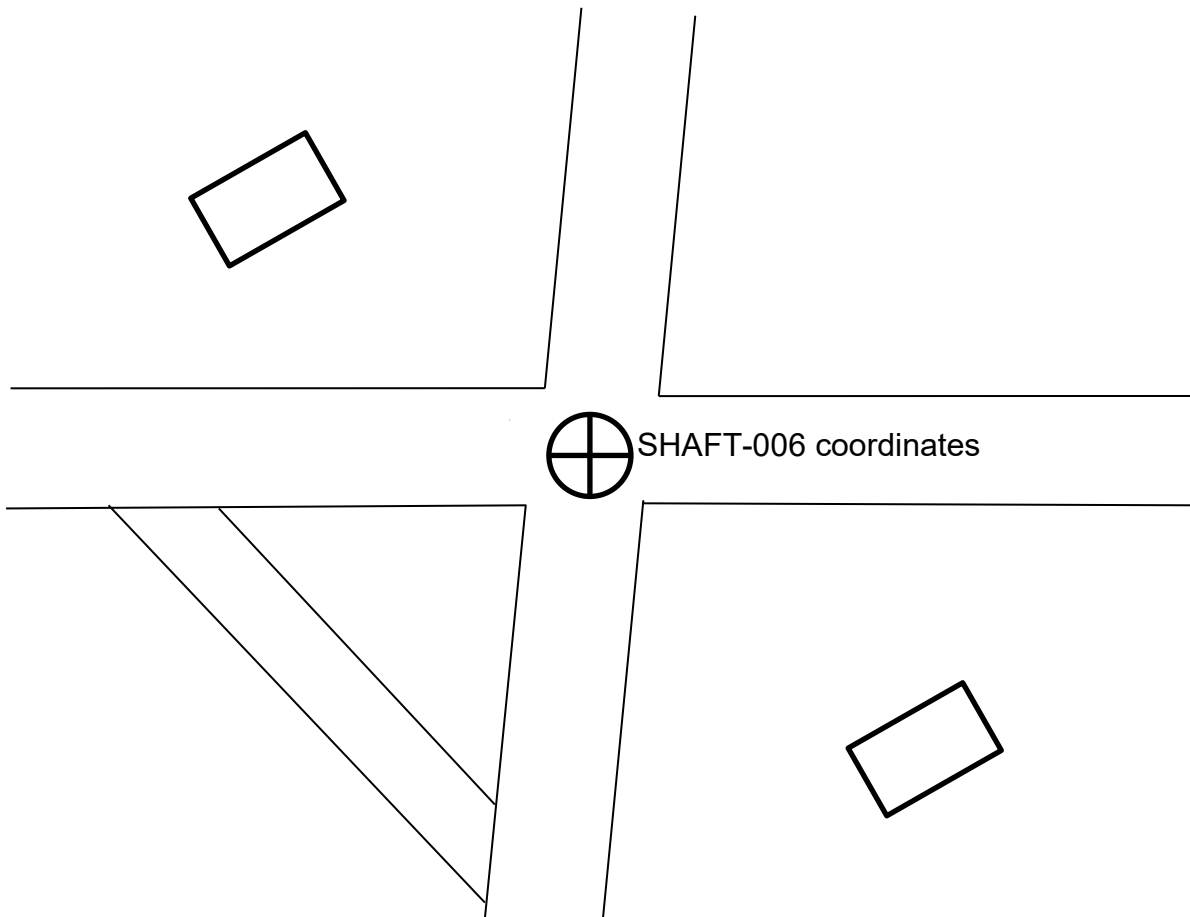
Remarks:	No groundwater encountered.
----------	-----------------------------

Stability: Pit walls stable

S220141

Site A, Leconfield, Cleator Moor

SHAFT-006



Pecked into slag from 0.30m-0.60m at
centre of shaft marked ⊕

NTS



TrialPit No
SHAFT-008
A
Sheet 1 of 1

Date
15/02/2022

Scale
1:26

Logged
KW

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				0.40		 MADE GROUND: Grass over brown slightly clayey slightly gravelly topsoil. Gravel is fine to medium subangular to angular of sandstone, brick and slag.	
						Greyish blue fused slag obstruction - unable to excavate through. End of Pit at 0.400m	

Remarks:	No groundwater encountered.
----------	-----------------------------

Stability: Pit walls stable

Trial Pit Log

TrialPit No
SHAFT-008
B
Sheet 1 of 1

Project Name:	Site A, Leconfield, Cleator Moor
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Project No.
S220141

Co-ords: 301440E - 515606N
Level:

Date
15/02/2022

Plant Used:	JCB 3CX
-------------	---------

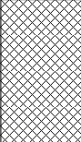
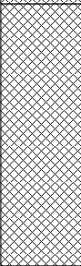
Dimensions
(m):

Scale
1:26

Client: Copeland Borough Council

Depth
0.50

Logged
KW

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
				0.50			MADE GROUND: Grass over brown slightly clayey slightly gravelly topsoil. Gravel is fine to medium subangular to angular of sandstone, brick and slag.	1
							MADE GROUND: Orange brown very gravelly clay. Gravel is fine to medium subangular to angular of sandstone, mudstone and slag. End of Pit at 0.500m	
				1.40				2
								3
								4
								5

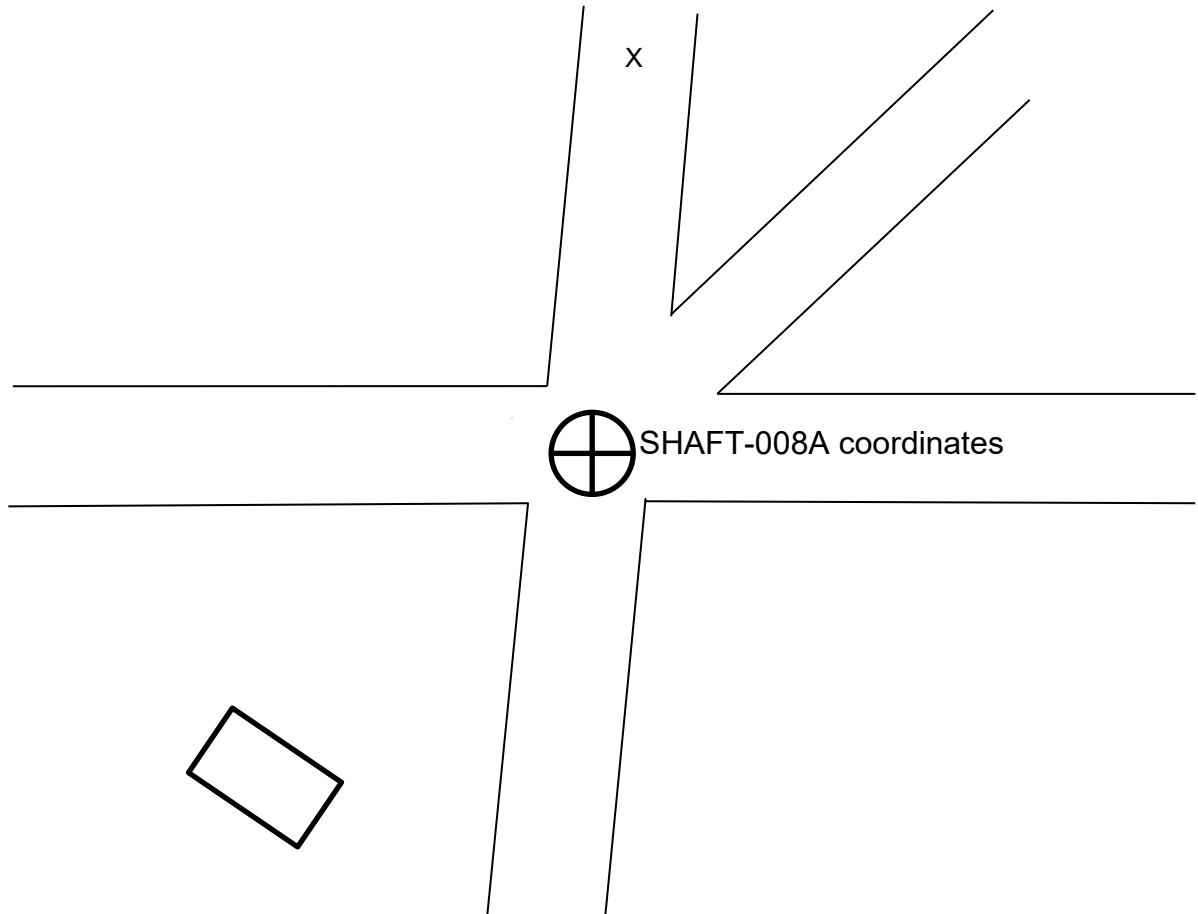
Remarks:	No groundwater encountered.
----------	-----------------------------

Stability: Pit walls stable

S220141

Site A, Leconfield, Cleator Moor

SHAFT-008A AND SHAFT-008B



X denotes area with slag absent until
0.50mbgl

NTS



Appendix H

Flood Maps for Planning

Flood map for planning

Your reference
LEC

Location (easting/northing)
301600/515522

Created
22 Jul 2021 10:10

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

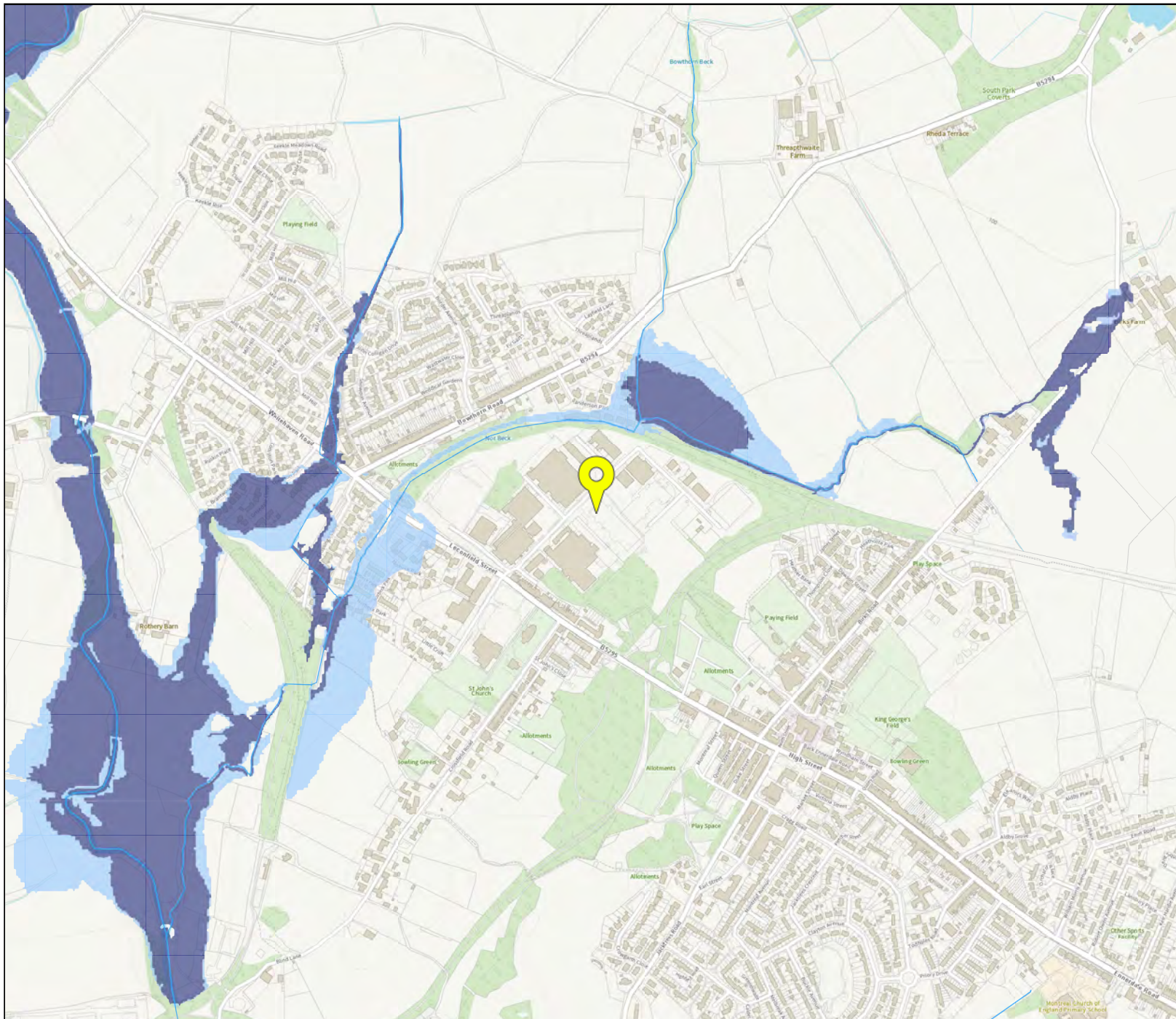
Notes

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.

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

LEC

Location (easting/northing)

301600/515522

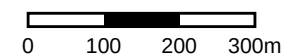
Scale

1:10000

Created

22 Jul 2021 10:10

-  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





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

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.

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