

SuDS and Drainage Report

Upper High Street Car Park, Worthing, West Sussex BN11 1DL

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1 Introduction

- 1.1.1 CGS Civils Ltd has been appointed to undertake a drainage statement for a proposed development at Upper High Street Car Park in Worthing, West Sussex.
- 1.1.2 The proposed development will consist of the introduction of single and multiple stacked shipping containers which will incorporate Class E usage (light industrial, workshops, offices, studios as well as flexibility to include café, retail and some storage). The proposed development is located as OS Grid Reference TQ 15098 03144 and has the post code BN11 1DL.
- 1.1.3 The purpose of this drainage scheme is to demonstrate how the proposed development can be satisfactorily drained without increasing flood risk onsite and where appropriate, providing betterment over the existing site to reduce flood risk in the region.

Fig 1. Site Location



2 Executive Summary:

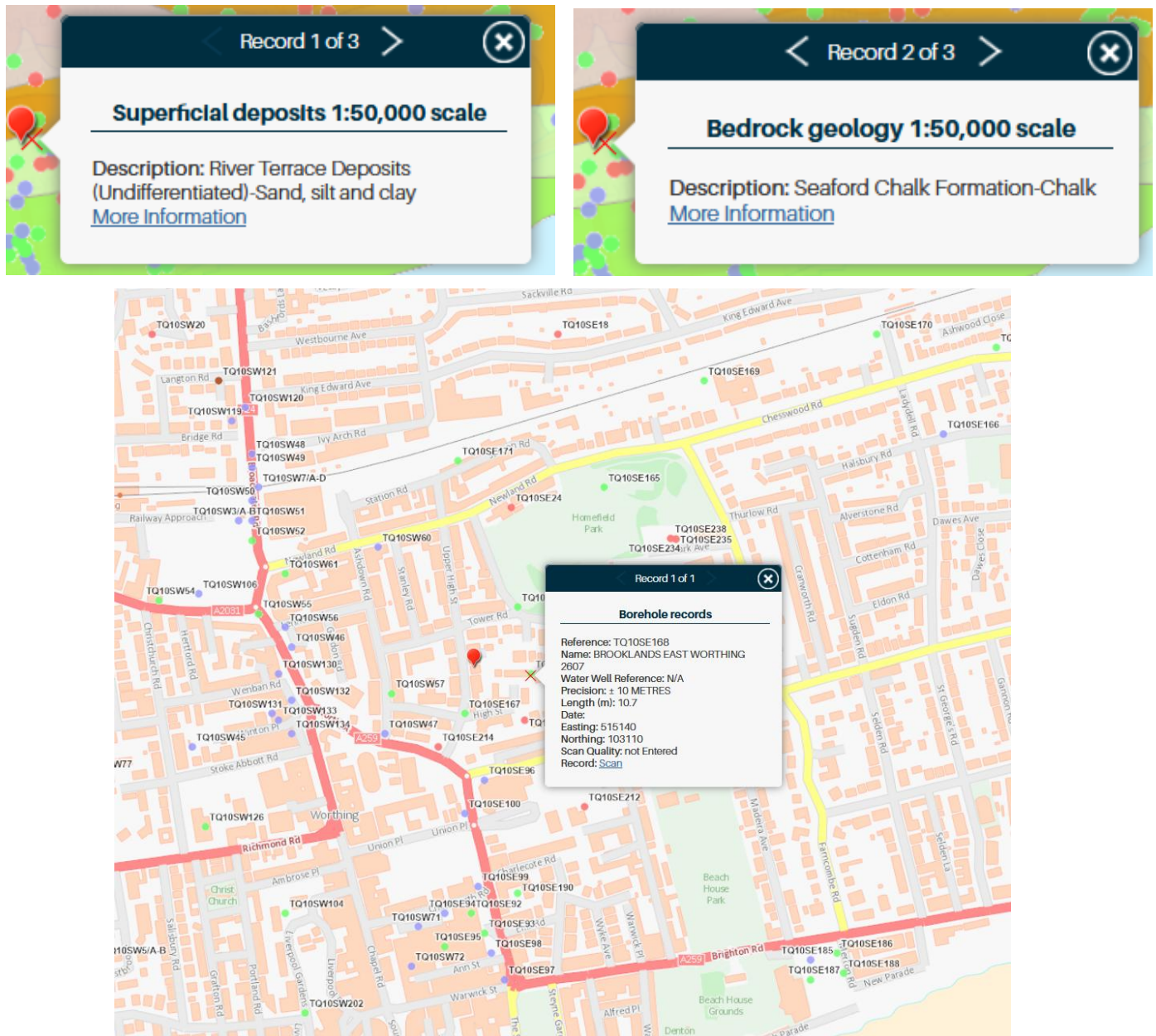
- 2.1.1 The proposed scheme will consist of the introduction of single and multiple stacked shipping containers which will incorporate Class E usage.
- 2.1.2 The existing site is comprised of hard standing car parking area. It is noted that there are a number of manholes present with and there is a channel drain that is present across the site running west to east; there is also a gully present. It is believed that all surface water runoff is captured by the channel drain/gully on site which discharges into an existing surface water sewer to the west.
- 2.1.3 A 1500mm diameter concrete sewer is noted to run across the site from southwest to northeast which has an 11.5m easement where no features can be located. CGS Civils Ltd are currently within correspondence with Southern Water to confirm if shipping containers can encroach within these easement as they are not permanent buildings and as such, have no foundations which in turn does not alter the easements intended functions. It is also noted that there is an existing concrete slab which follows the line of the sewer.
- 2.1.4 The Surface Water will discharge directly onto the surface as existing surface water runoff does, however, the inclusion of bioretention planters will allow the client to use this opportunity to provide betterment within the region by reducing the overall volume of runoff from discharging into the existing network whilst also providing water quality, amenity and biodiversity benefits.
- 2.1.5 The Foul water will discharge into an existing foul water network on site that serves the office block within the southeast corner of the car parking. The existing foul network is to be investigated by means of CCTV drainage survey to confirm if a connection can be made and if any remedial works are required.

3 Site Geology

3.1 British Geological Survey information

- 3.1.1 The British Geological Survey confirms the bedrock geology to be made up of Seaford Chalk Formation. The BGS website confirms the superficial deposits on site to be made up of River Terrace Deposits.
- 3.1.2 The British Geological Survey also holds records of historical boreholes near the site which give some insight into the ground geology.
- Borehole TQ10SE168 (Located approx. 20m South of the site) – Sandy Clay with Gravel.

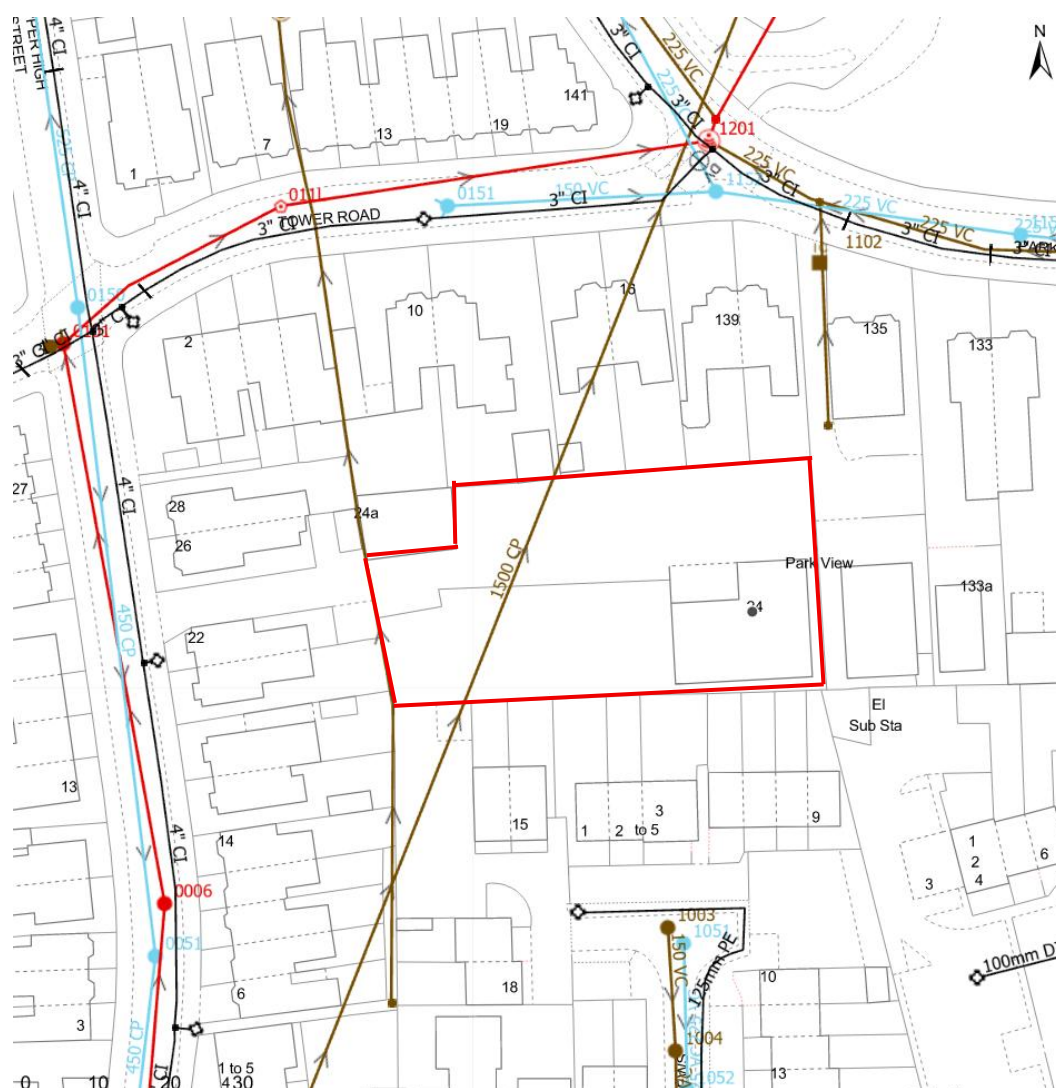
Fig 2. British Geological Survey



4 Existing Drainage

- 4.1.1 The existing site is comprised of a hard standing car parking area. It is noted that there are a number of manholes present with and a channel drain is present across the site running west to east; there is also a gully present. It is believed that all surface water runoff is captured by the channel drain/gully on site which discharges into an existing surface water sewer to the west. A CCTV Drainage survey will be undertaken to confirm this.
- 4.1.2 A 1500mm diameter concrete sewer is noted to run across the site from southwest to northeast which has an 11.5m easement where no features can be located. CGS Civils Ltd are currently within discussion with Southern Water to confirm if shipping containers can encroach within these easement as they are not permanent buildings and as such, have no foundations which in turn does not alter the easements intended functions. It is also noted that there is an existing concrete slab which follows the line of the sewer.

Fig 3. Southern Water sewer records



5 Proposed Drainage Strategy

5.1 SuDS Hierarchy

- 5.1.1 All options for the destination of run-off generated on site have been assessed in line with the SuDS hierarchy as set out in Building Regulations Part H document and DEFRA's Draft National Standards for SuDS.

5.2 Surface Water Drainage

- 5.2.1 The inclusion of the shipping containers will not increase the impermeable areas on site and therefore, the surface water runoff from the containers can discharge freely to ground whilst not increasing the flood risk on site or downstream.
- 5.2.2 It is proposed, however, that bio-retention planters are to be included as part of the shipping containers which will intercept runoff whilst also providing water quality and biodiversity benefits. Shipping containers can be retrofitted to include a sloping roof which will allow the surface water runoff to be captured into a rainwater downpipe, which can then discharge into a bioretention planter which will then discharge onto ground and be captured by the drainage network serving the car park as existing runoff would.
- 5.2.3 It should also be noted that bio-retention planters can be utilised to attenuate surface water runoff as the outlet for the planters can be fitted with flow control devices which will slow down the discharge of surface water into the system which will reduce the flood risk on site and downstream.
- 5.2.4 It is important to note that the proposed inclusion of shipping containers will not increase the impermeable areas on site as the entirety of the existing site is an impermeable car park and any robust below ground SuDS system would be disproportionate for the temporary structures. The inclusion of shipping containers provides the client with an opportunity to provide meaningful environmental improvements within the region through the use of SuDS features such as bioretention, which will not only provide betterment over the existing site by reducing the overall volume of storm water from entering the existing network, but will also provide water quality, amenity and biodiversity benefits.

Fig 4. Example of retrofitted shipping container



5.3 Water Quality

- 5.3.1 A key requirement of any SuDS system is that it protects the receiving water body from the risk of pollution.
- 5.3.2 Frequent and short duration rainfall events are those that are most loaded with potential contaminants (silts, fines, heavy metals, and various organic and inorganic contaminants) Therefore the first 5-10mm of rainfall should be adequately treated with SuDS.
- 5.3.3 The new SuDS Manual (Ciria C753, November 2015) introduces slightly different approach compared to the previous version for the water quality management of surface water. The Manual describes risks posed by the surface water runoff to the receiving environment as a function of:
- The pollution hazard at a particular site (i.e., the pollution source)
 - The effectiveness of SuDS treatment components in reducing levels of pollutants to environmentally acceptable levels
 - The sensitivity of the receiving environment
- 5.3.4 The recommended approaches for water quality risk management are given in the SuDS Manual Table 26.1.

Table 26.1 from SuDS manual. Approaches to Water Quality Risk Management

Table 26.1 Approaches to Water Quality Risk Management			
Design method	Hazard Characterisation	Risk Reduction	
		For Surface Water	For Groundwater
Simple Index Approach	Simple pollution hazard indices based on land use (Table 26.2)	Simple SuDS hazard mitigation indices (Table 26.3)	Simple SuDS hazard mitigation indices (Table 26.4)
Risk Screening	Factors characterising traffic density and extent of infiltration likely to occur (Table 26.5)	N/A	Factors characterising unsaturated soil depth and type, and predominant flow type through the soils (Table 26.5)
Detailed Risk Assessment	Site specific information used to define likely pollutants and their significance	More detailed, component specific performance information used to demonstrate that the proposed SuDS components reduce the hazard to acceptable levels	
Process-based treatment modelling	Time series rainfall used with generic pollution characteristics to determine statistical distributions of likely concentrations and loadings in the runoff	Models that represent the treatment processes in the proposed SuDS components give estimates of reductions in even mean discharge concentrations and total annual load reductions delivered by the system	

- 5.3.5 As per Table 26.1 Simple Index approach will be used as a design method for this site.
- 5.3.6 Table 26.2 will provide hazard classification of different land uses. The land uses for the surface water drainage for this site are.
- Other roofs
- 5.3.7 To deliver adequate treatment, the selected SuDS components should have a total pollution mitigation index for each contaminant type that equals or exceeds the pollution hazard index for each contaminant type. Therefore, the following must be achieved for the surface running off the site.

Total SuDS mitigation index $\geq$ pollution hazard index

- 5.3.8 Pollution Hazard Indices are given for different land uses in Table 26.2 of the SuDS manual;

Table 26.2 from SuDS manual. Pollution Hazard Indices for Different Land Use Classifications

Table 26.2 Pollution hazard indices for different land use classifications				
Land Use	Pollution Hazard Level	Total Suspended solids (TSS)	Metals	Hydro-Carbons
Residential roofs	Very Low	0.2	0.2	0.05
Other roofs (Typically commercial/industrial roofs)	Low	0.3	0.2 (up to 0.8 where there is potential for metals to leach from the roof)	0.05
Individual property driveways, residential car parks, low traffic roads (e.g., cul-de-sacs, homezones and general access roads) and non-residential car parking with infrequent change (e.g., schools, offices) i.e., < 300 traffic movements/day	Low	0.5	0.4	0.4
Commercial yard and delivery areas, non-residential car parking with frequent change (e.g., hospitals, retail), all roads except low traffic roads and trunk roads/motorways	Medium	0.7	0.6	0.7
Sites with heavy pollution (e.g., haulage yards, lorry parks, highly frequented lorry approaches to industrial estates, waste sites), sites where chemicals and fuels (other than domestic fuel oil) are to be delivered, handled, stored, used or manufactured; industrial sites; trunk roads and motorways	High	0.8	0.8	0.9

5.3.9 From Table 26.2 the following information is tabulated in Table I

Table 3: Pollution hazard index and destination of runoff for the proposed site

Table 3: Pollution Hazard Index and Destination of runoff for the proposed Site						
Land Use	Destination of Runoff	Pollution Hazard Level	Total Solids	Suspended	Metals	Hydrocarbons
Other roofs	Surface Water	Low		0.3	0.3 (up to 0.8)	0.05

5.3.10 The SuDS mitigation index will be obtained from Table 26.4 (for groundwater) of the SuDS manual.

Table 26.4 from SuDS manual. Indicative SuDS Mitigation Indices for discharges to ground waters.

5.3.11 SuDS mitigation index are tabulated in Table 5 as followed.

Table 26.4 Indicative SuDS mitigation indices for discharges to surface waters			
Type of SuDS Components	Mitigation Indices		
	TSS	Metals	Hydrocarbons
Filter Strip	0.4	0.4	0.5
Filter Drain	0.4	0.4	0.4
Swale	0.5	0.6	0.6
Bioretention System	0.8	0.8	0.8
Permeable Pavement	0.7	0.6	0.7
Detention Basin	0.5	0.5	0.6
Pond	0.7	0.7	0.5
Wetland	0.8	0.8	0.8
Proprietary treatment systems	These must demonstrate that they can address each of the contaminant types to acceptable levels for inflow concentrations relevant to the contributing drainage area		

Table 4: SuDS mitigation index

Table 4 Mitigation Indices						
Runoff Source	Destination of Runoff	Mitigation Index Source	Type of SuDS Component	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Other Roofs	Surface	Table 26.3 (for surface waters)	Bioretention system	0.8	0.8	0.8

5.3.12 The above analysis demonstrates that the SuDS devices within the design will mitigate any pollution present within the surface water system.

5.4 Foul water drainage

5.4.1 It is proposed that the foul water from the site is to be connected into an existing foul water drainage system that is present within the car park that currently serves the existing office block in the southeast corner. The existing foul water network is to be investigated by means of CCTV Drainage survey to confirm if a connection can be made and if any remedial works are required.

5.4.2 Existing manhole locations can be found within Appendix A.

6 Summary and Conclusions

6.1.1 CGS Civils has been instructed to produce a Drainage statement under National Planning Policy Framework (NPPF) to support the Planning Application the introduction of single and multiple stacked shipping containers which will incorporate Class E usage.

6.1.2 The Surface Water will discharge directly onto the surface as existing surface water runoff does, however, the inclusion of bioretention planters will allow the client to use this opportunity to provide betterment within the region by reducing the overall volume of runoff from discharging into the existing network whilst also providing water quality, amenity and biodiversity benefits.

6.1.3 The Foul water will discharge into an existing foul water network on site that serves the office block within the southeast corner of the car parking. The existing foul network is to be investigated by means of CCTV drainage survey to confirm if a connection can be made and if any remedial works are required.

6.1.4 The report has demonstrated that the proposed drainage measures ensure that suitable means of surface water and foul drainage can be achieved for the proposed development.

7 Appendices

7.1 Appendix A – Site Plan

IF YOU NEED ANY FURTHER INFORMATION OR INDEPENDENT ADVICE ON UNDERTAKING YOUR CDM REGULATIONS DUTIES, PLEASE CONTACT: THE ASSOCIATION FOR PROJECT SAFETY, 5 NEW MART PLACE, EDINBURGH EH141RW TEL: 08456 121 290 EMAIL: INFO@APS.ORG.UK YOU CAN VISIT THE HSE AND APS WEBSITES FOR MUCH MORE INFORMATION AT: WWW.HSE.GOV.UK AND WWW.APS.ORG.UK RESPECTIVELY.

	INDICATES - WARNING
	INDICATES - COMPULSORY INSTRUCTION
	INDICATES - FOR INFORMATION
	INDICATES - PROHIBITIVE INSTRUCTION

IT SHOULD BE ASSUMED THAT ALL WORKS ARE TO BE CARRIED OUT BY A COMPETENT CONTRACTOR AND, WHERE APPLICABLE, TO AN APPROVED METHOD STATEMENT.

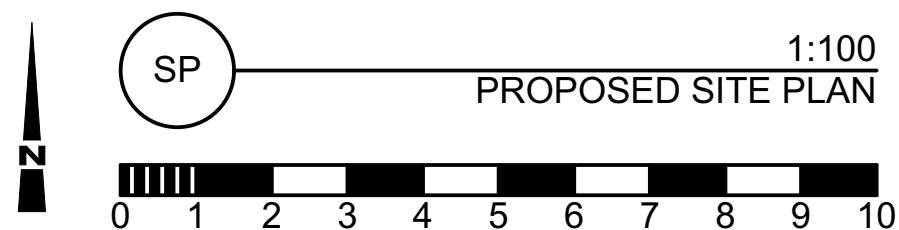
8x30FT CONTAINER L	OFFICE
8x30FT CONTAINER M	OFFICE
8x30FT CONTAINER N	OFFICE
8x30FT CONTAINER O	OFFICE
8x30FT CONTAINER P	SUANA
8x30FT CONTAINER Q	SUANA

CLIENT:
MORGAN CARR LTD
UNIT 1, 24 UPPER HIGH STREET,
WORTHING WEST SUSSEX BN11 1DL

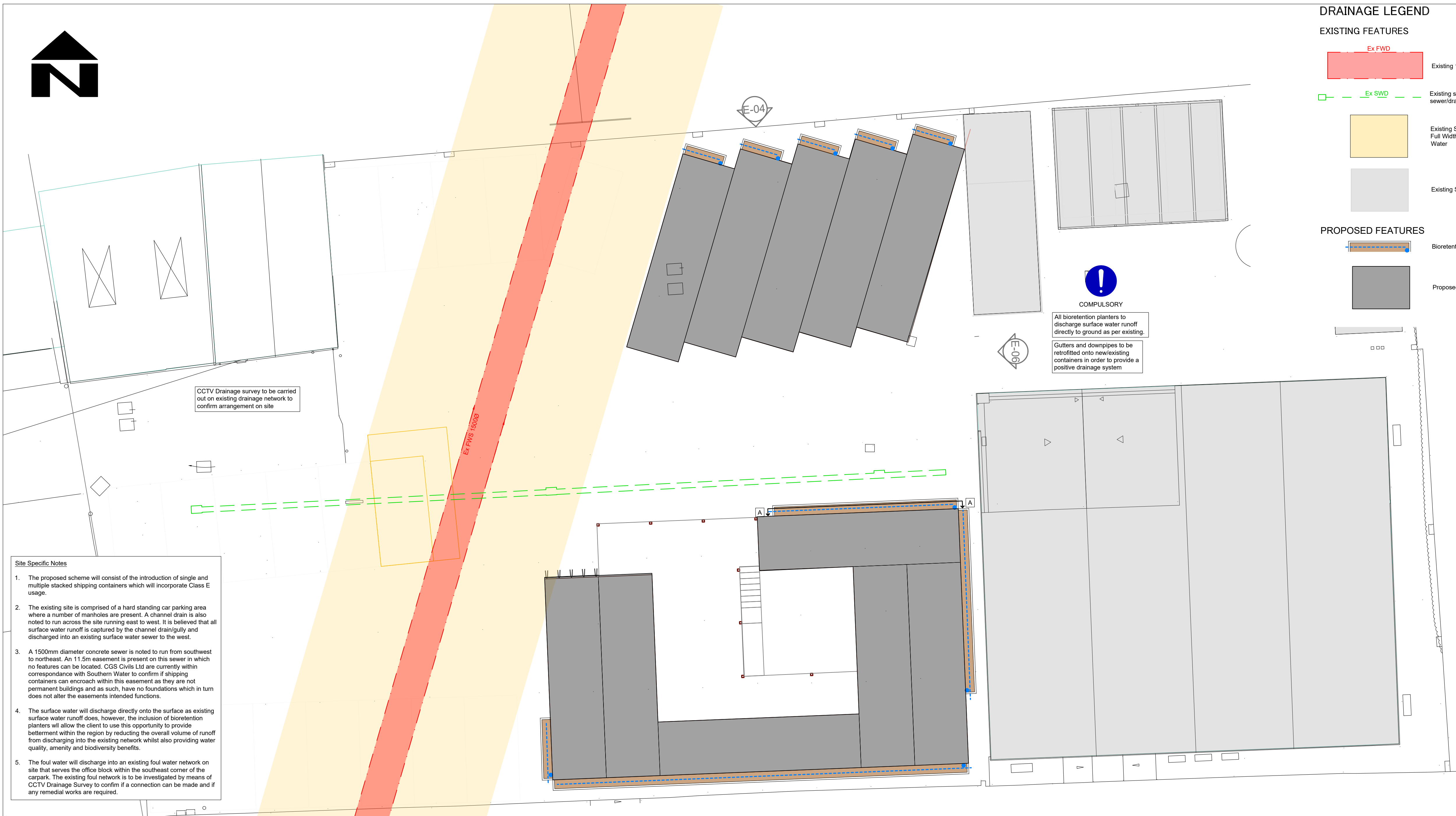
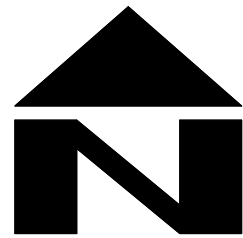
**UPPER CENTRAL, COMMUNITY HUB
INITIATIVE**
UNIT 1, 24 UPPER HIGH STREET,
WORTHING WEST SUSSEX BN11 1DL

PROPOSED SITE PLAN

© PHILIPS SURVEYORS LLP.



7.2 **Appendix B – Schematic Drainage Layout**



- Site Specific Notes**
- The proposed scheme will consist of the introduction of single and multiple stacked shipping containers which will incorporate Class E usage.
 - The existing site is comprised of a hard standing car parking area where a number of manholes are present. A channel drain is also noted to run across the site running east to west. It is believed that all surface water runoff is captured by the channel drain/gully and discharged into an existing surface water sewer to the west.
 - A 1500mm diameter concrete sewer is noted to run from southwest to northeast. An 11.5m easement is present on this sewer in which no features can be located. CGS Civils Ltd are currently within correspondence with Southern Water to confirm if shipping containers can encroach within this easement as they are not permanent buildings and as such, have no foundations which in turn does not alter the easements intended functions.
 - The surface water will discharge directly onto the surface as existing surface water runoff does, however, the inclusion of bioretention planters will allow the client to use this opportunity to provide betterment within the region by reducing the overall volume of runoff from discharging into the existing network whilst also providing water quality, amenity and biodiversity benefits.
 - The foul water will discharge into an existing foul water network on site that serves the office block within the southeast corner of the carpark. The existing foul network is to be investigated by means of CCTV Drainage Survey to confirm if a connection can be made and if any remedial works are required.

DRAINAGE LEGEND

EXISTING FEATURES

- Ex FWD** Existing 1500Ø Foul Water Sewer
- Ex SWD** Existing surface water sewer/drain and manhole
- Existing Sewer Easement - Full Width TBC By Southern Water
- Existing Structures

PROPOSED FEATURES

- Bioretention Planter
- Proposed Containers

STANDARD DRAINAGE NOTES

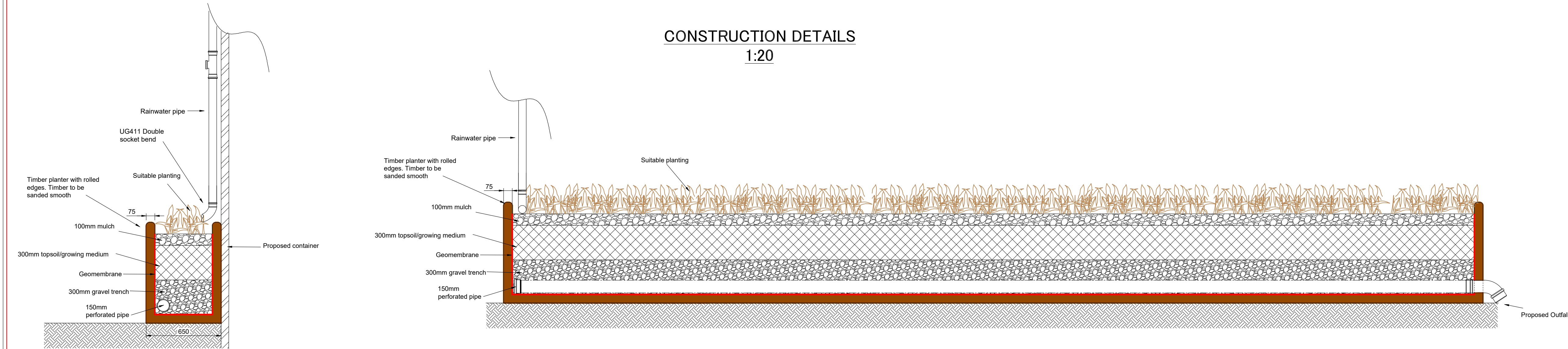
- DO NOT SCALE FROM THIS DRAWING. REFER TO FIGURED DIMENSIONS ONLY. THE CONTRACTOR SHOULD CHECK ALL DIMENSIONS ON SITE.
- ALL DIMENSIONS IN MILLIMETRES AND ALL LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
- THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT ARCHITECT AND ENGINEERING DETAILS, DRAWINGS AND SPECIFICATIONS.
- ANY DISCREPANCIES SHOULD BE REPORTED TO THE ARCHITECT AND/OR ENGINEER IMMEDIATELY, SO THAT CLARIFICATION CAN BE SOUGHT PRIOR TO THE COMMENCEMENT OF WORK.
- BEFORE COMMENCING CONSTRUCTION THE CONTRACTOR MUST CHECK THE INVERT LEVELS OF EXISTING SEWERS TO WHICH CONNECTIONS ARE MADE. IN ADDITION THE CONTRACTOR MUST LOCATE AND DETERMINE INVERT LEVELS OF THE EXISTING SEWERS TO WHICH CONNECTIONS ARE PROPOSED. ANY DISCREPANCIES ARE TO BE NOTIFIED TO THE ENGINEER IMMEDIATELY, PRIOR TO CONSTRUCTION.
- ALL DRAINAGE WORKS SHOULD COMMENCE AT THE PROPOSED DOWNSTREAM CONNECTION POINT. THE WORKS CONTINUING UPSTREAM FOLLOWING CONFIRMATION OF THE TIE-IN INVERT LEVELS TO THE ENGINEER. CONNECTIONS TO MANHOLES OR LARGER SIZED PIPES ETC. SHOULD BE SOFFIT TO SOFFIT UNLESS OTHERWISE INSTRUCTED BY THE ENGINEER, IF THIS IS NOT POSSIBLE INFORM THE ENGINEER IMMEDIATELY.
- COVER LEVELS SHOWN ARE APPROXIMATE. COVERS AND FRAMES SHALL BE SET TO FINISHED GROUND LEVELS AND FALLS.
- ALL UN-REFERENCED PIPES ARE TO BE 100mm DIA.
- ALL PIPES TO BE ADOPTED, OR CONNECTING TO ADOPTED SEWERS, TO BE VITRIFIED CLAY TO BS EN 295 AND BS65 (SWS ONLY), OR CONCRETE PIPES TO BE EN 1916 AND BS5911:PART 1.
- ROAD GULLY OUTLET PIPES ARE TO BE 150mm DIA. WITH CONCRETE SURROUND AND FLEXIBLE JOINTS. ALL GULLIES SHALL BE FITTED WITH GRADE D400 GRATINGS AND FRAMES TO BS EN124, UNLESS OTHERWISE STATED.
- ALL ADOPTABLE SEWERS SHALL BE CONSTRUCTED TO THE STANDARDS AND SPECIFICATION LAID DOWN IN 'SEWERS FOR ADOPTION' 6th EDITION, WITH A VIEW TO ADOPTION UPON COMPLETION OF WORKS.
- ALL PRIVATE DRAINAGE TO BE IN ACCORDANCE WITH THE BUILDING REGULATIONS APPROVED DOCUMENT PART-H, AND TO THE SATISFACTION OF THE BUILDING CONTROL INSPECTOR.
- THE CONTRACTOR IS TO KEEP A RECORD OF ANY VARIATIONS MADE ON SITE, INCLUDING THE RELOCATION OF SEWERS OR DRAINS, SO THAT AN AS CONSTRUCTED DRAWINGS CAN BE PREPARED UPON COMPLETION OF THE PROJECT.
- STUB CONNECTIONS TO ADOPTABLE MANHOLES SHALL BE MADE FROM VITRIFIED CLAY AND CONSIST OF TWO ROCKER PIPES LAID AT THE SAME GRADIENT AS THE UP OR DOWNSTREAM PIPE.
- IF ANY SUB SOIL DRAINAGE SYSTEMS ARE UNCOVERED DURING THE WORKS CONTACT THE ENGINEER FOR INSTRUCTIONS. SUB SOIL DRAINS ARE TO BE DIVERTED AROUND NEW WORKS AND CONNECTED INTO THE SURFACE WATER.
- NO PRIVATE AREAS ARE TO DRAIN ONTO ADOPTABLE AREAS AND VICE VERSA.
- ALL EXISTING MANHOLE COVER'S, GULLIES, ETC. ARE TO BE RAISED/LOWERED TO SUIT NEW LEVELS.
- IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO CONFIRM THE LOCATION AND DEPTH OF ALL EXISTING SERVICES AND UTILITIES THAT MAY BE PRESENT.
- UPON COMPLETION BUT PRIOR TO HANDOVER, CONTRACTOR TO CARRY OUT FULL CCTV SURVEY OF DRAINAGE SYSTEM WHICH IS TO BE REVIEWED BY ENGINEER TO ENSURE SATISFACTORY INSTALLATION.
- PROPRIETARY PRODUCTS TO BE INSTALLED IN FULL ACCORDANCE WITH MANUFACTURER'S GUIDANCE.
- MANHOLE AND CHAMBER COVER GRADES:
 - 'A15' IN ALL LANDSCAPED AREAS AND ON FOOTPATHS
 - 'B125' IN ALL DRIVEWAYS
 - 'C250' IN PRIVATE PARKING AREAS
 - 'D400' IN CARRIAGEWAY/ACCESS ROAD

Prefixed to drawing numbers shall signify the following:-

PL = PLANNING	Shall not be used for contract or construction purposes
P = PRELIMINARY	Shall not be used for contract or construction purposes
T = TENDER	Shall not be used for construction purposes
C = CONSTRUCTION	These are the only drawings that shall be used for construction purposes
R = RECORD	Record of actual completed work

CONSTRUCTION DETAILS

1:20



Section Through Bio-Retention Planter
A-A

Bio-Retention Planter

FOR PLANNING ONLY

2	23.04.26	REVISED TO SUIT NEW SITEPLAN	LH	CS	CS
P-	09.03.26	PRELIMINARY ISSUE	LH	CS	CS
REV	DATE	DESCRIPTION	BY	CHK	APP

 Consulting Civil Engineers					
CLIENT		MORGAN CARR LTD			
ARCHITECT		PHILIPS SURVEYORS			
JOB TITLE		UPPER HIGH STREET CAR PARK WORTHING			
DRAWING TITLE		PROPOSED SCHEMATIC SURFACE WATER STRATEGY			
DRAWN	ENGINEER	CHECKED	APPROVED		
LH	C SLADE	CS	CS		
DATE	SCALE @ A1				
FEBRUARY 2026		1:100			
JOB No.	STATUS	DRAWING No.		REV.	
C3995	PL	101		2	

7.3 **Appendix C – Borehole Logs**

Bore hole No.	Log	Depth (m)	Water Table	Cohesion kN/m ²	Angle of friction	N blows/0-3 m	Type of foundation	Remarks
2607 [1514 0311]	TQ 10 SE /168	G. L.						6.50 O.D.
	Concrete	0.15						
	Fill (Ash brick and cobbles)	1.22						
	Firm brown slightly sandy clay with a trace of fine to medium gravel	1.83		38.4				
	Medium dense brown sandy clay with a little fine to medium gravel	2.44						
	Fragments of white chalk in a very stiff to hard matrix with occasional flints	3.05						
		5.03	W.S.					
		5.34		292				
		8.40		244				
		10.50		358				
		10.70						
2608 [1540 0355] /169	TQ 10 SE /169	G. L.						5.00 O.D.
	Pit	0.61						
	Brown silty clay	1.07						
	Medium dense silty sandy fine to coarse gravel	2.44						
	Firm to stiff grey silty clay with layers of sand and traces of gravel.	4.40		59.8				
		5.48	W.S.					
		5.95		134				
		6.10						
	Very stiff mottled red, grey and brown silty clay.	6.68		206				
		10.68						
2609 [1566 0362] /170	TQ 10 SE /170	G. L.						5.74 O.D.
	Pit	1.52						
	Dense sandy fine to coarse gravel	3.50						
	Very stiff to hard light grey slightly sandy silty clay	3.96		344				
		5.51		249				
		6.55						
	Very stiff mottled brown, grey and red silty clay.	7.00		173				
		8.53		203				
	Mottled grey-brown silty clay.	10.68						