

Foul and Surface Water Drainage Strategy Report

The Old Coal Yard, North End Road, Yapton, West Sussex BN18 0DL

For

Sussex Design & Development Ltd

Rev – P1

Reference C2600

Date 21st May 2025

Revision	Date of Issue	Comments	Prepared By	Checked By
P	30/03/2023	Initial Issue	LH	CS
P1	23/05/2025	Revised	LH	CS

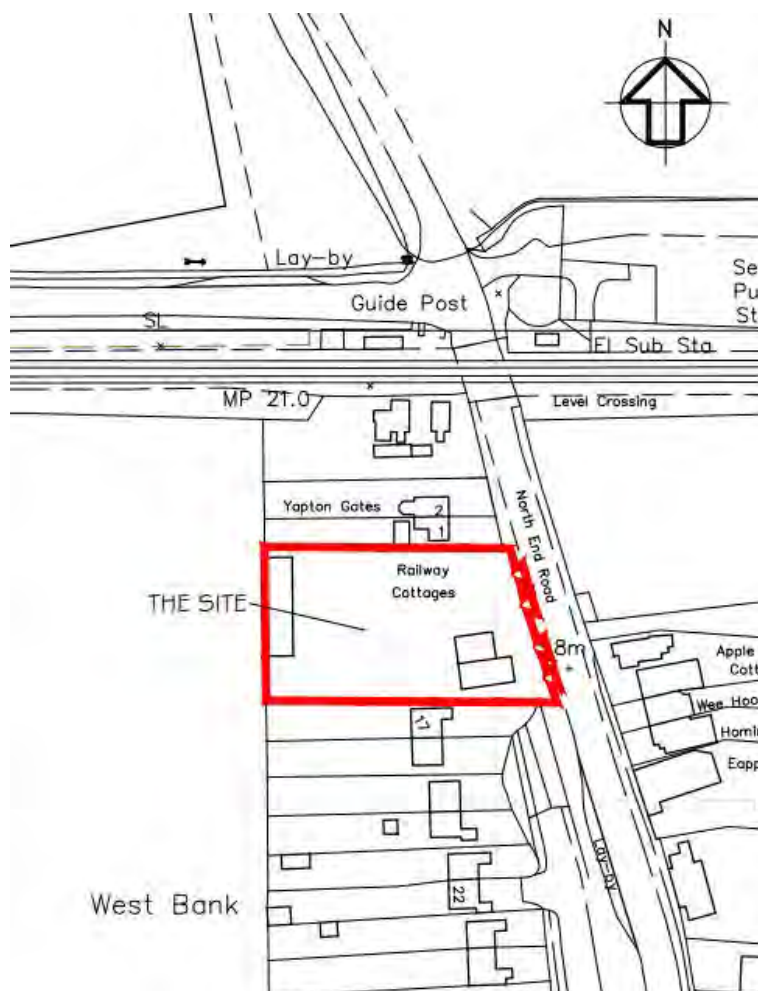
Contents

1	INTRODUCTION.....	3
2	SITE GEOLOGY	4
3	EXISTING DRAINAGE	5
4	PROPOSED DRAINAGE STRATEGY.....	5
5	MAINTENANCE.....	9
6	SUMMARY AND CONCLUSIONS.....	13
7	APPENDICES.....	14

1 Introduction

- 1.1.1 CGS Civils Ltd has been appointed by Sussex Design & Development Ltd to undertake a drainage strategy report for a proposed development at The Old Coal Yard, North End Road in Yapton, West Sussex.
- 1.1.2 The purpose of this drainage strategy is to demonstrate how the development area can be satisfactorily drained without increasing flood risk onsite and elsewhere.
- 1.1.3 The proposed development will consist of the erection of 4 No. 4-bedroom semi-detached dwellings, with access and parking. The proposed development is located as OS Grid Reference SU 98091 04329 and has the post code BN18 0DL.
- 1.1.4 The proposed site plan can be found in **Appendix A**.

Fig 1. Site Location

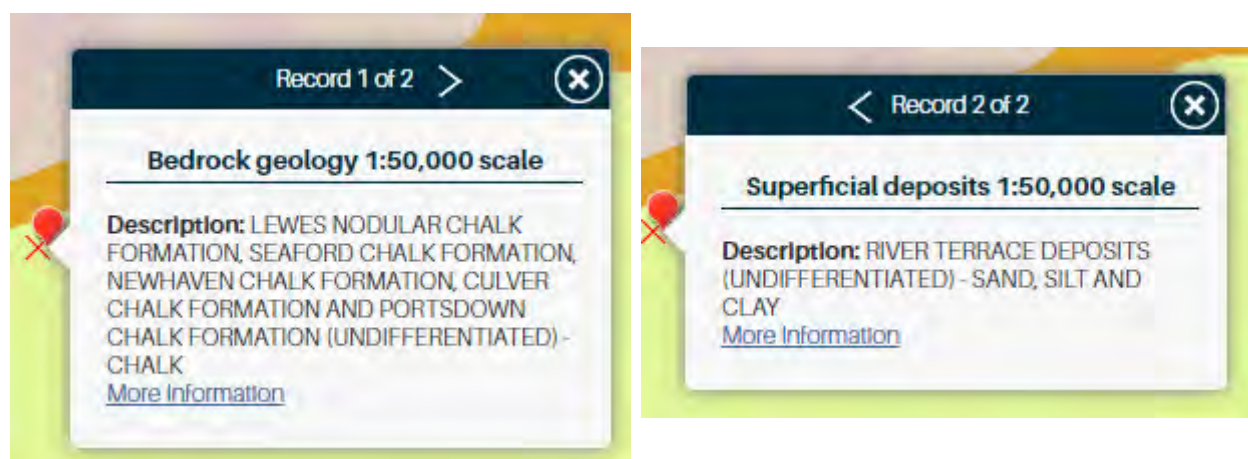


2 Site Geology

2.1 British Geological Survey information

- 2.1.1 The British Geological Survey confirms the bedrock geology to be made up of Lewes Nodular Chalk, Seaford Chalk, Newhaven Chalk, Culver Chalk and Portsdown Chalk formation. The BGS website confirms the superficial deposits on site to be made up of River Terrace Deposits.
- 2.1.2 The British Geological survey also holds records of historical boreholes near the site which give some insight into the ground geology.
- Borehole SU90SE32 (Located approx. 115m East of the site) – Clay, Sand and Chalk

Fig 2. British Geological Survey



2.2 Geological Assessment

- 2.2.1 An infiltration test to BRE365 was carried out on site by the client (Sussex Design & Development Ltd) on Tuesday 21st March. 3 No. trial pits were excavated across the site, in the general locations of the porous paved parking areas and the proposed soakaways. The infiltration test yielded a worst-case infiltration rate of $1.46 \times 10^{-5} \text{m/s}$.

Fig 3. Infiltration Test Photographs



- 2.2.2 Two No. winter groundwater monitoring well was installed on site on 22nd October 2024 to a depth of 4.0 meters below ground level (mbgl); no groundwater was encountered during the installation of the well. A further 9 monitoring visits were conducted between 12th November 2024 and 11th March 2025, with the highest groundwater level of 2.28mbgl being recorded. A copy of the groundwater well installation report and monitoring results can be found in **Appendix F**.

3 Existing Drainage

- 3.1.1 The existing site consists of an open gravel area with no buildings, therefore there is no existing drainage.

4 Proposed Drainage Strategy

4.1 SuDS Hierarchy

- 4.1.1 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.

Discharge Destination	
Discharge to Ground	Yes – at recorded infiltration rate of 1.46×10^{-5} m/s
Discharge to Watercourse	N/A
Discharge to Surface Water Sewer	N/A
Discharge to Other Sewer	N/A

4.2 Surface Water Drainage

- 4.2.1 An infiltration test to BRE365 was conducted on site which recorded a worst case infiltration rate of 1.46×10^{-5} m/s. In addition to this, a winter's groundwater monitoring was carried out on site which confirmed a peak groundwater level of 2.28mbgl. It is determined that the use of infiltration is a viable option on site and adheres to Arun District Councils requirements for a 1m easement between the base of the infiltration structure and peak groundwater level.
- 4.2.2 It is proposed that the site will discharge all surface water to ground via infiltration; each plot will have their individual roof areas collected into a positive drainage network before being discharged into ground via a geocellular soakaway that is to be placed within the respective rear gardens. The hard paved areas for each plot will be constructed from a porous surface that will allow them to freely drain to ground via infiltration. There is to be a channel drain located along the front of each access in order to stop private areas from draining onto the public highway, the channel drains are to be fitted with a sump unit that will discharge into the sub-base of the porous paved parking area via a diffuser unit.
- 4.2.3 All infiltration features have been designed to cater for the 1 in 100-year +45% storm.
- 4.2.4 Hydraulic calculations have been carried out which can be found at **Appendix C**.

4.3 Water Quality

- 4.3.1 A key requirement of any SuDS system is that it protects the receiving water body from the risk of pollution.
- 4.3.2 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.
- 4.3.3 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
- 4.3.4 The EA website indicates that the site does not lie within a Source Protection Zone.
- 4.3.5 The recommended approaches for water quality risk management are given in the SuDS Manual Table 26.1.

Fig 5. 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	

- 4.3.6 As per Table 26.1 Simple Index approach will be used as a design method for this site.
- 4.3.7 Table 26.2 will provide hazard classification of different land uses. The land uses for the surface water drainage for this site are.
- Residential Roofs
 - Individual Property driveways and residential car parks
 - Low traffic roads
- 4.3.8 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

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

Fig 6. 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

4.3.10 From Table 26.2 the following information is tabulated in Table 1

Table 1: Pollution hazard index and destination of runoff for the proposed site

Table 1: Pollution Hazard Index and Destination of runoff for the proposed Site					
Land Use	Destination of Runoff	Pollution Hazard Level	Total Suspended Solids	Metals	Hydrocarbons
Residential Roof	Ground Water	Very Low	0.2	0.2	0.05
Individual driveways, residential car parks and low traffic roads	Ground water	Low	0.5	0.4	0.4

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

Figure 7 Indicative SuDS Mitigation Indices for discharges to ground waters.

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

Table 26.4 Indicative SuDS mitigation indices for discharges to groundwater			
Characteristics of the material overlying the proposed infiltration surface, through which the runoff percolates	TSS	Metals	Hydrocarbons
A layer of dense vegetation underlain by a soil with good containment attenuation potential of at least 300mm in depth	0.6	0.5	0.6
A soil with good contaminant attenuation potential of at least 300mm in depth	0.4	0.3	0.3
Infiltration trench (where a suitable depth of filtration material is included that provides treatment, i.e., graded gravel with sufficient smaller particles but not single size coarse aggregate such as 20mm gravel) underlain by a soil with good contaminant attenuation potential of at least 300mm in depth.	0.4	0.4	0.4
Constructed permeable pavement (where a suitable filtration later is included that provides treatment, and including a geotextile at the base separating the foundation from the subgrade) underlain by a soil with good contaminant attenuation potential of at least 300mm in depth	0.7	0.6	0.7
Bioretention underlain by a soil with good contaminant attenuation potential of at least 300mm in depth	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 2: SuDS mitigation index

Mitigation Indices						
Runoff Source	Destination of Runoff	Mitigation Index Source	Type of SuDS Component	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Individual driveways, residential car parks and low traffic roads	Ground water	Table 26.4 (for ground waters)	Permeable Pavement	0.7	0.6	0.7

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

4.4 Foul water drainage

4.4.1 The foul water from each plot will be connected into a shared foul water network that is to be discharged into a new chamber that will be constructed over an existing foul water drain on site. This connection is subject to Southern Water approval under a S106 agreement.

4.4.2 A CCTV survey should be undertaken to confirm if a connection onsite is possible and if remedial works are required.

5 Maintenance

5.1 Introduction

- 5.1.1 During construction, the Contractor will be responsible for maintaining the drainage and SuDS (Sustainable Drainage Systems). Upon handover, the occupiers will take on the responsibility of these duties as laid out in this report.
- 5.1.2 The maintenance schedule for the proposed development will be split down into two separate categories; SuDS features and regular private drainage.

5.2 SuDS at The Old Coal Yard, Yapton

- 5.2.1 As listed above, in section 5.1.2, the SuDS features used on site will be **permeable paving and soakaways**.
- 5.2.2 The SuDS features have been designed for easy maintenance and comprise:
- Regular Day-to-Day care – litter collection, regular gardening to control vegetation growth and checking inlets where water enters the SuDS features
 - Occasional tasks – checking the SuDS features and removing any silt that builds up in the SuDS feature
 - Remedial work – repairing damage where necessary

5.3 SuDS Drainage Maintenance Specification

5.3.1 Soakaway

In order to maintain the functioning of the attenuation tanks, the following maintenance requirements should be adhered to:

Table 21.3 Operation and maintenance requirements for attenuation storage tanks		
Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action	Monthly for 3 months, then annually
	Remove debris from the catchment surface (where it may cause risks to performance)	Monthly
	For systems where rainfall infiltrates into the tank from above, check surface of filter for blockage by sediment, algae, or other matter; remove and replace surface infiltration medium as necessary.	Annually
	Remove sediment from per-treatment structures and/or internal forebays	Annually, or as required
Remedial Actions	Repair/rehabilitate inlets, outlet, overflows and vents	As required
Monitoring	Inspect/check all inlets, outlets, vents, and overflows to ensure that they are in good condition and operating as designed	Annually
	Survey inside of tank for sediment build-up and remove if necessary	Every 5 years or as required

5.3.2 Permeable Paving

In order to maintain the functioning of the permeable paving, the following maintenance requirements should be adhered to:

Table 21.3 Operation and maintenance requirements for permeable paving		
Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	Brushing and vacuuming (standard cosmetic sweep over whole surface)	Once a year, after autumn leaf fall, or reduced frequency as required, based on site-specific observations of clogging or manufacturer's recommendations – pay particular attention to areas where water runs onto pervious surface from adjacent impermeable areas as this area is most likely to collect the most sediment
Occasional maintenance	Stabilise and mow contributing and adjacent areas	As required
	Removal of weeds or management using glyphosate applied directly into the weeds by an applicator rather than spraying	As required – once per year on less frequently used pavements
Remedial Actions	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50mm of level of the paving	As required
	Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users, and replace lost jointing material	As required
	Rehabilitation of surface and upper substructure by remedial sweeping	Every 10 to 15 years or as required (if infiltration performance is reduced due to significant clogging)
Monitoring	Initial inspection	Monthly for three months after installation
	Inspect for evidence of poor operation and/or weed growth – if required take remedial action	Three-monthly, 48h after large storms in first six months
	Inspect silt accumulation rate and establish appropriate brushing frequencies	Annually
	Monitor inspection chambers	Annually

5.4 General Drainage Maintenance Specification

5.4.1 Inlet Structures and Inspection Chambers

- Inlet structures such as rainwater downpipes, road gullies and channel drains should be free from obstruction at all times to allow free flow through the SuDS
- Inspection Chambers and Rodding Eyes are used on bends or where pipes come together. They allow access and cleaning to the system if necessary.

Inlet Structures and Inspection Chambers	
Regular Maintenance	Frequency
Inlet Structures Inspect rainwater downpipes, channel drains and road gullies, removing obstructions and silt as necessary. Check that there is no physical damage. Strim vegetation 1m min surround to structures and keep area free from silt and debris	Monthly
Inspection Chambers and below ground control chambers. Remove cover and inspect, ensuring that the water is flowing freely and that the exit route for water is unobstructed. Remove debris and silt. Undertake inspection after leaf fall in Autumn	Annually
Occasional Maintenance Check topsoil levels are 20mm above edges of chambers to avoid mower damage.	As necessary
Remedial Work Repair physical damage if necessary	As required

5.4.2 Below ground drainage pipes

- Below ground drainage pipes convey water to the SuDS system. They should always be free from obstruction to allow free flow.

Below Ground Drainage Pipes	
Regular Maintenance	Frequency
Inspect and identify any areas that are not operating correctly. If required, take remedial action.	Monthly for 3 months then annually
Remove debris from the catchment surface (where it may cause risks to performance)	Monthly
Remove sediment from pre-treatment inlet structures and inspection chambers.	Annually or as required
Maintain vegetation to designed limits within the vicinity of below ground drainage pipes and tanks.	Monthly or as required
Remedial Work	
Repair physical damage if necessary	As required
Monitoring	
Inspect all inlets, outlets and vents to ensure that they are in good conditions and operating as designed.	Annually
Survey inside of pipe runs for sediment build up and remove if necessary.	Every 5 years or as required

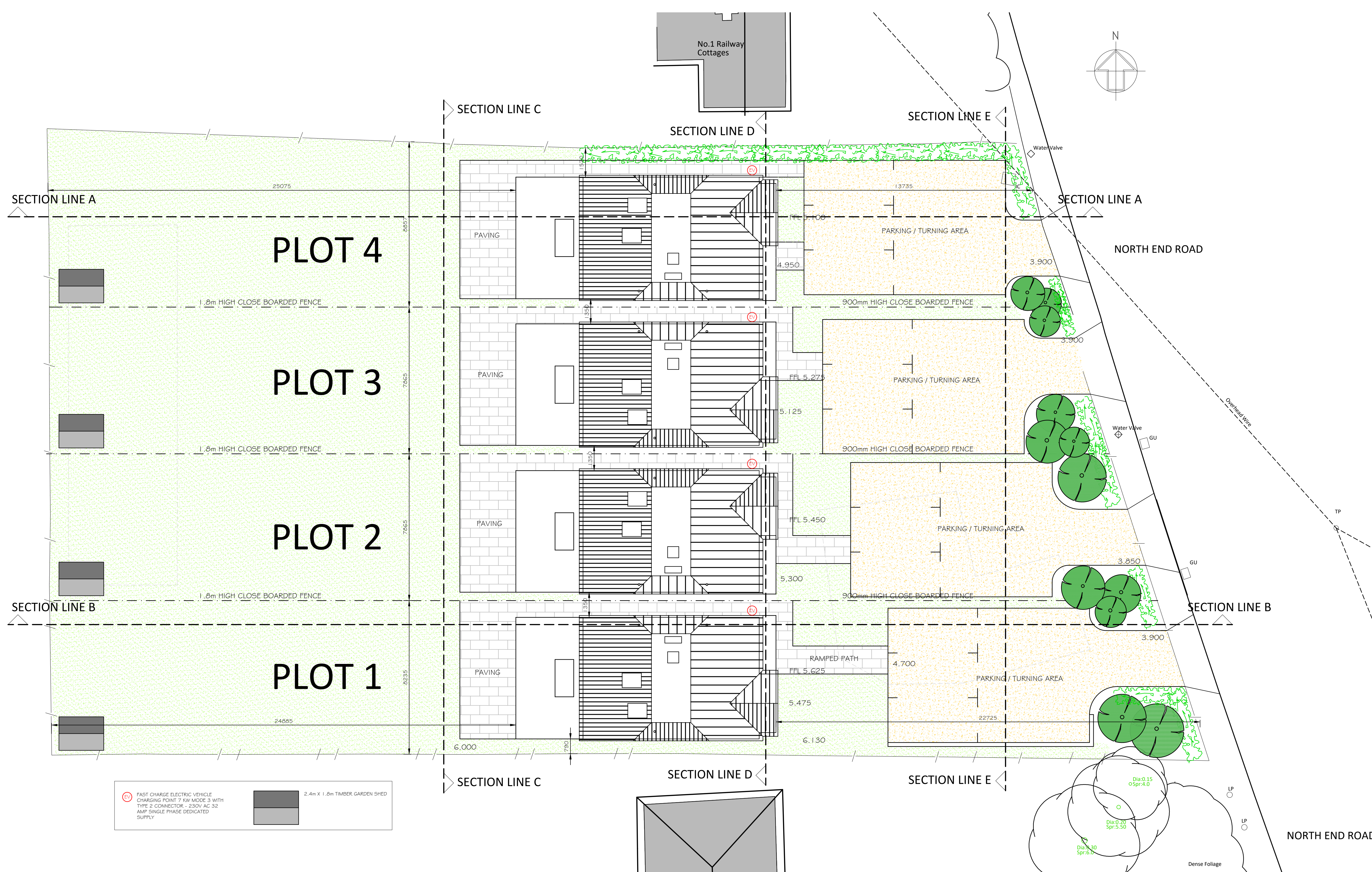
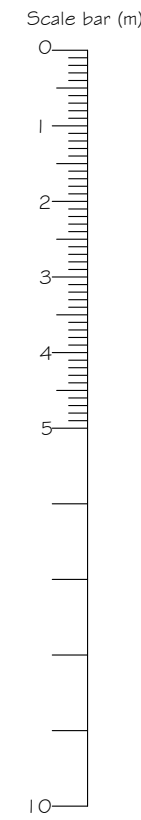
6 Summary and Conclusions

- 6.1.1 CGS Civils has been instructed by Sussex Design & Development Ltd to produce a Drainage statement under National Planning Policy Framework (NPPF) to support the Planning Application for the development of 4 No. 4-bedroom semi-detached dwellings with associated access and parking.
- 6.1.2 The Surface Water will discharge to ground via infiltration. All roof areas are to be discharged via geocellular soakaways located within the garden of each plot, all hard paved areas are to discharge freely to ground via infiltration through the use of a porous paved surface. All infiltration features have been designed to an infiltration rate of $1.46 \times 10^{-5} \text{m/s}$ and to cater for the 1 in 100-year +45% storm.
- 6.1.3 The Foul water from each plot will be discharged into a shared foul water drain which will discharge into the existing foul water sewer within North End Road via a new chamber that is to be constructed over the existing foul water drain on site.
- 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

NOTES
WRITTEN DIMENSIONS TO BE TAKEN IN PREFERENCE TO SCALE, AND ARE TO BE CHECKED ON SITE PRIOR TO COMMENCING WORK.
THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER DOCUMENTS RELATING TO THIS PROJECT.
ANY DISCREPANCIES ARE TO BE REFERRED IMMEDIATELY TO THE PROJECT DESIGNER.
THIS DRAWING IS COPYRIGHT, AND SHOULD NOT BE USED OR REPRODUCED WITHOUT PERMISSION.
IT IS THE CONTRACTOR'S RESPONSIBILITY TO ENSURE COMPLIANCE WITH THE BUILDING REGULATIONS.



NORTH END ROAD

B PROPOSALS AMENDED 17.02.23
A PROPOSALS AMENDED 03.02.23
REV DESCRIPTION DATE

PROJECT
THE OLD COAL YARD
NORTH END ROAD
YAPTON
WEST SUSSEX

DRAWING TITLE
PRELIMINARY PROPOSED SITE LAYOUT &
STREET ELEVATION

SCALE 1:100 @A1 DRAWN BY DATE
FLB JAN 23

DWG NO 12095K02 REV.B

Unit 3b Woodhorn Business Centre
Woodhorn Lane
Oving Chichester
West Sussex PO20 2BK

CHARTERED BUILDING SURVEYORS
SLOANE & BROWN
ARCHITECTURAL SERVICES

7.2 **Appendix B – Drainage Layout**

DESIGN SUBJECT TO THE APPROVAL OF:
PLANNING AUTHORITY
BUILDING CONTROL
SOUTHERN WATER

DESIGN SUBJECT TO THE CONFIRMATION OF:
EXTERNAL LEVELS DESIGN
LOCATION AND DEPTH OF EXISTING UTILITIES

DRAINAGE LEGEND (1:100)

EXISTING FEATURES

Ex FWD Existing foul water sewer/drain and manhole

Existing foul/surface water sewer/drain and manhole to be abandoned

PROPOSED FEATURES

FWD Foul water sewer/drain

SWD Storm water sewer/drain

Channel drain

Storm water access chamber (3000)

Storm water inspection chamber (4500)

Storm water catchpit chamber (4500)

Polystorm Diffuser Units

Foul water access chamber (3000)

Foul water inspection chamber (4500)

00.000

Finished floor level

1000 4.5m 1:100 2 BED

PIPE INFO - DIAMETER, LENGTH, GRADIENT, BEDDING TYPE

ABBREVIATIONS

MH - MANHOLE

IC - INSPECTION CHAMBER

AC - ACCESS CHAMBER

CP - CATCHPIT

BC - BRAKE CHAMBER

RE - RODDING EYE

IL - INVERT LEVEL

SL - SUMP LEVEL

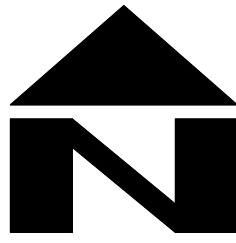
CL - COVER LEVEL

Site Specific Notes

- The proposed scheme will consist of the development of 4 No. 4-bedroom dwellings. Each plot will have their own access and parking areas.
- Site geology is confirmed to be River Terrace Deposits, which is comprised of Sand, Silt and Clay followed by Chalk formation. An onsite infiltration test was carried out by the client and yielded a worst-case infiltration rate of 1.46x10⁻³m/s.
- It is proposed that surface water runoff is to be discharged to ground via infiltration. All roof areas are to be collected into a positive drainage network before being discharged to ground through the use of geocellular soakaways. All hard paved areas are to be constructed from a porous construction to allow runoff to freely drain to ground. A channel drain is to be constructed along every access in order to capture any runoff. The channel drain will be connected to a diffuser unit that will discharge into the sub-base of the porous paving. All infiltration features have been designed to cater for the 1 in 100-year+45% storm.
- The foul water from each plot will be connected into a shared foul network that is to discharge into the existing foul water sewer located within North End Road. The foul connection will be made via a new chamber that is to be constructed over an existing foul water drain. The connection is subject to Southern Water approval under a S106 agreement.

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



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 SPURS 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 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 DRAWING 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 COVERS, 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.
- TECHNICAL, INSTALLATION AND MAINTENANCE INFORMATION FOR ANY THIRD PARTY PROPRIETARY SYSTEMS TO BE OBTAINED FROM THE MANUFACTURERS BY THE CONTRACTOR AND SUBMITTED TO ENGINEER FOR APPROVAL.
- 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

P7	21.05.25	REVISED FFLS	LH	CS	CS
P6	21.05.25	REVISED TO SUIT COMMENTS	LH	CS	CS
P5	16.05.25	REVISED TO SUIT BUILDING REGS	LH	CS	CS
PL4	15.04.25	REVISED TO SUIT SITE PLAN	LH	CS	CS
PL3	18.03.25	REVISED TO SUIT SITE PLAN	LH	CS	CS
PL2	12.02.25	REVISED TO SUIT GROUNDWATER MONITORING RESULTS	LH	CS	CS
PL1	23.04.24	REVISED TO SUIT NEW SITEPLAN	LH	CS	CS
P	30.03.23	PRELIMINARY ISSUE	LH	CS	CS
REV	DATE	DESCRIPTION	BY	CHK	APP

cgs
civils
Consulting Civil Engineers

CLIENT
SUSSEX DESIGN & DEVELOPMENT LTD

ARCHITECT
SLOANE & BROWN

JOB TITLE
THE OLD COAL YARD
YAPTON, WEST SUSSEX

DRAWING TITLE
DRAINAGE LAYOUT

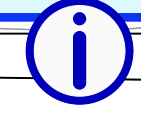
DRAWN	ENGINEER	CHECKED	APPROVED
LH	C SLADE	CS	CS
DATE	MARCH 2023	SCALE @ A1	1:100
JOB No.	C2600	STATUS	P
DRAWING No.	101	REV.	P7

PRELIMINARY



INFORMATIVE

All Soakaways to be Polytype Polystorm R-units wrapped in permeable geotextile 5x2x0.4m DP
Total 3.8m³ storage for 1 in 100 year + 45% peak storm event
Designed to recorded infiltration rate of 1.46x10⁻³m/s
Soakaway to be located min 5m from any building with min 500mm cover to units



INFORMATIVE

All porous paving to be:
Porous Paved Parking Area
60mm Porous Blocks
50mm 2/6mm Laying Course
Geotextile
300mm 5/20mm Sub Base
Geotextile
Total storage provided in sub-base 6.9m³
Designed to recorded infiltration rate of 1.46x10⁻³m/s

7.3 **Appendix C – Surface Water Calculations**

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	2	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.400	Preferred Cover Depth (m)	0.350
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
S2	0.009	5.00	5.475	500	530.135	131.528	0.799
SA1			5.475	150	523.685	131.528	0.908

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	S2	SA1	6.450	0.600	4.676	4.567	0.109	59.2	150	5.08	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	1.310	23.1	1.2	0.649	0.758	0.009	0.0	23	0.689

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	6.450	59.2	150	Circular	5.475	4.676	0.649	5.475	4.567	0.758

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	S2	500	Manhole	Adoptable	SA1	150	Manhole	Adoptable

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Normal
Rainfall Events	Singular	Skip Steady State	x
FSR Region	England and Wales	Drain Down Time (mins)	240
M5-60 (mm)	20.000	Additional Storage (m³/ha)	20.0
Ratio-R	0.400	Starting Level (m)	
Summer CV	0.750	Check Discharge Rate(s)	x
Winter CV	0.840	Check Discharge Volume	x

Storm Durations

15 | 30 | 60 | 120 | 180 | 240 | 360 | 480 | 600 | 720 | 960 | 1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
100	45	0	0

Node SA1 Soakaway Storage Structure

Base Inf Coefficient (m/hr)	0.05220	Invert Level (m)	4.467	Depth (m)	0.400
Side Inf Coefficient (m/hr)	0.05220	Time to half empty (mins)	341	Inf Depth (m)	
Safety Factor	2.0	Pit Width (m)	5.000	Number Required	1
Porosity	0.95	Pit Length (m)	2.000		

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 99.41%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
240 minute winter	S2	232	5.374	0.698	1.1	0.2944	0.0000	FLOOD RISK
240 minute winter	SA1	232	5.374	0.807	1.1	3.8193	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
240 minute winter	S2	1.000	SA1	1.1	0.578	0.046	0.1136
240 minute winter	SA1	Infiltration		0.1			

7.4 **Appendix D – Borehole Logs**

SU 90 SE 32**9822 0430****North End, Yapton****Block H****Surface level +6.0 m****Water not stuck****August 1981****Waste
Bedrock****3.3 m****1.2 m+****LOG**

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.3	0.3
Brickearth	Clay, brown, silty, with a few subangular flint pebbles. Very sandy near base	2.7	3.0
Raised Beach Deposits (younger)	Sand, mid to dark brown: fine to coarse; quartz with flint; silty and with angular to well rounded flint pebbles	0.3	3.3
Upper Chalk	Chalk, soft, rubbly	1.2+	4.5

7.5 **Appendix E – Soakage Test Results**

Job: The Old Coal Yard, Yapton - Test 1

Infiltration Calculator

$$f = \frac{V_{p75-25}}{a_{p50} \times t_{p75-25}}$$

V_{p75-25} = Effective storage volume between 75% and 25% effective depth

a_{p50} = Internal surface area of the trial pit up to 50% effective depth and including the base area

t_{p75-25} = The time for the water level to fall from 75% to 25% effective depth

f = Infiltration rate

Trial pit width	=	0.3
Trial pit depth	=	0.9
Trial pit length	=	1

a_{p50} = 1.47 m/squared

t_{p75-25} = 6300 seconds

V_{p75-25} = 0.135 m/cubed

F =

1.46E-05

Job: The Old Coal Yard, Yapton - Test 2

Infiltration Calculator

$$f = \frac{V_{p75-25}}{a_{p50} \times t_{p75-25}}$$

V_{p75-25} = Effective storage volume between 75% and 25% effective depth

a_{p50} = Internal surface area of the trial pit up to 50% effective depth and including the base area

t_{p75-25} = The time for the water level to fall from 75% to 25% effective depth

f = Infiltration rate

Trial pit width	=	0.3
Trial pit depth	=	0.9
Trial pit length	=	1

a_{p50} = 1.47 m/squared

t_{p75-25} = 2820 seconds

V_{p75-25} = 0.135 m/cubed

F = 3.26E-05

Job: The Old Coal Yard, Yapton - Test 3

Infiltration Calculator

$$f = \frac{V_{p75-25}}{a_{p50} \times t_{p75-25}}$$

V_{p75-25} = Effective storage volume between 75% and 25% effective depth

a_{p50} = Internal surface area of the trial pit up to 50% effective depth and including the base area

t_{p75-25} = The time for the water level to fall from 75% to 25% effective depth

f = Infiltration rate

Trial pit width	=	0.3
Trial pit depth	=	0.9
Trial pit length	=	1

a_{p50} = 1.47 m/squared

t_{p75-25} = 4800 seconds

V_{p75-25} = 0.135 m/cubed

F = 1.91E-05

498050 E

498060 E

498070 E

498080 E

498090 E

498100 E

498110 E

498120 E

1st
③ 8.23 fill 75%
9.10 Empty 25%

1st
8.00 ft
9.45 empty

① 8.50 ft
10.10 empty



PROJECT
SLOANE BROWN
DRAWING TITLE
SCALE
DATE
REV. 1

SLOANE
BROWN



















3









7.6 **Appendix F – Well installation report and groundwater monitoring results**



Middle Barn
East Ashey Manor Farm
Ashey Road, Ryde
Isle of Wight, PO33 4AU

25 October 2024

Our ref: NN1806R01

Chris Slade

Attention: Mr Slade

Dear Sir,

GROUND WATER MONITORING INSTALLATIONS, THE OLD COAL YARD, YAPTON

This letter presents a summary of the ground water well installations undertaken by E3S Consulting Ltd (E3S) on behalf of CGS Civils Ltd (The Client) in relation to a proposed residential development at the above site.

Fieldwork was undertaken on 22 October 2024. The site works consisted of the advancement of two groundwater well installations (BH01 and BH02) advanced to a depth of 4.00m bgl. A borehole location plan is included as **Figure 1** of this report.

The borehole location was set out based on site access and logged by a Geo-Environmental Consultant from E3S. The borehole logs are presented as **Appendix A** of this letter. Groundwater was not encountered within either of the boreholes when dipped post construction.

We trust that the site works undertaken and summary letter meet your current requirements. Should you have any immediate comments of queries please do not hesitate to contact the undersigned.

Kind Regards,

For and on behalf of E3S Consulting Ltd,

Chris Barron BSc (Hons) MEnvSc CGeol FGS

Attachments;

Figure 1 – Site & Borehole Location Plan (1 page)

Appendix A – Borehole Logs (2 Pages)



Drawn	CB	e3s Consulting	Client: PADWICK BUILDERS LTD		
Approved	JO		Project: GROUNDWATER MONITORING WELL INSTALLATION THE OLD COAL YARD, YAPTON		
Date	25/10/2024		Title: INVESTIGATION LOCATION PLAN		
Scale	NTS		Project no:	NN1806	Figure no: FIGURE 1
Original	A3		Rev: 1		

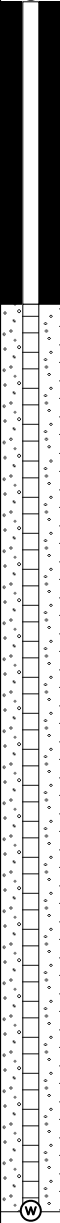
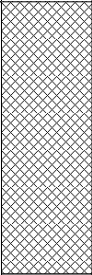
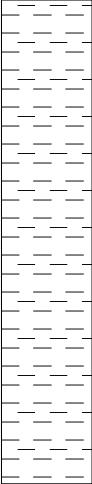
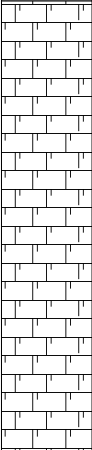
APPENDIX A

BOREHOLE LOGS



BOREHOLE LOG

Project Name: GROUNDWATER MONITORING WELLS		Client: PADWICK BUILDERS LTD		Date: 22/10/2024	
Location: THE OLD YARD, YAPTON		Contractor:			
Project No. : NN1806		Crew Name:		Drilling Equipment:	
Borehole Number BH01	Hole Type BH	Level	Logged By	Scale 1:25	Page Number Sheet 1 of 1

Well Ⓜ	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.90			MADE GROUND Black brown gravelly CLAY, gravel is fine to coarse sub rounded to sub angular of brick, flint and chalk fragments.	
								Orange brown slightly silty, slightly gravelly CLAY, gravel is fine to medium, sub angular of chert.	1
					2.50			Off white CHALK.	3
					4.00			End of Borehole at 4.000m	4
									5

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation

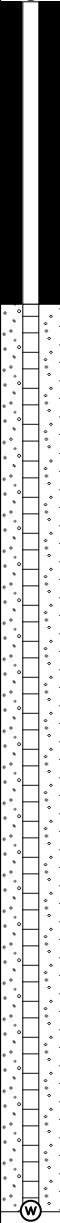
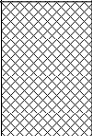
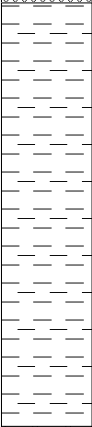
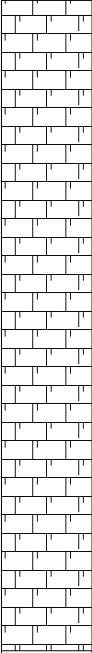
Remarks





BOREHOLE LOG

Project Name: GROUNDWATER MONITORING WELLS		Client: PADWICK BUILDERS LTD		Date: 22/10/2024	
Location: THE OLD YARD, YAPTON		Contractor:			
Project No. : NN1806		Crew Name:		Drilling Equipment:	
Borehole Number BH02	Hole Type BH	Level	Logged By	Scale 1:25	Page Number Sheet 1 of 1

Well Ⓢ	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.45			MADE GROUND Black brown gravelly CLAY, gravel is fine to coarse sub rounded to sub angular of brick, flint and chalk fragments.	
								Orange brown slightly silty, slightly gravelly CLAY, gravel is fine to medium, sub angular of chert.	1
					1.85			Off white CHALK.	2
					4.00			End of Borehole at 4.000m	4
									5

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation

Remarks



Project:	The Old Coal Yard, Yapton	GWM
Project No:	C2600	
Client:	Olaf Christiansen	