



Consulting Civil Engineers

Foul and Surface Water Drainage Report

1 Greenways Crescent, Ferring, West Sussex BN12 5EF

For

Mr & Mrs C Newell

Rev – **P1**

Reference **C1692**

Date **26th May 2021**

Revision	Date of Issue	Comments	Prepared By	Checked By
P	26/05/21	Initial Issue	LH	CS
P1	14/07/21	Revised report to suit drainage layout	LH	CS

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1 Introduction

- 1.1.1 CGS Civils Ltd have been appointed by Mr & Mrs C Newell to undertake a drainage strategy report for a proposed development at 1 Greenways Crescent, Ferring in West Sussex.
- 1.1.2 The purpose of this drainage strategy is to demonstrate how the development area can be satisfactorily drained without increase flood risk onsite and elsewhere.
- 1.1.3 The existing site consists of an existing residential dwelling with associated access. The proposed development will consist of a replacement property and the construction of a new detached garage.
- 1.1.4 The proposed development is located as OS Grid Reference TQ 09579 02443 and has the post code BN12 5EF
- 1.1.5 The total green line boundary is approximately 0.1403 Ha, and the proposed development will result in an increase of 0.0369 Ha of impermeable area.
- 1.1.6 The proposed site will make use of the existing access along Greenways crescent, the access road is to be redeveloped and a new access is to be constructed to the west of the dwelling to allow access to the detached garage. The site is flanked on all sides by a residential area and a root protection area is located to the East.
- 1.1.7 The proposed site plan can be found in **Appendix A**.

Fig 1. Site Location

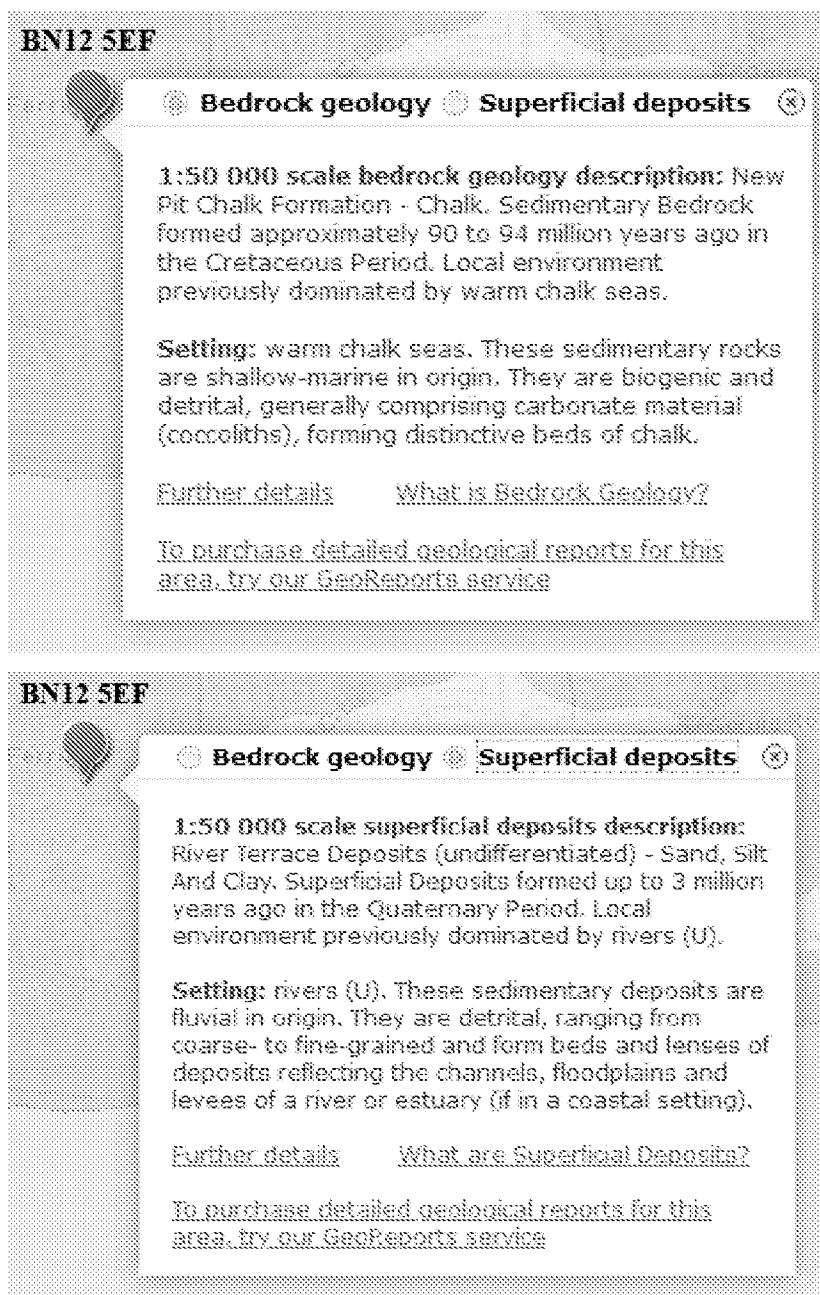


2 Site Geology

2.1 British Geological Survey information

- 2.1.1 The British Geological Survey confirms the bedrock geology to be made up Pit Chalk Formation, which is primarily comprised of Chalk. The BGS website confirms the Superficial Deposits to be made up of River Terrace Deposits (undifferentiated) which is primarily comprised of Sand, Silt and Clay.
- 2.1.2 Local historical borehole logs close to the site confirm the ground geology.
- Borehole TTQ00SE51 (Located approx. 300m North West of the site) – Clay and Gravel (1.8mbgl), Gravel (2.4mbgl)

Fig 2. British Geological Survey



3 Existing Drainage

- 3.1.1 It is not currently known how the existing site discharges surface water. Due to the presence of Clay and lack of any surface water system it is presumed that the surface water discharges into the existing foul sewer as a combined connection. This will be confirmed via onsite investigations at a later stage.

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
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 Based upon the information gathered from the British Geological Survey website regarding the make up of the superficial deposits on site, it is determined that discharge to ground via infiltration can be achieved. The hard paved driveways are to be made up of a permeable resin bound construction which will allow them to discharge to ground freely by acting like a large blanket soakaway. Half of the proposed roof areas are to be discharged directly to the sub-base of the permeable driveway either using conventional diffuser units or a Raintaina RWP filter chamber; whereas the other half of the roof areas are to be discharged to a small geocellular soakaway that is located to the south of the property.
- 4.2.2 Both infiltration features have been designed to an assumed infiltration rate of 2x10-5m/s and to cater for the 1 in 100-year +40% storm.
- 4.2.3 An infiltration test to BRE365 is required to be undertaken to confirm the infiltration rate on site.
- 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-	Low	0.5	0.4	0.4

residential car parking with infrequent change (e.g., schools, offices) i.e., < 300 traffic movements/day				
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 Index						
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) Table 26.3 (for surface 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 will discharge into the local foul water sewer via a new chamber that is to be constructed over the existing sewer on site.

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 occupier 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 1 Greenways Crescent, Ferring

- 5.2.1 As listed above, in section 5.1.2, the SuDS features used on site will be Soakaway and permeable paving.
- 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 Soakaway, the following maintenance requirements should be adhered to:

Table 5.3.1 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 pre-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 21.4 Operation and maintenance requirements for permeable		
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.	Monthly
Trim vegetation 1m min surround to structures and keep area free from silt and debris	
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.	Annually
Undertake inspection after leaf fall in Autumn	
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.

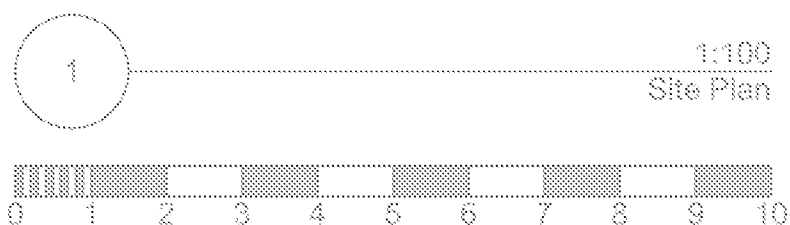
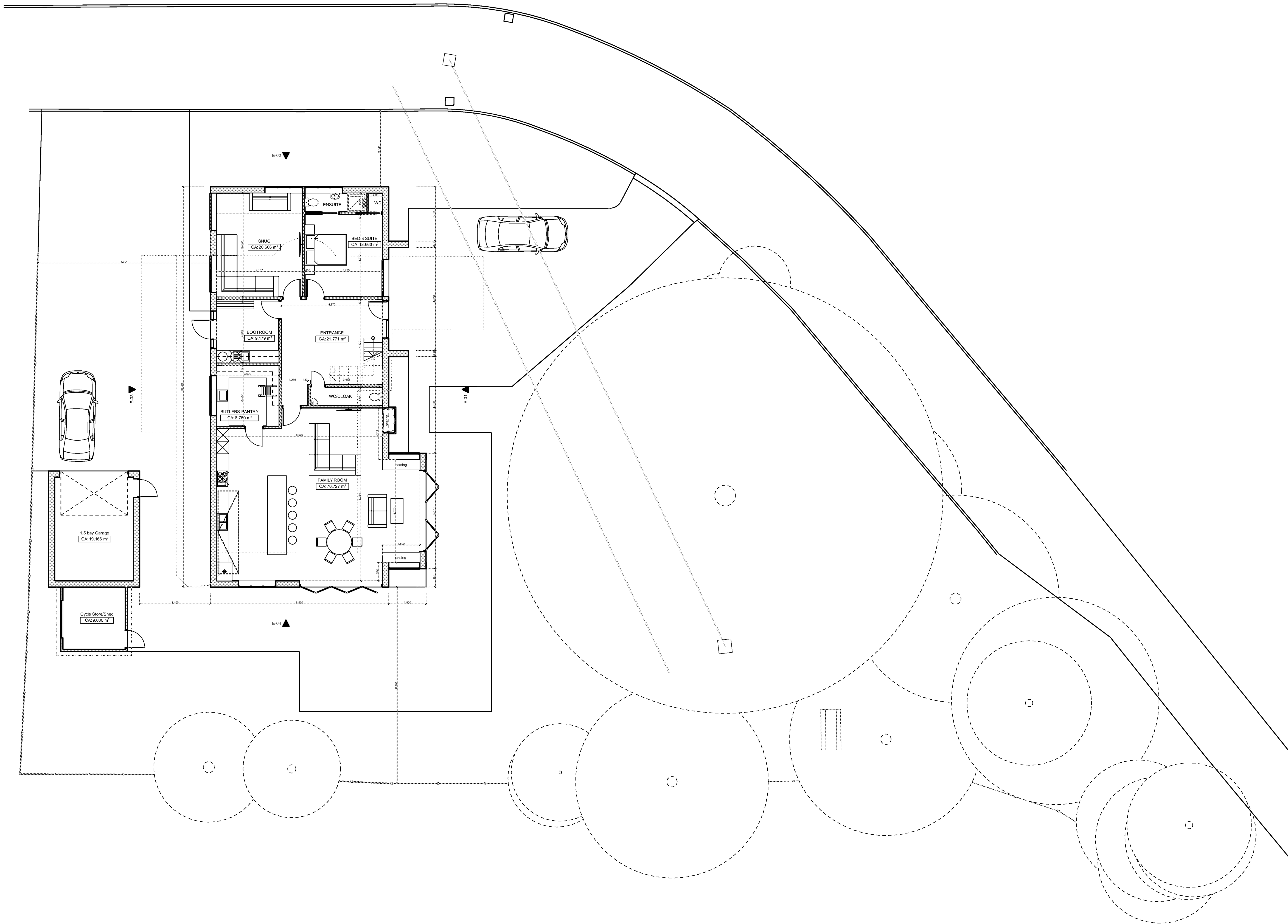
Below Ground Drainage Pipes	
Regular Maintenance	Frequency
Inspect and identify any areas that are not operating correctly. If required, take remedial action.	Monthly for 3 months then annually
Remove debris from the catchment surface (where it may cause risks to performance)	Monthly
Remove sediment 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 Mr & Mrs C Newell to produce a Drainage statement under National Planning Policy Framework (NPPF) to support the Planning Application for the redevelopment of the existing property and the construction of the detached garage.
- 6.1.2 The Surface Water will discharge to ground via infiltration using a resin bound permeable driveway construction and via a conventional geocellular soakaway. An infiltration test to BRE365 is to be undertaken to confirm the infiltration rate of soils on site.
- 6.1.3 The Foul water will discharge into the local existing foul water sewer via a new constructed chamber.
- 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



THIS DRAWING IS INDICATIVE ONLY AND MUST NOT BE RELIED UPON FOR CONSTRUCTION - UNLESS THE DRAWING IS NAMED AS 'CONSTRUCTION'.

ALL DIMENSIONS TO BE CHECKED AND VERIFIED WITH ANY DISCREPANCIES REPORTED TO PHILIPS SURVEYORS LLP.

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- THE APPOINTMENT OF PRINCIPAL DESIGNER AND PRINCIPAL CONTRACTOR.

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IN ADDITION TO THE HAZARDS AND RISKS NORMALLY ASSOCIATED WITH THE TYPE OF CONSTRUCTION WORK DETAILED ON THIS DRAWING, PLEASE NOTE THE FOLLOWING SIGNIFICANT RISKS AND INFORMATION:

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

FOR INFORMATION RELATING TO END USE, MAINTENANCE, DEMOLITION ETC. - PLEASE REFER TO THE HEALTH & SAFETY FILE.

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

Rev.	Amendments	Date	Drw.
C	CLIENT CHANGES	20.04.21	GRM
B	CLIENT CHANGES	01.04.21	GRM
A	DIMENSIONS ADDED	11.03.21	GRM

PS PHILIPS SURVEYORS
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CLIENT:
Mr & Mrs C Newell
61 Foxdale Drive Angmering West
Sussex BN16 4HF

PROJECT:
REPLACEMENT DWELLING
1 Greenways Crescent Ferring West
Sussex BN12 5EF

DRAWING TITLE:
Feasibility
PROPOSED SITE PLAN

DRAWN: GRM	JOB NO: 2366-21	SCALE @ A1: As Shown
CHECKED: POW	DRAWING NO: FE-03	REV: C
DATE: March 21		

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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
SOAKAWAY TEST TO BRE 365
RWP LOCATIONS

DRAINAGE LEGEND (1:100)

EXISTING FEATURES

Existing foul water sewer/drain
and manhole

PROPOSED FEATURES

Storm water sewer/drain
Storm water inspection chamber (450Ø)
Porous paved parking area
Storm water orifice flow control chamber (500Ø)
Foul water sewer/drain
Foul water access chamber (300Ø)
Foul water inspection chamber (450Ø)

00.000

100Ø 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

Root Protection Area

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 ASSUMED TO BE 100mm DIA.
- ALL PIPES TO BE ADOPTED, OR CONNECTING TO ADOPTED SEWERS, TO BE VITRIFIED CLAY TO BS EN 295 AND BS85 (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 D40 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' 8th 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.
- 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

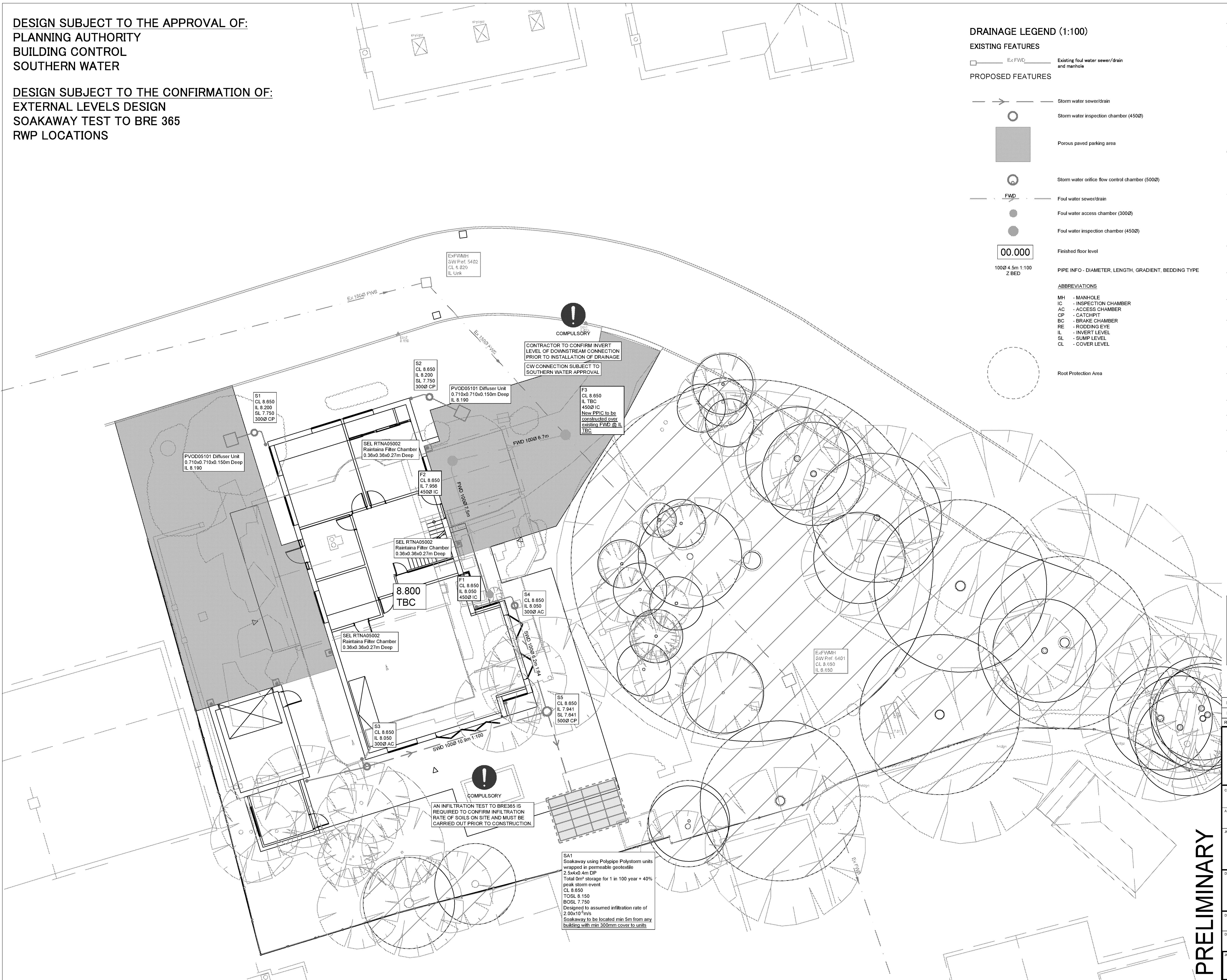


Prefix to drawing numbers shall signify the following:-
P = PRELIMINARY Shall not be used for contract or construction purposes
T = TENDER Shall not be used for construction purposes
C = CONSTRUCTION These are the only drawings that shall be used for construction purposes
R = RECORD Record of actual completed work

P1	14.07.21	REVISED TO SUIT CLIENTS COMMENTS	LH	CS	CS
P-	01.06.21	PRELIMINARY ISSUE	LH	CS	CS
REV	DATE	DESCRIPTION	BY	CHK	APP

 Consulting Civil Engineers					
CLIENT		MR & MRS C NEWELL			
ARCHITECT		PHILIPS SURVEYORS			
JOB TITLE		1 GREENWAYS CRESCENT FERRING			
DRAWING TITLE		DRAINAGE STRATEGY			
DRAWN	LH	ENGINEER	C SLADE	CHECKED	CS
DATE	MAY 2021	SCALE @ A1	1:100		
JOB No.	C1692	STATUS	P	DRAWING No.	100
		REV.	P1		

PRELIMINARY



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)	0.600
Ratio-R	0.400	Preferred Cover Depth (m)	1.200
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)	Node Type	Manhole Type	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
S3	0.005	5.00	8.650	Manhole	Adoptable	300	509576.463	102434.072	0.600
S4	0.002	5.00	8.650	Manhole	Adoptable	300	509585.030	102443.407	0.600
S5	0.002	5.00	8.650	Manhole	Adoptable	500	509586.907	102437.270	0.709
SA1			8.650	Manhole	Adoptable	100	509588.345	102432.569	0.792

Links (Input)

Name	US Node	DS Node	Length (m)	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)
1.000	S4	S5	6.418	8.050	7.941	0.109	58.9	100
1.001	S3	S5	10.923	8.050	7.941	0.109	100.2	100
1.002	S5	SA1	4.916	7.941	7.856	0.083	59.2	100

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Normal
FSR Region	England and Wales	Skip Steady State	x
M5-60 (mm)	20.000	Drain Down Time (mins)	240
Ratio-R	0.400	Additional Storage (m³/ha)	20.0
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 %)
30	0	0	0
100	40	0	0

Node SA1 Soakaway Storage Structure

Base Inf Coefficient (m/hr)	0.07200	Invert Level (m)	7.750	Depth (m)	0.400
Side Inf Coefficient (m/hr)	0.07200	Time to half empty (mins)	245	Inf Depth (m)	
Safety Factor	2.0	Pit Width (m)	2.500	Number Required	1
Porosity	0.95	Pit Length (m)	3.000		

Results for 30 year Critical Storm Duration. Lowest mass balance: 95.08%

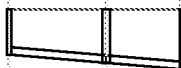
Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S3	10	8.086	0.036	1.7	0.0086	0.0000	OK
15 minute winter	S4	11	8.070	0.020	0.7	0.0028	0.0000	OK
180 minute winter	S5	140	8.036	0.095	0.8	0.0240	0.0000	OK
180 minute winter	SA1	140	8.036	0.178	0.8	2.0393	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
15 minute winter	S3	1.001	S5	1.7	0.549	0.277	0.0333
15 minute winter	S4	1.000	S5	0.7	0.307	0.089	0.0151
180 minute winter	S5	1.002	SA1	0.8	0.605	0.102	0.0381
180 minute winter	SA1	Infiltration		0.1			

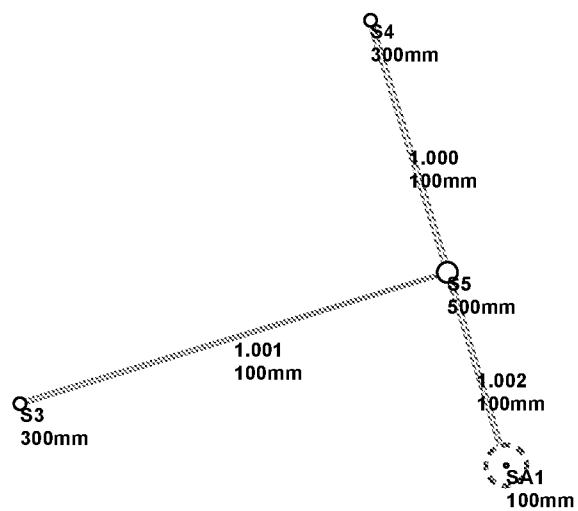
Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 95.08%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
180 minute winter	S3	172	8.502	0.452	0.7	0.1072	0.0000	FLOOD RISK
180 minute winter	S4	172	8.502	0.452	0.3	0.0620	0.0000	FLOOD RISK
180 minute winter	S5	172	8.502	0.561	1.3	0.1420	0.0000	FLOOD RISK
180 minute winter	SA1	172	8.502	0.644	1.1	2.8587	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
180 minute winter	S3	1.001	S5	0.7	0.448	0.116	0.0855
180 minute winter	S4	1.000	S5	0.3	0.232	0.038	0.0502
180 minute winter	S5	1.002	SA1	1.1	0.555	0.140	0.0385
180 minute winter	SA1	Infiltration		0.1			

Node Name	S4	S5	SA1
A4 drawing Hor Scale 500 Ver Scale 100 Datum (m) -2.000			
	Link Name	1.000	1.002
	Section Type	100mm	100mm
	Slope (1:X)	58.9	59.2
	Cover Level (m)	8.650	8.650
	Invert Level (m)	8.050	7.941
	Length (m)	6.418	4.916

Node Name	S3	S5
A4 drawing Hor Scale 500 Ver Scale 100 Datum (m) -2.000		
Link Name	1.001	
Section Type	100mm	
Slope (1:X)	100.2	
Cover Level (m)	8.650	8.650
Invert Level (m)	8.050	7.941
Length (m)	10.923	



7.4 **Appendix D – Borehole Logs**

West Ferring--Map N.S.G. 332.

490. †St. Mary's, house 100 yds. N. of the church. Ht. above
25/ O.D. 10 ft. Map 63 S.E.

						Thickness	Depth
						ft.	ft.
Birkbeck & Brighton Road Bank	{	Drift	{	Clay and gravel	...	6	6
				Gravel	...	2	8
				Sand and clay	...	18	26 7.1
				Chalk	...	74	100 30.1

Lining-tubes to 70 ft. down. R.L. W. 18 ft. above.

This house is now called "Geystale".
Well still in use for domestic purposes.
No knowledge of water-levels or amount
pumped. 1941
Visited 17/2/41. T.F.S.

Note. Also published in W.S. Pt. II, p. 208. (1911).
Made and communicated by Duke & Ockendon.

DATA Bank