

Surface Water Drainage Report

New Wharf, Shoreham- By- Sea

Planning Ref: AWDM/0671/25

For

Oakfield Construction Ltd

Rev - P

Reference **C3919**

Date **08th December 2025**

Revision	Date of Issue	Comments	Prepared By	Checked By
P	08/12/2025	Initial Issue	MR	CS

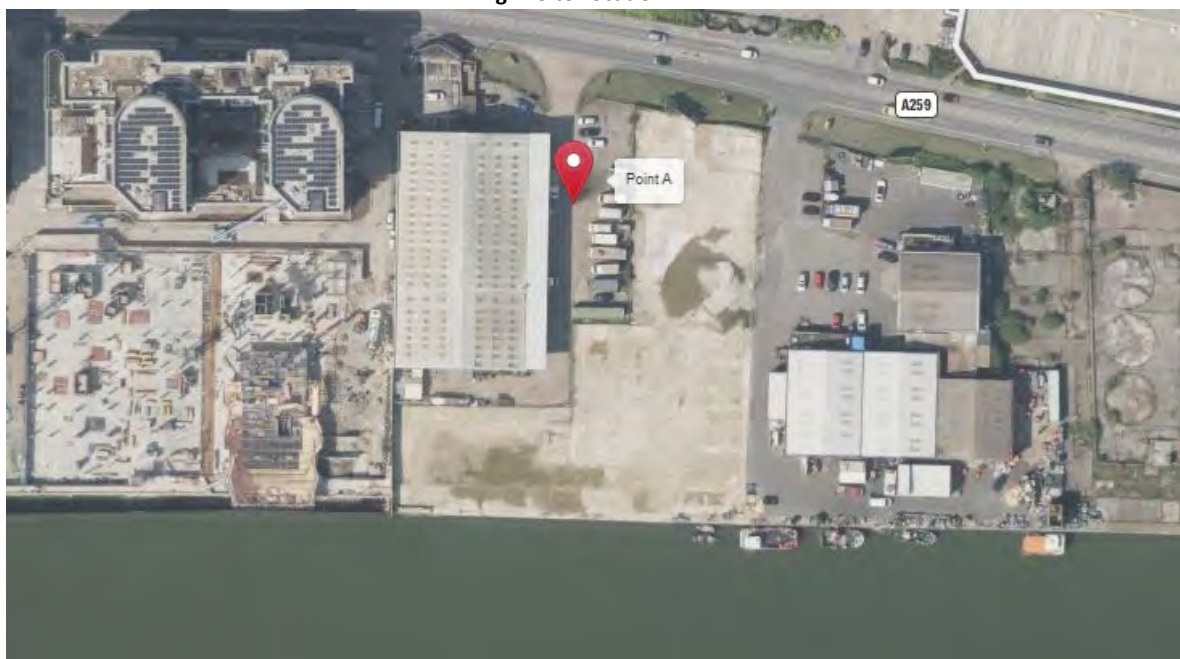
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1 Introduction

- 1.1.1 CGS Civils Ltd has been appointed to undertake a drainage strategy report for a proposed development at New Wharf, Shoreham- By-Sea
- 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 in order to clear Condition 6 and 7. The conditions are in place on Decision Notice from **09.09.2025**, with the planning reference: **AWDM/0671/25**. The conditions require the following to be included:
- *6. Construction shall not begin until a detailed surface water drainage scheme for the site has been submitted to and approved in writing by the Local Planning Authority. The surface water drainage scheme must prioritise the use of source control Sustainable Drainage Systems (SuDS) in consideration of the Non Statutory Technical Standards for SuDS and demonstrate no increase in flood risk as a result of the Proposed Development with sufficient supporting evidence provided to support its viability including supporting calculations for the 100% AEP (1 in 1 year), 3.33% AEP (1 in 30 year), 3.33% AEP (1 in 30 year) plus climate change, the 1% AEP (1 in 100 year) and the 1% AEP (1 in 100) plus climate change critical storms. The scheme shall subsequently be implemented in accordance with the approved details before the development is completed. Reason: To ensure the flood risk is adequately addressed and not increased in accordance with the National Planning Policy Framework and policies 35 and 36 of the Adur Local Plan.*
 - *7. The development hereby approved shall not be occupied until details of the maintenance and management of the sustainable drainage scheme have been submitted to and approved in writing by the Local Planning Authority. The drainage scheme shall be implemented prior to the first occupation of the development hereby approved and thereafter managed and maintained in accordance with the approved details in perpetuity. The Local Planning Authority shall be granted access to inspect the sustainable drainage scheme for the lifetime of the development. The details of the scheme to be submitted for approval shall include: I. a timetable for its implementation. II. details of SuDS feature and connecting drainage structures and maintenance requirement for each aspect including a drawing showing where they are located. III. a management and maintenance plan for the lifetime of the development which shall include details of design life and the arrangements for adoption by any public body or statutory undertaker, or any other arrangements to secure the operation of the sustainable drainage scheme throughout its lifetime. This will include the name and contact details of any appointed management company. Reason: To ensure that the development achieves a high standard of sustainability and ensure the flood risk is adequately addressed and not increased in accordance with the National Planning Policy Framework and policies 35 and 36 of the Adur Local Plan*
- 1.1.3 The existing site consists of an existing vacant warehouse with hardstanding and car parking. The proposed development will consist of the erection of 33 self-storages units over an existing hard paved area. The proposed development is located at OS Grid Reference **TQ 22403 05053** and has the post code **BN43 6RN**

Fig 1. Site Location



2 Executive Summary:

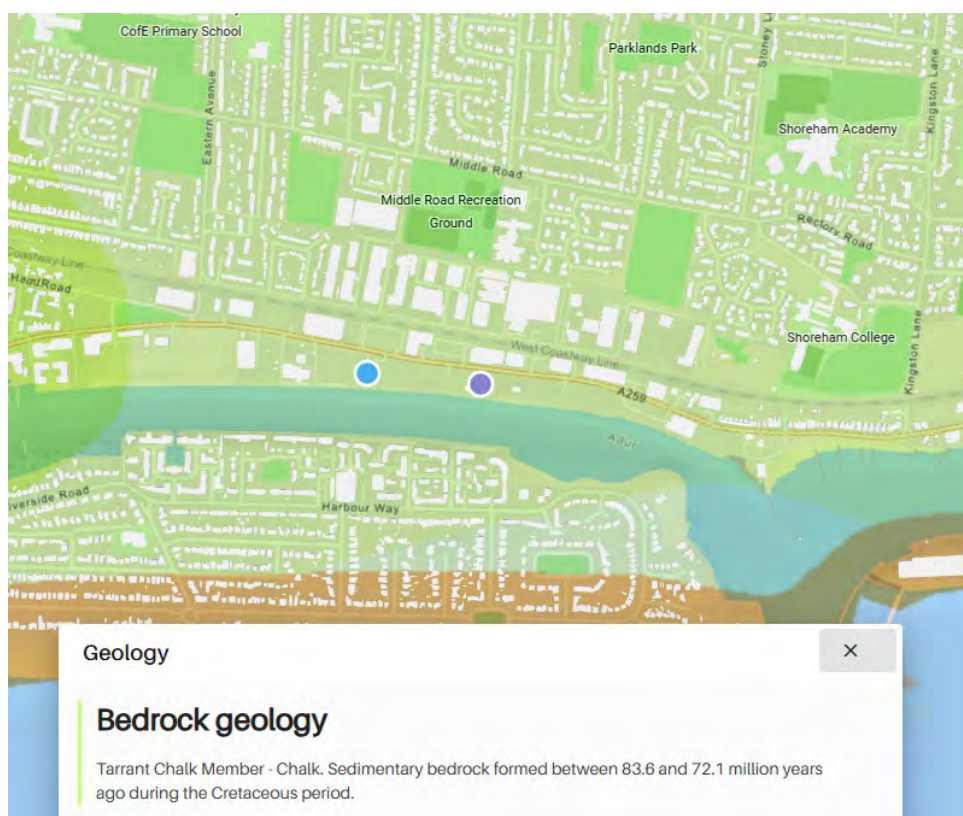
- 2.1.1 Surface water runoff will be discharged into the existing drainage network located to the south of the site, which continues into third-party land, consistent with the current surface water discharge arrangement. The proposed drainage network will be remodelled to include improved linear drainage and above and below ground storage to improve the site's flood resilience without increasing flood risk off site.

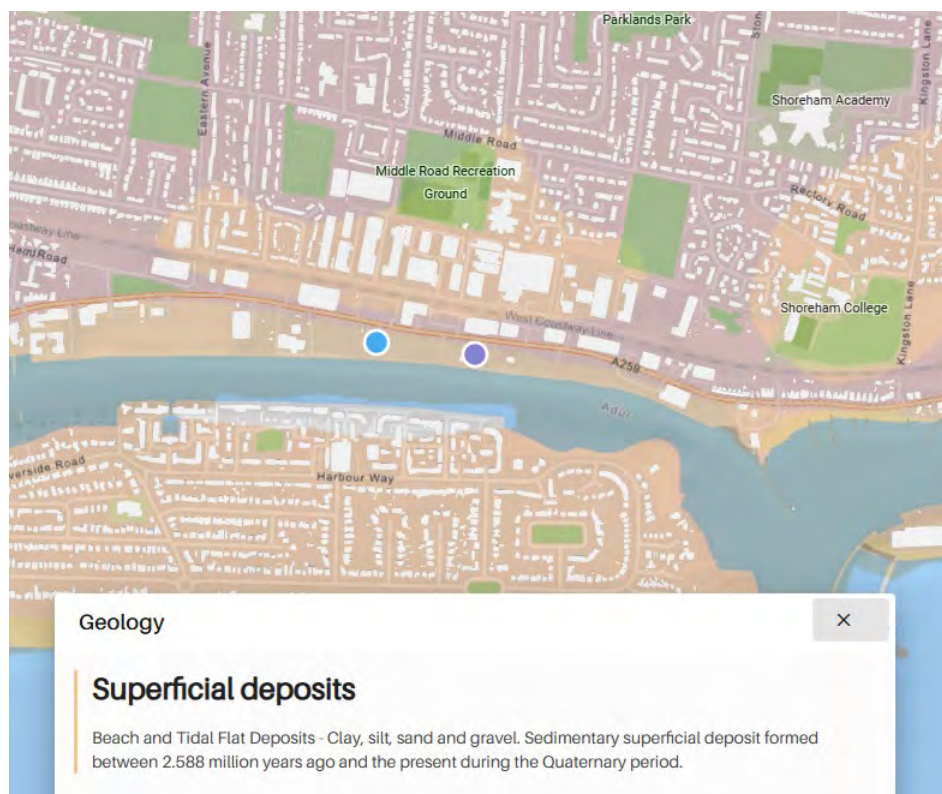
3 Site Geology

3.1 British Geological Survey information

- 3.1.1 The British Geological Survey confirms the bedrock geology to be made up Tarrant Chalk Member- Chalk. The BGS website confirms the superficial deposits on site to be made up of Beach and Tidal Flat Deposits- Clay, silt, sand and gravel.
- 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 **TQ20NW82** (Located approx. 200m East of the site) – Ground geology (Chalk, gravel)
 - Borehole **TQ20NW38** (Located approx. 200m West of the site) – Ground geology (Stiff brown silty clay). Standing water level 3.66mbgl.
- 3.1.3 The Historical Borehole Logs can be found at **Appendix B**.

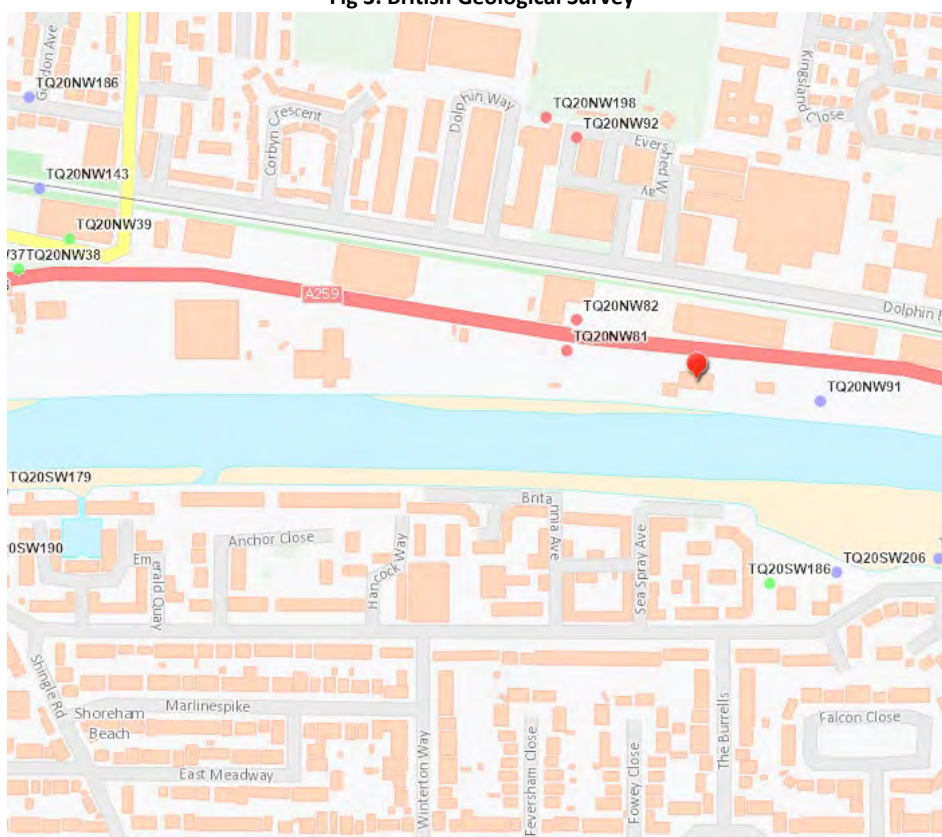
Fig 2. British Geological Survey





Snippet from BGS Website showing Bedrock geology and superficial deposits
<http://mapapps.bgs.ac.uk/geologyofbritain/home.html?>

Fig 3. British Geological Survey



Snippet from BGS Website showing Historical Borehole Logs

3.2 Geological Assessment

- 3.2.1 No intrusive ground investigation has been undertaken. Based on the British Geological Survey information, the site is underlain by chalk soils and stiff silty clay soils, which a high potential for variability in groundwater levels. According to the BGS records, standing water has been encountered at approximately 3.66 m below ground level (mbgl).

4 Existing Drainage

- 4.1.1 The existing surface water runoff is discharged into the on-site drainage network, which then continues through third-party land and discharges directly into the tidal section of River Adur without restriction on flow rates.
- 4.1.2 The existing drainage layout can be found at **Appendix C**

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.

Table 1. SuDS Hierarchy

Discharge Destination	
Rainwater Harvesting	N/A
Discharge to Ground	NO- Discharge to ground is not proposed. The drainage strategy is based on reinforcing and upgrading the existing surface water system, taking into account that the current arrangement relies on the site's proximity to the tidal area. The existing network drains southwards and discharges without restriction into the River Adur
Discharge to Watercourse	YES- The reinforced surface water drainage network is proposed to discharge into the tidal River Adur without restriction, consistent with the existing drainage arrangement.
Discharge to Surface Water Sewer	N/A
Discharge to Other Sewer	N/A

5.2 Proposed Hydraulic Calculation Specifications:

Table 2. SuDS Hierarchy

Hydraulic Calculations Settings:	
Rainfall Methodology	FEH-22
Volumetric Run-off Coefficient Cv	1
CV Winter and Summer	1
Additional Storage (m ³ / ha)	0.0
Maximum Rainfall (mm/hr)	75

5.3 Surface Water Drainage

- 5.3.1 A drainage strategy was produced by others which aimed to restrict surface water flows to greenfield rates in accordance with usual planning policy to protect downstream receptors. Given that the surface water from the site discharged directly into the tidal section of the River Adur and in proximity to the harbour, it was felt that this approach would be unnecessary and result in significant groundworks to install large volumes of below ground storage. Our approach therefore has been to focus on reinforcement of the current drainage network to provide protection for up to the 1 in 100-year storm + 45% without increasing discharge rates.
- 5.3.2 Taking advantage of the fact that the existing hard-paved area will be fully resurfaced with new tarmac, a central section of the site will grade to form an above ground channel with a section of linear drainage running across its length. The volume of the channel has been calculated to contain flood volumes for up the 1 in 100-year storm + 45% climate change allowance.
- 5.3.3 The northern part of the hardstanding area, approximately 0.035 ha, will be captured by the ACO drainage channel and conveyed into the proposed bioretention planter unit. The Planter unit will provide an additional 9.80 m³ of storage and, in addition to storing surface water, will also provide a degree of water quality improvement.
- 5.3.4 A Storm Shark Hydrodynamic Vortex Separator is proposed to provide pollution mitigation prior to surface water runoff from the site being discharged into the river, serving approximately 0.158 ha of impermeable area.
- 5.3.5 To primarily reduce the load on the existing southern drainage system and to prevent any on-site flooding, an offline attenuation tank has been provided which captures a small quantity of water generated more severe storm events.
- 5.3.6 The entire reinforced drainage system has been designed to accommodate the 1 in 100-year storm event with a 45% allowance for climate change. In accordance with SuDS guidance, discharge to a tidal estuary may proceed without flow restriction; therefore, no flow control or attenuation is included in this design to ensure a robust design with reduced maintenance risks appropriate for its location.
- 5.3.7 Proposed Drainage Plan, Contributing Area Plan, Exceedance Flow Routes, Typical Construction Details and Hydraulic calculations have been carried out which can be found at **Appendix D**.

5.4 Water Quality

- 5.4.1 A key requirement of any SuDS system is that it protects the receiving water body from the risk of pollution.
- 5.4.2 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.
- 5.4.3 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
- 5.4.4 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	

5.4.5 As per Table 26.1 Simple Index approach will be used as a design method for this site.

5.4.6 Table 26.2 will provide hazard classification of different land uses. The land uses for the surface water drainage for this site are.

- Commercial yard and delivery areas, non-residential car parking with frequent change

5.4.7 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

5.4.8 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

5.4.9 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 3: Pollution Hazard Index and Destination of runoff for the proposed Site					
Land Use	Destination of Runoff	Pollution Hazard Level	Total Suspended Solids	Metals	Hydrocarbons
Commercial yard and delivery areas, non-residential car parking with frequent change	Surface Water	Medium	0.7	0.6	0.7

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

Table 26.3 from SuDS manual. Indicative SuDS Mitigation Indices for discharges to surface waters.

Table 26.3 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		

5.4.11 SuDS mitigation indices are tabulated in Table 5 as follows:

Table 5: 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
Commercial yard and delivery areas, non-residential car parking with frequent change	Surface water	Table 26.3 (for surface waters)	Bioretention system (provided only for northern part of the site – impermeable area of 0.035ha)	0.8	0.8	0.8
			Storm Shark Hydrodynamic Vortex Separator (provided for 0.153 ha of the hardstanding impermeable area)	0.5	0.4	0.45

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

5.5 Construction Phase Drainage

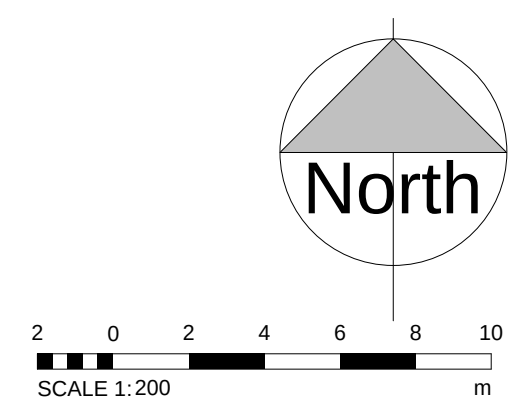
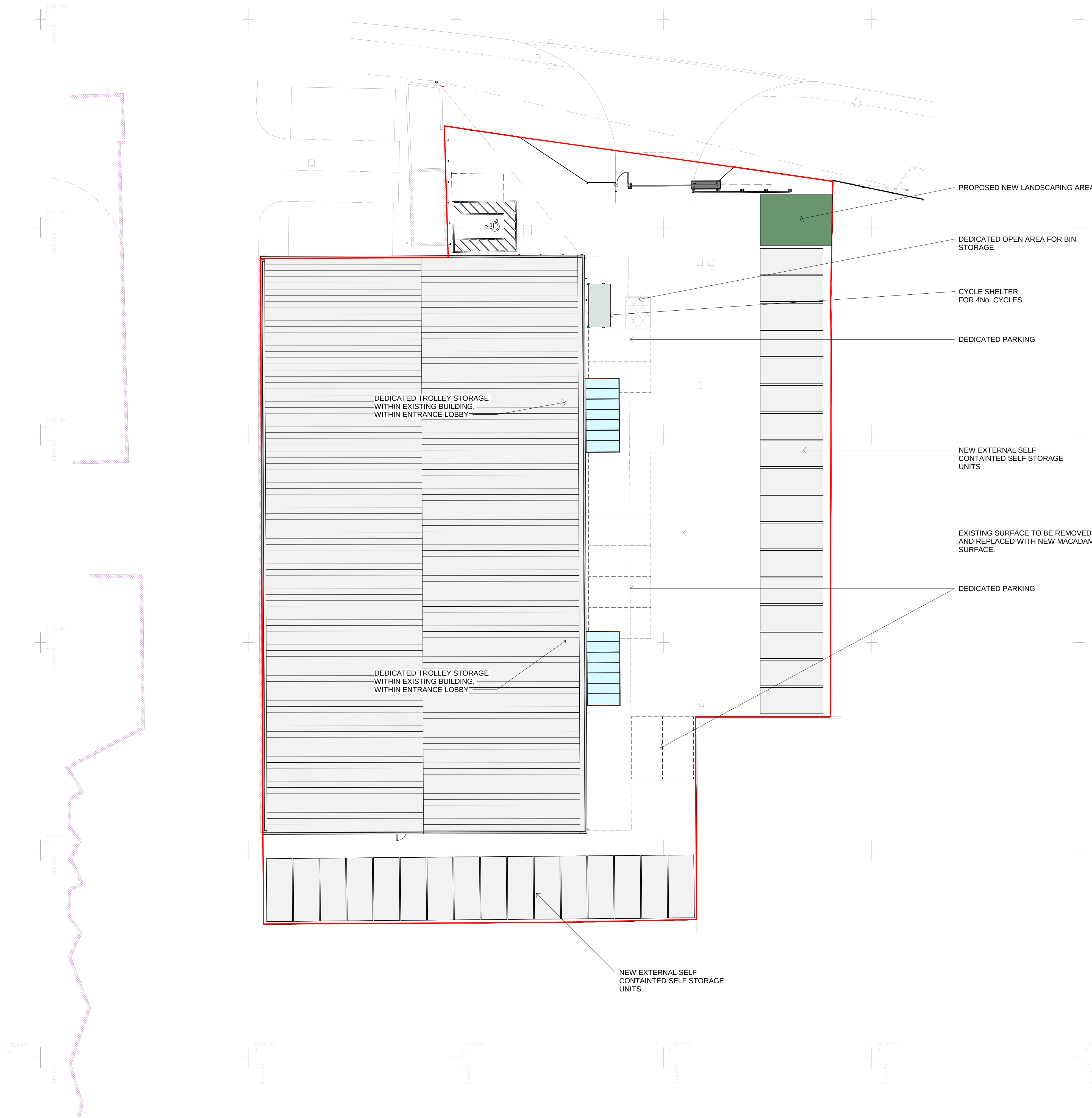
- 5.5.1 It is an offence to cause or knowingly permit the entry of any polluting, poisonous or noxious material in the water environment. If the pollution is serious enough to lower the ecological status of the water body as set out in terms by the Water Framework Directive (2000/60/EC) then prosecution may occur.
- 5.5.2 Remediation of any damage caused will not require the polluter to be prosecuted first. If the water pollution is serious enough to be classed as environmental damage, the damage will require to be remediated such that the area is returned to the condition it would have been in if the damage had not occurred.
- 5.5.3 If any pollution has not been reported or the polluter has not taken actions to prevent any further damage; they would then be causing an offence. Third parties (e.g., Private water supply users, landowners, recreation users and the public) who may be affected by possible damage may also report the risk of any environmental damage to the enforcing authority.
- 5.5.4 The principles of SuDS (Sustainable Drainage Systems) shall be applied to all components of design and construction regarding surface water management. Any design or site works that may impact on the site drainage or the water quality shall:
- Soakaway where soils allow
 - Consider and manage erosion
 - Remove pollutants in surface water
 - Retain any silts on site and prevent silts from discharging to watercourses or drains
 - Keep runoff rates at existing greenfield runoff
 - Prevent accidental spillages reaching watercourse
- 5.5.5 As infiltration on site is not feasible, the temporary drainage for the development will be in the form of land drains, which will discharge into the river or highway drainage subject to a trade effluent discharge application. Alternatively, surface water runoff can be pumped into the existing sewer.
- 5.5.6 Pollution will be controlled via the use of catchpit manholes and geotextiles.
- 5.5.7 Any potential hazardous substances will be within a controlled compound with a separate drainage system that will contain a penstock valve / containment kit in the event of a spillage.

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 for the erection of 33 self-storages units over an existing hard paved area.
- 6.1.2 The surface water runoff will be discharged into the existing drainage network located to the south of the site, which continues into third-party land, consistent with the current surface water discharge arrangement prior to discharging into the tidal section of the River Adur. The proposed drainage network will focus on the reinforcement of the existing system by providing both above and below ground storage and more efficient surface drainage to protect the site and reduce the risk of flooding elsewhere. The system has been designed to manage the 1 in 100-year storm event, including a 45% allowance for climate change.
- 6.1.3 The report has demonstrated that the proposed drainage measures ensure that suitable means of surface water drainage can be achieved for the proposed development.
- 6.1.4 A maintenance schedule has been written up for the drainage network including the SuDS features and can be found within **Appendix E**.

7 Appendices

7.1 Appendix A – Site Plan



Architects are to be notified of any discrepancies. Contractors must check all dimensions on site. This drawing is subject to copyright laws and is for use on this project only. This drawing is to be used solely for the information as titled only. For other information refer to the latest revision of any cross referenced drawings. To be read in conjunction with relevant design standards/protocols

P3	22/07/25	Bin storage relocated. Cycle shelter adjusted. 2No. storage units omitted. Landscaping added to front. Note regarding trolley storage added.	JL	CF
P2	29/04/25	Planning Approved layout shown	JL	CF
P1	25/03/25	Planning Issue	JL	CF
P0	05/02/25	Draft Issue	JL	CF
Rev	Date	Description	Drm	Cd

Status:

Planning

Client:

 CINCH SELF STORAGE

Project name:

Cinch Shoreham

Project address:

Brighton Road, Shoreham-By-Sea, BN43 6RN

Drawing Title:

Proposed Site Plan

Drg No:

6951 -SSA- XX- XX- DR- A-007

Revision:

P3

Date:	Scale:	Sheet size:
Jan 25	1 : 200	A1

 S+SA ARCHITECTS

1 CARDALE PARK, BECKWITH HEAD ROAD
HARROGATE, N.YORKSHIRE, HG3 1RZ
WWW.SSA-ARCHITECTS.CO.UK
T: 01423 856999

7.2 **Appendix B – Borehole Logs**



GROUND EXPLORATIONS LTD.

BOREHOLE NO. 9

TQ 20 NW / 38
2218 0515

Contract Name THE HAM, SHOREHAM Report No. 4746/PT
Client West Sussex County Council Site Address
Address County Hall, The Ham,
Chichester, Shoreham,
Sussex. Sussex.

Standing Water Level 3.66 m. Method of Boring Shell/auger.
Water Struck 3.35m. 7.62m. 9.14m. Diameter 15.24 cm.
Ground Level 4.07m. Start 14.7.69. Finish 15.7.69.
Remarks

JARS			CORES		BULK	
m.	m.	m.	m.	m.	m.	m.
2437 0.61			2438 1.07		2441 3.66	
2439 2.13			2440 2.59			
2443 4.88			2442 4.12			
2444 6.10						
2445 7.62						
2446 9.14						
2447 10.67						
2448 12.19						
2449 13.72						
2450 15.24						
2451 water						
Description					Thickness	Depth
					m.	m.
Made ground (topsoil and stones)					0.46	0.46
Stiff brown silty clay with patches of organic matter					2.89	3.35
Brown chalky flinty clay					0.61	3.96
Very stiff brown clay with pieces of rock chalk					0.92	4.88
Medium hard white matrix of putty chalk with pieces of rock chalk and flints					7.31	12.19
Hard white matrix of putty chalk with pieces of rock chalk					3.43	15.62
TOTALS					15.62	15.62

- Notes 1. Descriptions are in accordance with B.S. Code of Practice C.P. 2001
Clients are requested to compare with samples submitted.
2. Core samples are nominally 10cms. diameter and 45cms. long.
Depths shown are to top of sample.

1" : 318

TQ 20 NW | 81-82 *

310/61 South Western (the Distilleries, Chemical Works, Shoreham-by-Sea
(formerly Warley Mill and Island) (10/10/1919)

(3.05m)

(a) B.G.S. No. 107. (10/10/1919). Lining tubes: 25 x 10 in from surface;
x 5 in to 125 down; x 5 in to 622 down. Yield negligible. Brackish. Dando, 1915.
(b) W.S. No. 111. (10/10/1919). Lining tubes: 68 x 10 in from
surface. Water struck at 421. R.W.L. -1. Yield 750 g.p.h. Brackish. Dando, 1919.

(a) Drift)				
Uck)				
Mck)	..	...	1300	1300 (396.24m)
Lck)				
? UGS)				
G	...	...	15	1315 (400.81m)

(a) TQ 20 NW | 81 N.G.R. 2272. 0507

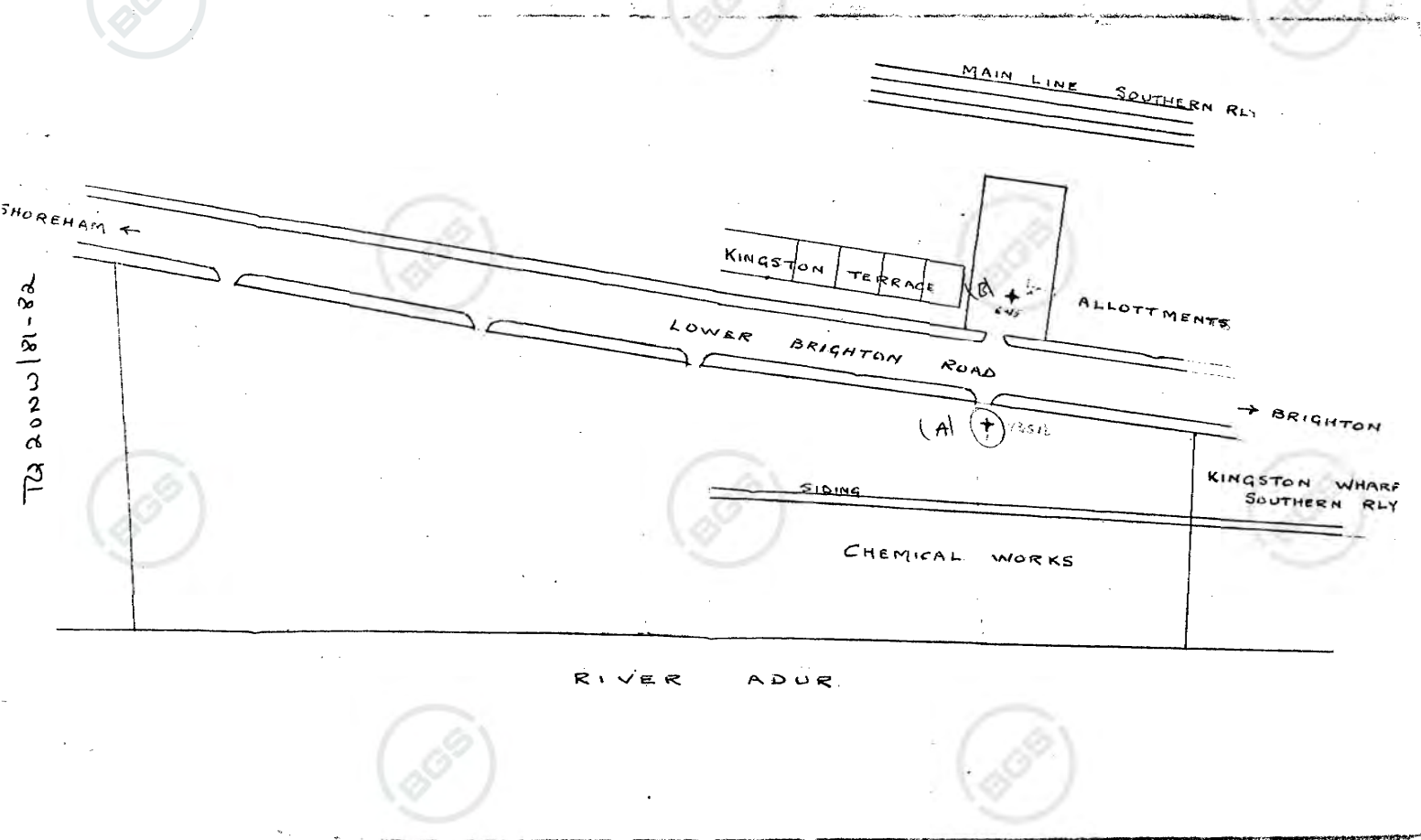
	(Chalk and flints	98	98 (29.87m)
	(Chalk	37	135 (41.15m)
Drift	(Hard grey chalk (seems of soft and		
Uck	(hard chalk at 341 ft)	273	405 (124.36m)
Mck	(Chalk and flints (plastic chalk		
Lck	(at 450 ft)	77	485 (147.83m)
? UGS	(Hard chalk with flints (slight		
1300	(infiltration of water at 622 ft)	175	660 (201.17m)
	(Hard chalk	640	1300 (396.24m)
G	Gault	15	1315 (400.81m)
15			

(b) TQ 20 NW | 82 N.G.R. 2273. 0510

Drift	Gravel and clay	7	7 (2.13m)
22	Clay and flints	15	22 (6.71m)
	Marl and flint	26	48 (14.63m)
	Chalk and flint	96	144 (43.89m)
Uck	Harder chalk and flint		
228	(Fissure at 169 ft)	25	169 (51.51m)
	Softer chalk (water cut at 236 ft)	71	240 (73.15m)
	Very hard chalk	10	250 (76.20m)

A - TQ 2272 0507

B - TQ 2273 0510



TQ 20NW/P2
N.G.R. 2273.0510

WELL SINKING in Shereham by sea (Buckingham) County Sussex
Date 1/1/1940
Sunk feet. Bored 6 250 feet.
Examined by Duke & Ockenden.
Rest level of water
Yield tested at 750 galls per hr.
Quality (with copy of analysis on separate sheet) Brackish.

GEOLOGICAL FORMATION.	NATURE OF STRATA.	THICKNESS.		DEPTH.	
		Feet.	Inches.	Feet.	Inches.
Upper Chalk	Gravel and clay.	7	-	7	-
	Clay and flint.	15	-	22	-
	Marl and flint.	26	-	48	-
	Chalk & flint.	96	-	144	-
	Harder chalk & flint (fracture at 169')	25	-	169	-
	Softer chalk (water cut at 236')	71	-	240	-
	Very hard chalk.	10	-	250	-
R.L.W. 16 ft. down. Yld 750 g.p. hour.					

419. 1919.

		Thickness		Depth	
		Ft.		Ft.	
Drift	Gravel and clay	7	...	7	...
	Clay and flint	15	...	22	...
	Marl and flint	26	...	48	...
	Chalk and flint	96	...	144	...
Upper Chalk	Harder chalk and flint (fracture at 169 ft.)	25	...	169	...
	Softer chalk (water cut at 236 ft.)	71	...	240	...
	Very hard chalk	10	...	250	...

R.L.W. 16 ft. down. Yield 750 g. p. hour. Lined 10 in. tubes to 68 ft.
Information from Messrs. Duke and Ockenden, Ltd. Water salt, and unused. (1926).

Wells & Springs of Sussex.

Wells & Springs
of Sussex,
page 184

419

Ref. 9501/30. 20th March 1940
Site plan obtained. O.D. + 15
Supply negligible & brackish. Disused

[Signature]

318/64 South Western Tar Distilleries, Chemical Works, Shoreham-by-Sea
(formerly Forbes Abbot and Lennard). (Disused)

(a) W.S.Sx. III, p. 187. Surface +10. Lining tubes: 25 x 10 in from surface; x 8 in to 126 down; x 6 in to 622 down. Yield negligible. Brackish. Dando, 1915.
(b) W.S.Sx. III, p. 187. Surface +15. Bore 250. Lining tubes: 68 x 10 in from surface. Water struck at -221. R.W.L. -1. Yield 750 g.p.h. Brackish. Dando, 1919.

(a) Drift)				
Uck)				
Mck)	...	...	1300	1300
Lck)				
? UGS)				
G)	...	...	15	1315

(a)	(Chalk and flints	98	98
	(Chalk	37	135
Drift)	(Hard grey chalk (seams of soft and		
Uck)	(hard chalk at 341 ft)	273	408
Mck)	(Chalk and flints (plastic chalk		
Lck)	(at 450 ft)	77	485
? UGS)	(Hard chalk with flints (slight		
1300	(infiltration of water at 622 ft)	175	660
	(Hard chalk	640	1300
G	Gault	15	1315

(b)			
Drift	Gravel and clay	7	7
22	Clay and flints	15	22
	Marl and flint	26	48
	Chalk and flint	96	144
Uck	Harder chalk and flint		
228	(Fissure at 169 ft)	25	169
	Softer chalk (water cut at 236 ft)	71	240
	Very hard chalk	10	250

A - TQ 2272 0508
B - TQ 2273 0511

Shoreham-by-Sea—Map N.S.G. 318.

MESSRS. FORBES ABBOT AND LENNARD'S CHEMICAL WORKS,
1/4 mile E.S.E. of railway station. Ht. above O.D. 10 ft. Map 65
S.W.

Two wells.

418. 1915.

	Thickness	Depth
	Ft.	Ft.
Chalk and flints	98	98
Chalk	37	135
Hard grey chalk (seams of soft and hard chalk at 341 ft.)	273	408
Chalk and flints (plastic chalk at 450 ft.)	77	485
Hard chalk with flints (slight infiltra- tion of water at 622 ft.)	175	660
Middle and Lower Chalk Hard chalk	640	1,300
Gault	15	1,315

Lined 10 in. tubes to 25 ft., 8 in. tubes to 126 ft., 6 in. tubes to 622 ft.

From imperfect specimens, Mr. Lamplugh was of the opinion that the
Gault was reached somewhere between 1,260 ft. and 1,315 ft. No Tertiary
Beds were found at the top.

Information from Messrs. Duke and Ockenden, Ltd. Classification by
W. Whitaker.

421. *ASHFOLD HOUSE, 1 mile N.W. of church. Ht. above O.D.
about 400 ft. Map 14 S.E.

					Thickness	Dep th
					Ft.	Ft.
Tunbridge Wells Sand	Old well	...	...	...	—	39
	Blue rock	...	...	...	23	62
	Coal (lignite)	...	...	...	1	63
	Very hard blue rock	...	...	...	10	73
	Blue rock and marl	...	...	...	3½	76½
	Hard white marl	...	...	...	10½	87
	Hard white rock	...	...	...	7½	94½
	Very hard blue rock	...	...	...	29½	124
	Blue rock and sand	...	...	...	4½	128½
	Blue rock and clay	...	...	...	5	133½
	Clay and white marl	...	...	...	3	137
	Rock	...	...	...	8	141
	Hard rock	...	...	...	8	144
	Hard rock and clay	...	...	...	5	149
	Hard rock	...	...	...	5	154
	Hard rock and a little clay	...	...	...	16	170
	Hard rock	...	...	...	35	205
	Hard rock and a little clay	...	...	...	4	209
	Very hard rock	...	...	...	14½	223½
	Very hard sand-rock (spring)	...	...	...	36½	260

R.L.W. 190 ft. down. Plenty of water. Information from Messrs. Duke
and Ockenden, Ltd.



WELL BORING at *Shoreham by sea* (for *Megors*). County *Sussex*. 105
Geol. map *9* 1 in. map New Series *318* 6 in. map
Made by *Duke & Ockenden*. Date *1919* *TQ 20/34B*
Sunk *feet.* Bored *6* *250* feet.
Communicated by *Duke & Ockenden*.
Height above Ordnance Datum Rest level of water
Yield *tested at 450 galls. per hr.*
Quality (with copy of analysis on separate sheet) *Brackish.* *TQ 2273 0511* **64B**

GEOLOGICAL FORMATION.	NATURE OF STRATA.	THICKNESS.		DEPTH.	
		Feet.	Inches.	Feet.	Inches.
<i>(b)</i> <i>Drift</i> <i>Upper Chalk</i>	Gravel & clay.	7	-	7	-
	Clay and flint.	15	-	22	-
	Marl and flint.	26	-	48	-
	Chalk & flint.	96	-	144	-
	Harder chalk & flint (fissure at 169')	25	-	169	-
	Softer chalk (water cut at 236')	71	-	240	-
	Very hard chalk.	10	-	250	-
<i>R.L.W. 16 ft. down. Yields 450 g.p. hour.</i>					

419. 1919.				Thickness	Depth
				Ft.	Ft.
Drift	{ Gravel and clay	...	...	7	7
	{ Clay and flint	...	...	15	22
	{ Marl and flint	...	...	26	48
	{ Chalk and flint	...	...	96	144
Upper Chalk	{ Harder chalk and flint (fissure at 169 ft.)	...	...	25	169
	{ Softer chalk (water cut at 236 ft.)	...	...	71	240
	{ Very hard chalk	...	...	10	250

R.L.W. 16 ft. down. Yield 750 g. p. hour. Lined 10 in. tubes to 68 ft.
Information from Messrs. Duke and Ockenden, Ltd. Water salt, and (1926).

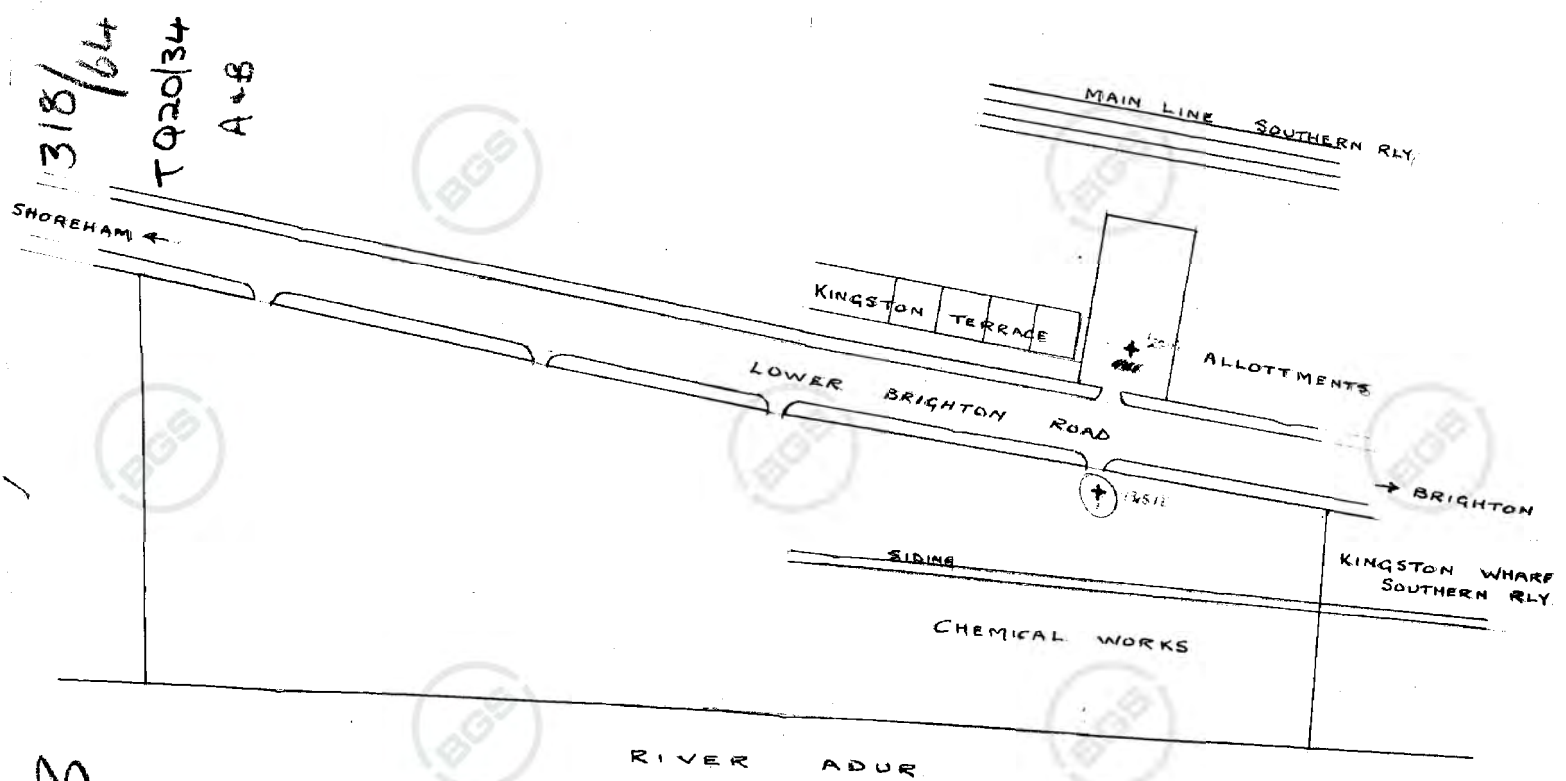
Woodgate E. of Coastguard Station.

'Wells & Springs
of Sussex,'
page 184

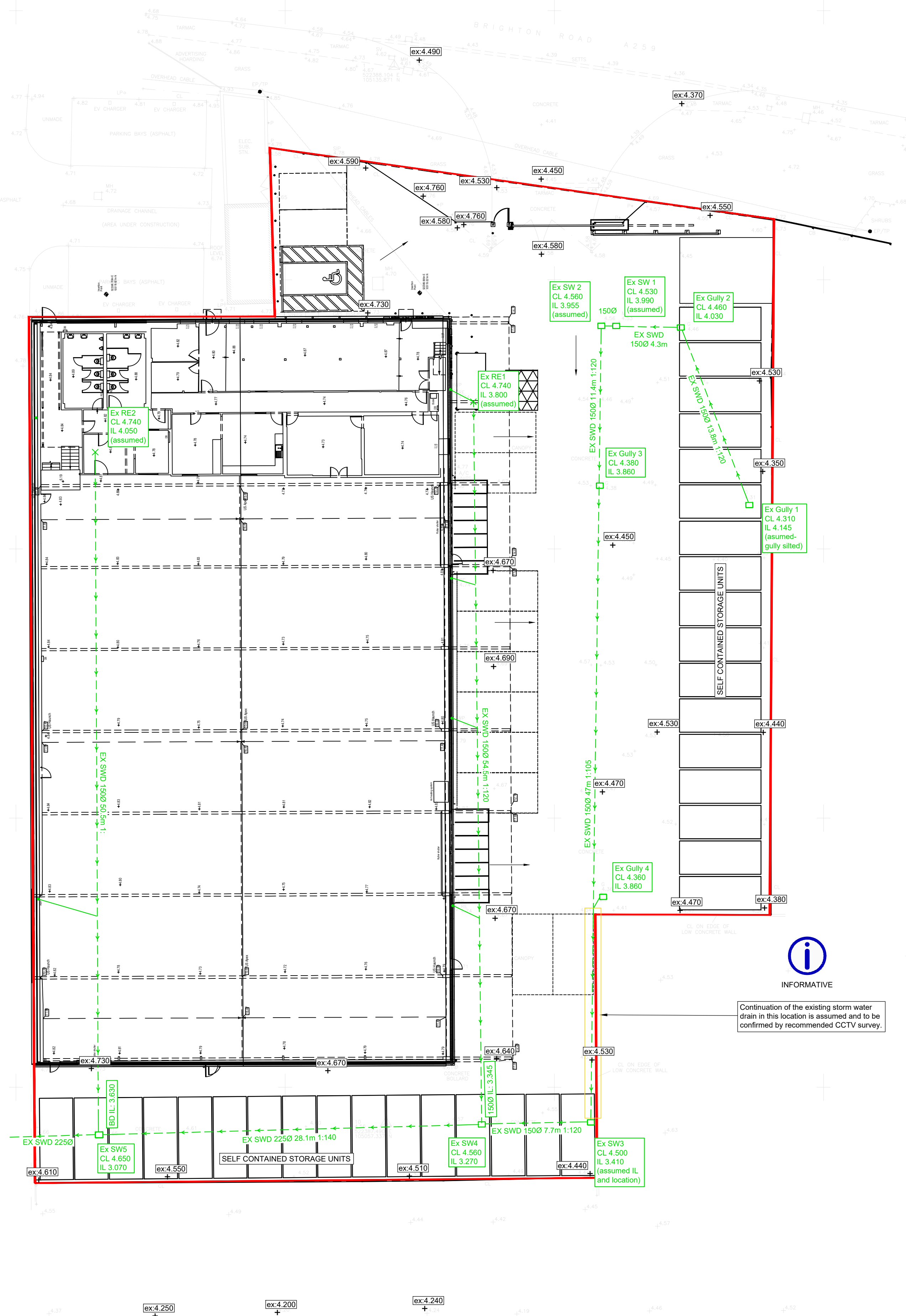
1919

Ref. 9507/30. 20th March 1940
Site plan obtained. O.D. +15
Supply negligible & brackish. Discussed

[Signature]



7.3 **Appendix C – Existing Drainage Layout**



EXISTING FEATURES

Existing surface water sewer/drain and manhole as taken from topographical survey information and provided from HPM 'Indicative Drainage Strategy Layout 29141-200'

- STANDARD DRAINAGE NOTES
1. DO NOT SCALE FROM THIS DRAWING. REFER TO FIGURED DIMENSIONS ONLY. THE CONTRACTOR SHOULD CHECK ALL DIMENSIONS ON SITE.
 2. ALL DIMENSIONS IN MILLIMETRES AND ALL LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
 3. THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT ARCHITECT AND ENGINEERING DETAILS, DRAWINGS AND SPECIFICATIONS.
 4. ANY DISCREPANCIES SHOULD BE REPORTED TO THE ARCHITECT AND/OR ENGINEER IMMEDIATELY, SO THAT CLARIFICATION CAN BE SOUGHT PRIOR TO THE COMMENCEMENT OF WORK.
 5. 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.
 6. 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 UNITS OF EXISTING PIPES ARE TO BE SOFT TO SOFIT UNLESS OTHERWISE INSTRUCTED BY THE ENGINEER, IF THIS IS NOT POSSIBLE INFORM THE ENGINEER IMMEDIATELY.
 7. COVER LEVELS SHOWN ARE APPROXIMATE. COVERS AND FRAMES SHALL BE SET TO FINISHED GROUND LEVELS AND FALLS.
 8. ALL UN-REFERENCED PIPES ARE TO BE 100mm DIA
 9. ALL PIPES TO BE ADOPTED, OR CONNECTING TO ADOPTED SEWERS, TO BE VITRIFIED CLAY TO BS EN 256 AND BS551 (SWS) OR 150mm CONCRETE PIPE TO BS EN 256 AND BS5911 PART 1.
 10. 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.
 11. ALL ADAPTABLE SEWERS SHALL BE CONSTRUCTED TO THE STANDARDS AND SPECIFICATIONS LAID DOWN DOWN IN 'SEWERS FOR ADOPTION' IN ADDITION, WITH A VIEW TO ADOPTION UPON COMPLETION OF WORKS.
 12. ALL PRIVATE DRAINAGE TO BE IN ACCORDANCE WITH THE BUILDING REGULATIONS APPROVED DOCUMENT PART-H, AND TO THE SATISFACTION OF THE BUILDING CONTROL INSPECTOR.
 13. THE CONTRACTOR IS TO KEEP A RECORD OF ANY VARIATIONS MADE ON SITE. IN ADDITION THE CONTRACTOR IS TO KEEP RECORDS OF ALL SEWERS, DRAINS, SO THAT AN AS CONSTRUCTED DRAWING CAN BE PREPARED UPON COMPLETION OF THE PROJECT.
 14. SUB CONNECTIONS TO ADAPTABLE MANHOLES SHALL BE MADE FROM VITRIFIED CLAY AND CONSIST OF TWO ROCKER PIPES LAID AT THE SAME GRADIENT AS THE UP OR DOWNSTREAM PIPE.
 15. 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.
 16. NO PRIVATE AREAS ARE TO DRAIN ONO ADAPTABLE AREAS AND VICE VERSA.
 17. ALL EXISTING MANHOLE COVERS, GULLIES, ETC. ARE TO BE REPAIRED OR REPLACED TO SUIT NEW LEVELS.
 18. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO CONFIRM THE LOCATION AND DEPTH OF ALL EXISTING SERVICES AND UTILITIES THAT MAY BE PRESENT.
 19. 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 INVESTIGATION.
 20. PROPRIETARY PRODUCTS TO BE INSTALLED IN FULL ACCORDANCE WITH MANUFACTURER'S GUIDANCE.
 21. 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:-

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P = PRELIMINARY	Shall <u>not</u> be used for contract or construction purposes
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P-	05.12.25	PRELIMINARY ISSUE	MR	CS	CS
REV	DATE	DESCRIPTION	BY	CHK	APP



CLIENT OAKEFIELD CONSTRUCTION LTD

ARCHITECT
S+SA ARCHITECTS

JOB TITLE
NEW WHARF, SHOREHAM BY SEA
BN43 6RN

DRAWING TITLE

EXISTING DRAINAGE LAYOUT

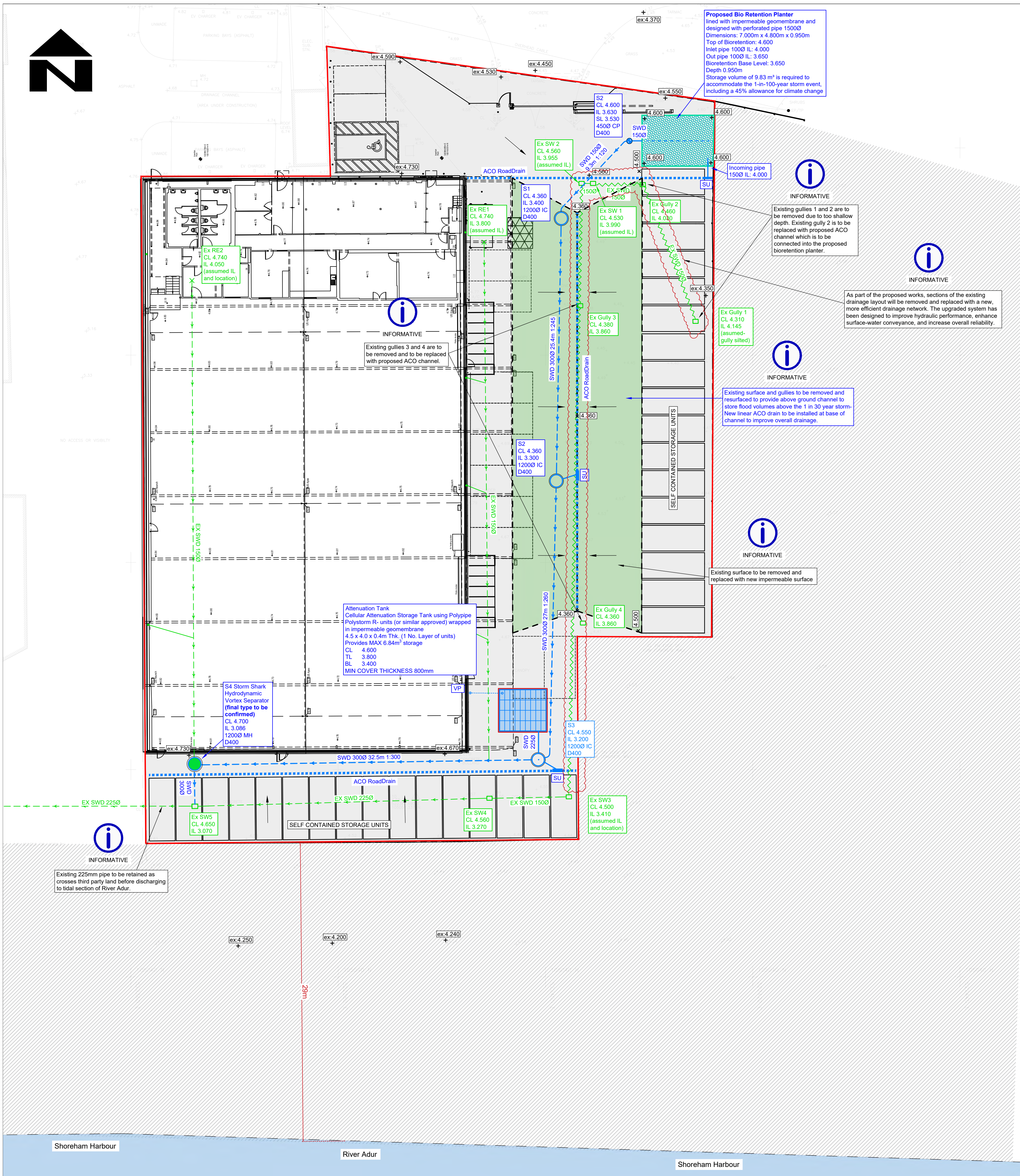
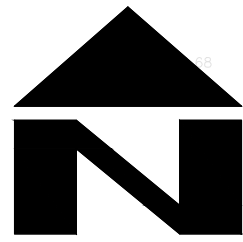
DRAWN	ENGINEER	CHECKED	APPROVED
MR	CS	CS	CS

DATE	DECEMBER 2025	SCALE @ A1	1:200
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JOB No.	STATUS	DRAWING No.	REV.
C3919	P	401	P-

PRELIMINARY

7.4 Appendix D – Proposed Drainage Plan, Contributing Area Plan & Exceedance Flow Routes, Typical Construction Details and Hydraulic Calculations



DRAINAGE LEGEND

EXISTING FEATURES

Existing surface water sewer/drain and manhole as taken from topographical survey information and provided from HPM 'Indicative Drainage Strategy Layout 29141-200'

PROPOSED FEATURES

SWD Surface Water Drainage
ACO ACO Drain channel
Storm water manhole (10500)
Proposed Hydrodynamic Vortex Separator 12000
Storm water catchpit chamber (4500)
Proposed Bioretention planter unit with perforated 1000 pipe
Proposed area of 'above-ground storage' graded to fall towards the central ACO channel.
Proposed surface level
Fall in surface
Pipe info - diameter, length, gradient, bedding type
1000 4.5m 1:100 Z BED

ABBREVIATIONS

MH - MANHOLE
IC - INSPECTION CHAMBER
AC - ACCESS CHAMBER
CP - CATCHPIT
BC - BRAKE CHAMBER
RE - RODDING EYE
IL - INVERT LEVEL
SL - SUMP LEVEL
RA - RESTRICTED ACCESS COVER
CL - COVER LEVEL
TL - TOP OF CELLULAR SA
BL - BASE OF CELLULAR SA
FL - FORMATION LEVEL

Site Boundary 0.364 ha
(as taken from S+SA Architects
'Proposed Site Plan' drawing no:
6951-SSA-XX-XX-DR-A-007 P3;
dated: 22.07.25)

STANDARD DRAINAGE NOTES

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Site Specific Notes

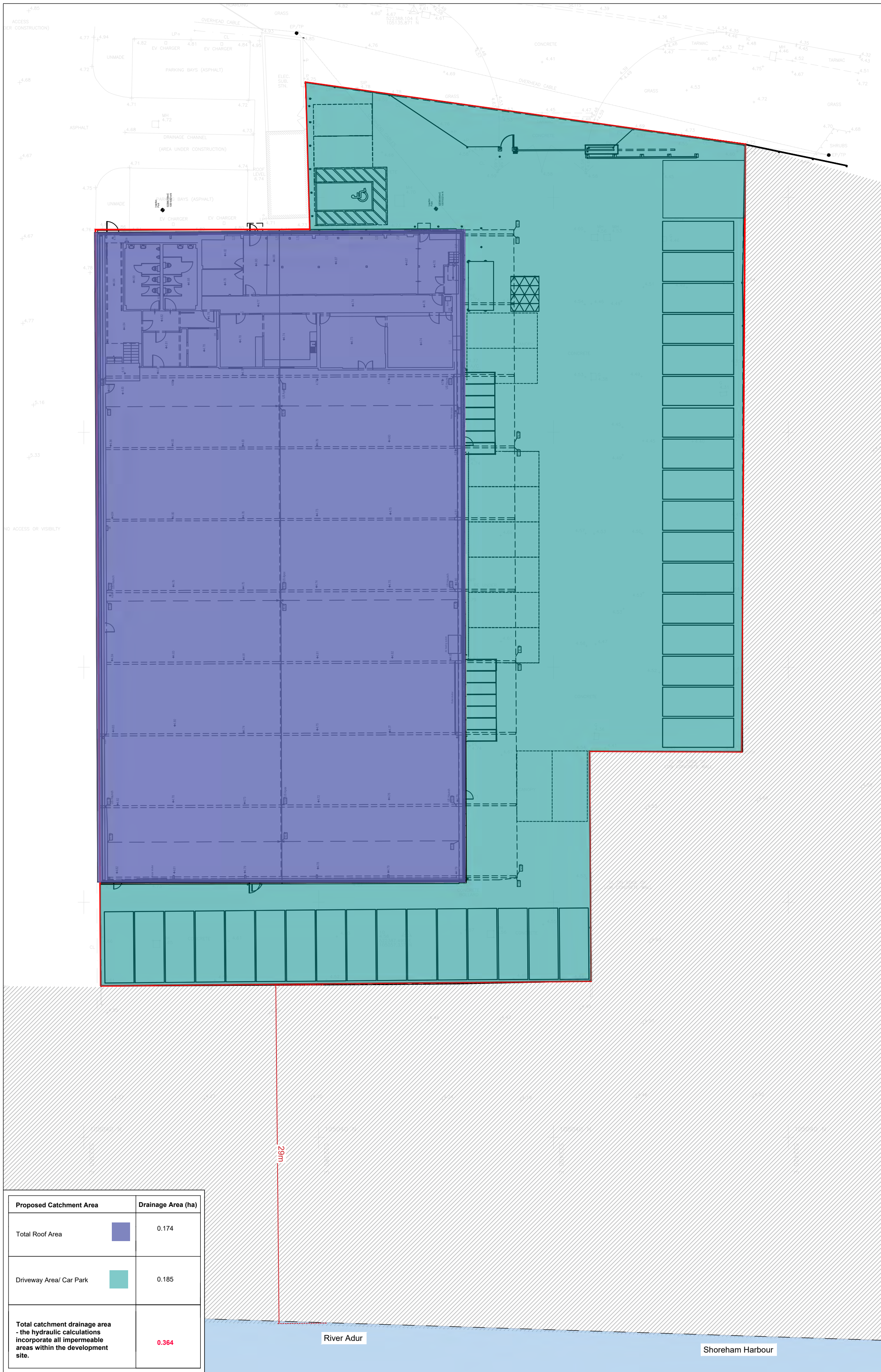
- Surface water network designed to the critical 1 in 100 year storm event plus an allowance of 45% for the predicted effects of climate change.
- Hydraulic calculations based on FEH22 rainfall data.
- As the impermeable area of the development remains unchanged from the existing, and the existing hard-paved surface is to be fully resurfaced, and given that the site lies approximately 30 m north of the River Adur, the proposed surface water strategy focuses on improving the existing system. The design reduces loading on the existing drainage network by upgrading drainage features, replacing existing gullies with more efficient linear ACO channels, and enhancing overall flow conveyance.
- Proposed Bioretention Planter and Hydrodynamic Vortex Separator included to provide treatment of surface water runoff.
- Offline attenuation tank provided to prevent flooding of the S3 manhole area.

DESIGN SUBJECT TO THE APPROVAL OF:
PLANNING AUTHORITY
BUILDING CONTROL

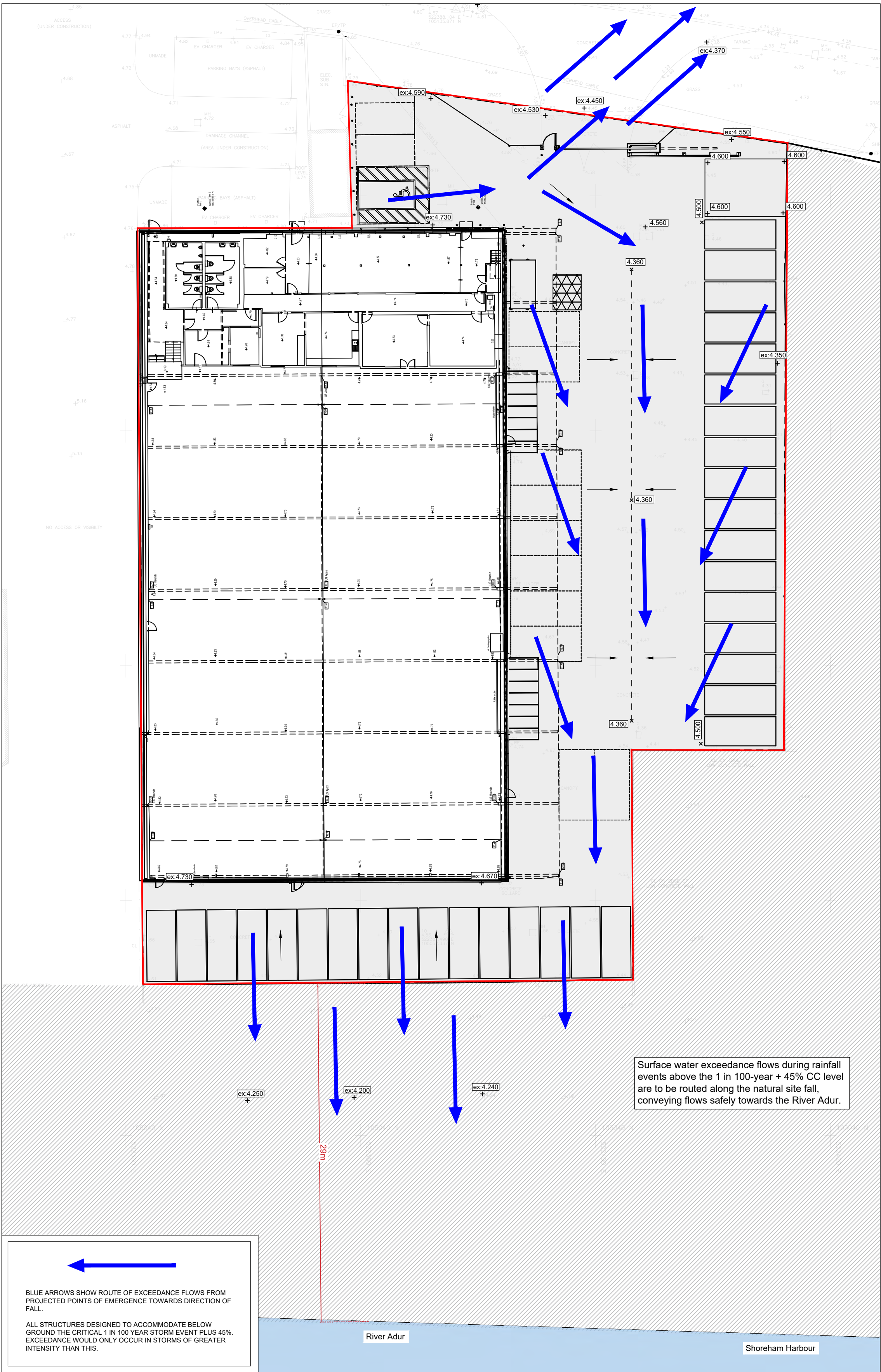
DESIGN SUBJECT TO THE CONFIRMATION OF:
EXTERNAL LEVELS DESIGN
LOCATION AND DEPTH OF EXISTING UTILITIES

PRELIMINARY

P-	05.12.25	PRELIMINARY ISSUE	MR	CS	CS
REV	DATE	DESCRIPTION	BY	CHK	APP
 Consulting Civil Engineers					
CLIENT	OAKFIELD CONSTRUCTION LTD				
ARCHITECT	S+SA ARCHITECTS				
JOB TITLE	NEW WHARF, SHOREHAM BY SEA BN43 6RN				
DRAWING TITLE	PROPOSED DRAINAGE PLAN				
DRAWN	MR	ENGINEER	CS	CHECKED	CS
DATE	DECEMBER 2025		SCALE @ A1 1:200		
JOB No.	C3919	STATUS	P	DRAWING No.	101
REV.					P-



CONTRIBUTING AREA PLAN (scale 1:250)



EXCEEDANCE FLOW ROUTES (scale 1:250)

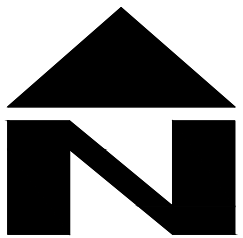
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 Consulting Civil Engineers					
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ARCHITECT S+SA ARCHITECTS					
JOB TITLE NEW WHARF, SHOREHAM BY SEA BN43 6RN					
DRAWING TITLE CONTRIBUTING AREA PLAN & EXCEEDANCE FLOW ROUTES					
DRAWN MR	ENGINEER CS		CHECKED CS	APPROVED CS	
DATE DECEMBER 2025		SCALE @ A1 1:250			
JOB No. C3919	STATUS P	DRAWING No. 201		REV. P-	

PRELIMINARY



05/12/2025

Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	2	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.200
CV	1.000	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	4.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	x
Maximum Rainfall (mm/hr)	75.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
S1	0.036	4.00	4.560	1200	522403.745	105116.770	1.160
S2	0.086	4.00	4.500	1200	522401.046	105087.860	1.200
S3	0.080	4.00	4.550	1200	522400.539	105061.008	1.350
S4	0.044	4.00	4.700	1200	522366.104	105060.454	1.614
Ex RE 1	0.044	4.00	4.740		522394.481	105110.929	0.940
Ex RE 2	0.044	4.00	4.800		522366.199	105107.453	0.750
Ex SW 4	0.000	4.00	4.560	600	522394.858	105057.436	1.290
Ex SW 5			4.650	600	522365.677	105056.640	1.705
BioRetention	0.030	4.00	4.600	450	522412.169	105120.079	0.950
Outfall			4.650	450	522361.637	105056.519	1.725
AT		4.00	4.550	450	522397.527	105065.043	1.150

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)
5.000	Ex SW 4	Ex SW 5	29.192	0.600	3.270	3.070	0.200	146.0	100	4.77	55.6
4.000	Ex RE 2	S4	46.999	0.600	4.050	3.680	0.370	127.0	150	4.88	55.6
2.000	Ex RE 1	S3	50.287	0.600	3.800	3.350	0.450	111.7	150	4.88	55.6
1.005	Ex SW 5	Outfall	4.042	0.600	2.945	2.925	0.020	202.1	225	5.80	52.2
1.000	BioRetention	S1	9.300	0.600	3.650	3.550	0.100	93.0	150	4.15	55.6
1.001	S1	S2	24.500	0.600	3.400	3.300	0.100	245.0	300	4.56	55.6
1.003	S3	S4	34.439	0.600	3.200	3.086	0.114	302.1	300	5.66	52.8
1.004	S4	Ex SW 5	3.838	0.600	3.086	3.070	0.016	239.9	300	5.73	52.5
1.002	S2	S3	26.857	0.600	3.300	3.200	0.100	268.6	300	5.03	55.5
3.000	AT	S3	2.000	0.600	3.400	3.275	0.125	16.0	225	4.01	55.6

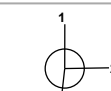
Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
5.000	0.634	5.0	0.0	1.190	1.480	0.000	0.0	0	0.000
4.000	0.890	15.7	8.8	0.600	0.870	0.044	0.0	81	0.916
2.000	0.950	16.8	8.8	0.790	1.050	0.044	0.0	78	0.963
1.005	0.916	36.4	68.7	1.480	1.500	0.364	0.0	225	0.933
1.000	1.042	18.4	6.0	0.800	0.860	0.030	0.0	59	0.933
1.001	1.000	70.7	13.3	0.860	0.900	0.066	0.0	88	0.771
1.003	0.899	63.6	52.6	1.050	1.314	0.276	0.0	209	1.001
1.004	1.011	71.4	69.1	1.314	1.280	0.364	0.0	239	1.145
1.002	0.954	67.5	30.5	0.900	1.050	0.152	0.0	142	0.931
3.000	3.287	130.7	0.0	0.925	1.050	0.000	0.0	0	0.000

Pipeline Schedule

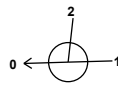
Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
5.000	29.192	146.0	100	Circular	4.560	3.270	1.190	4.650	3.070	1.480
4.000	46.999	127.0	150	Circular	4.800	4.050	0.600	4.700	3.680	0.870
2.000	50.287	111.7	150	Circular	4.740	3.800	0.790	4.550	3.350	1.050
1.005	4.042	202.1	225	Circular	4.650	2.945	1.480	4.650	2.925	1.500
1.000	9.300	93.0	150	Circular	4.600	3.650	0.800	4.560	3.550	0.860
1.001	24.500	245.0	300	Circular	4.560	3.400	0.860	4.500	3.300	0.900
1.003	34.439	302.1	300	Circular	4.550	3.200	1.050	4.700	3.086	1.314
1.004	3.838	239.9	300	Circular	4.700	3.086	1.314	4.650	3.070	1.280
1.002	26.857	268.6	300	Circular	4.500	3.300	0.900	4.550	3.200	1.050
3.000	2.000	16.0	225	Circular	4.550	3.400	0.925	4.550	3.275	1.050

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
5.000	Ex SW 4	600	Manhole	Adoptable	Ex SW 5	600	Manhole	Adoptable
4.000	Ex RE 2		Junction		S4	1200	Manhole	Adoptable
2.000	Ex RE 1		Junction		S3	1200	Manhole	Adoptable
1.005	Ex SW 5	600	Manhole	Adoptable	Outfall	450	Manhole	Adoptable
1.000	BioRetention	450	Manhole	Adoptable	S1	1200	Manhole	Adoptable
1.001	S1	1200	Manhole	Adoptable	S2	1200	Manhole	Adoptable
1.003	S3	1200	Manhole	Adoptable	S4	1200	Manhole	Adoptable
1.004	S4	1200	Manhole	Adoptable	Ex SW 5	600	Manhole	Adoptable
1.002	S2	1200	Manhole	Adoptable	S3	1200	Manhole	Adoptable
3.000	AT	450	Manhole	Adoptable	S3	1200	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
S1	522403.745	105116.770	4.560	1.160	1200		1	1.000	3.550	150
							0	1.001	3.400	300
S2	522401.046	105087.860	4.500	1.200	1200		1	1.001	3.300	300
							0	1.002	3.300	300
S3	522400.539	105061.008	4.550	1.350	1200		1	3.000	3.275	225
							2	2.000	3.350	150
							3	1.002	3.200	300
							0	1.003	3.200	300
S4	522366.104	105060.454	4.700	1.614	1200		1	4.000	3.680	150
							2	1.003	3.086	300
							0	1.004	3.086	300
Ex RE 1	522394.481	105110.929	4.740	0.940			0	2.000	3.800	150
Ex RE 2	522366.199	105107.453	4.800	0.750			0	4.000	4.050	150

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
Ex SW 4	522394.858	105057.436	4.560	1.290	600		0	5.000	3.270	100
Ex SW 5	522365.677	105056.640	4.650	1.705	600		1 2 0	5.000 1.004 1.005	3.070 3.070 2.945	100 300 225
BioRetention	522412.169	105120.079	4.600	0.950	450		0	1.000	3.650	150
Outfall	522361.637	105056.519	4.650	1.725	450		1	1.005	2.925	225
AT	522397.527	105065.043	4.550	1.150	450		0	3.000	3.400	225

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Normal	Starting Level (m)	
Rainfall Events	Singular	Skip Steady State	x	Check Discharge Rate(s)	x
Summer CV	1.000	Drain Down Time (mins)	240	Check Discharge Volume	x
Winter CV	1.000	Additional Storage (m³/ha)	0.0		

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 %)
1	0	0	0
2	0	0	0
10	0	0	0
30	0	0	0
30	45	0	0
100	0	0	0
100	45	0	0

Node BioRetention Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	3.650
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Time to half empty (mins)	12

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	34.0	0.0	0.400	34.0	0.0	0.750	34.0	0.0	0.950	34.0	0.0
0.100	34.0	0.0	0.500	34.0	0.0	0.800	34.0	0.0			
0.200	34.0	0.0	0.600	34.0	0.0	0.850	34.0	0.0			
0.300	34.0	0.0	0.700	34.0	0.0	0.900	34.0	0.0			

Node S2 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	4.360
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	3.5	3.5	0.140	500.0	500.0

Node AT Soakaway Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	3.400	Depth (m)	0.400
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	3	Inf Depth (m)	
Safety Factor	2.0	Pit Width (m)	4.500	Number Required	1
Porosity	0.95	Pit Length (m)	4.000		

Results for 1 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S1	10	3.466	0.066	8.0	0.0751	0.0000	OK
15 minute summer	S2	10	3.407	0.107	19.3	0.1205	0.0000	OK
15 minute summer	S3	10	3.361	0.161	35.1	0.1818	0.0000	OK
15 minute summer	S4	11	3.278	0.192	44.9	0.2167	0.0000	OK
15 minute summer	Ex RE 1	10	3.861	0.061	5.9	0.0000	0.0000	OK
15 minute summer	Ex RE 2	10	4.113	0.063	5.9	0.0000	0.0000	OK
15 minute summer	Ex SW 4	1	3.270	0.000	0.0	0.0000	0.0000	OK
15 minute summer	Ex SW 5	11	3.181	0.236	45.0	0.0668	0.0000	SURCHARGED
15 minute summer	BioRetention	11	3.696	0.046	4.0	0.4741	0.0000	OK
15 minute summer	Outfall	11	3.103	0.178	45.1	0.0000	0.0000	OK
15 minute summer	AT	1	3.400	0.000	0.0	0.0000	0.0000	OK
Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S1	1.001	S2	7.8	0.465	0.110	0.4160	
15 minute summer	S2	1.002	S3	18.7	0.616	0.277	0.8166	
15 minute summer	S3	1.003	S4	33.9	0.789	0.534	1.4791	
15 minute summer	S4	1.004	Ex SW 5	45.0	1.034	0.630	0.1668	
15 minute summer	Ex RE 1	2.000	S3	5.7	0.860	0.340	0.3336	
15 minute summer	Ex RE 2	4.000	S4	5.7	0.821	0.364	0.3275	
15 minute summer	Ex SW 4	5.000	Ex SW 5	0.0	0.000	0.000	0.1142	
15 minute summer	Ex SW 5	1.005	Outfall	45.1	1.181	1.239	0.1483	18.8
15 minute summer	BioRetention	1.000	S1	3.4	0.780	0.187	0.0410	
15 minute summer	AT	3.000	S3	0.0	0.000	0.000	0.0139	

Results for 2 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S1	10	3.484	0.084	12.7	0.0951	0.0000	OK
15 minute summer	S2	11	3.447	0.147	30.0	0.1659	0.0000	OK
15 minute summer	S3	11	3.420	0.220	53.4	0.2492	0.0000	OK
15 minute summer	S4	11	3.338	0.252	68.0	0.2856	0.0000	OK
15 minute summer	Ex RE 1	10	3.878	0.078	9.0	0.0000	0.0000	OK
15 minute summer	Ex RE 2	10	4.131	0.081	9.0	0.0000	0.0000	OK
15 minute summer	Ex SW 4	12	3.281	0.011	0.3	0.0030	0.0000	OK
15 minute summer	Ex SW 5	11	3.281	0.336	66.9	0.0950	0.0000	SURCHARGED
15 minute summer	BioRetention	11	3.709	0.059	6.1	0.6109	0.0000	OK
15 minute summer	Outfall	11	3.132	0.207	66.9	0.0000	0.0000	OK
15 minute summer	AT	12	3.408	0.008	1.5	0.1354	0.0000	OK
Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S1	1.001	S2	12.4	0.497	0.175	0.6166	
15 minute summer	S2	1.002	S3	28.2	0.644	0.419	1.2042	
15 minute summer	S3	1.003	S4	50.2	0.856	0.790	2.0447	
15 minute summer	S4	1.004	Ex SW 5	66.9	1.162	0.937	0.2228	
15 minute summer	Ex RE 1	2.000	S3	8.8	0.961	0.523	0.4596	
15 minute summer	Ex RE 2	4.000	S4	8.8	0.916	0.559	0.4517	
15 minute summer	Ex SW 4	5.000	Ex SW 5	-0.3	-0.066	-0.065	0.1208	
15 minute summer	Ex SW 5	1.005	Outfall	66.9	1.682	1.836	0.1576	28.8
15 minute summer	BioRetention	1.000	S1	5.5	0.881	0.296	0.0576	
15 minute summer	AT	3.000	S3	-1.5	0.475	-0.012	0.0274	

Results for 10 year Critical Storm Duration. Lowest mass balance: 99.63%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S1	11	3.751	0.351	24.7	0.3971	0.0000	SURCHARGED
15 minute summer	S2	11	3.743	0.443	58.1	0.5012	0.0000	SURCHARGED
15 minute summer	S3	12	3.703	0.503	105.7	0.5690	0.0000	SURCHARGED
15 minute summer	S4	11	3.528	0.442	98.8	0.4998	0.0000	SURCHARGED
15 minute summer	Ex RE 1	11	4.101	0.301	17.9	0.0000	0.0000	SURCHARGED
15 minute summer	Ex RE 2	10	4.197	0.147	17.9	0.0000	0.0000	OK
15 minute summer	Ex SW 4	12	3.453	0.183	2.5	0.0518	0.0000	SURCHARGED
15 minute summer	Ex SW 5	11	3.447	0.502	98.2	0.1419	0.0000	SURCHARGED
15 minute summer	BioRetention	12	3.766	0.116	12.2	1.2033	0.0000	OK
15 minute summer	Outfall	9	3.138	0.213	97.5	0.0000	0.0000	OK
15 minute summer	AT	12	3.706	0.306	43.6	5.2870	0.0000	SURCHARGED
Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S1	1.001	S2	23.0	0.524	0.326	1.7253	
15 minute summer	S2	1.002	S3	57.5	0.816	0.852	1.8913	
15 minute summer	S3	1.003	S4	73.5	1.044	1.157	2.4252	
15 minute summer	S4	1.004	Ex SW 5	98.2	1.395	1.375	0.2703	
15 minute summer	Ex RE 1	2.000	S3	16.4	0.957	0.976	0.8853	
15 minute summer	Ex RE 2	4.000	S4	16.7	1.030	1.062	0.7653	
15 minute summer	Ex SW 4	5.000	Ex SW 5	-2.5	-0.367	-0.508	0.2284	
15 minute summer	Ex SW 5	1.005	Outfall	97.5	2.453	2.679	0.1591	58.0
15 minute summer	BioRetention	1.000	S1	10.7	0.991	0.579	0.1499	
15 minute summer	AT	3.000	S3	-43.6	-1.147	-0.333	0.0795	

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.44%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S1	11	4.094	0.694	25.4	0.7854	0.0000	SURCHARGED
15 minute summer	S2	11	4.087	0.787	60.7	0.8902	0.0000	SURCHARGED
15 minute summer	S3	11	4.043	0.843	124.4	0.9537	0.0000	SURCHARGED
15 minute summer	S4	11	3.781	0.695	129.0	0.7865	0.0000	SURCHARGED
15 minute summer	Ex RE 1	11	4.638	0.838	23.5	0.0000	0.0000	FLOOD RISK
15 minute summer	Ex RE 2	10	4.491	0.441	23.5	0.0000	0.0000	SURCHARGED
15 minute summer	Ex SW 4	12	3.658	0.388	2.3	0.1097	0.0000	SURCHARGED
15 minute summer	Ex SW 5	11	3.644	0.699	128.0	0.1979	0.0000	SURCHARGED
15 minute summer	BioRetention	12	4.108	0.458	28.8	4.7404	0.0000	SURCHARGED
15 minute summer	Outfall	8	3.138	0.213	125.0	0.0000	0.0000	OK
15 minute summer	AT	11	4.041	0.641	65.7	6.9505	0.0000	SURCHARGED
Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S1	1.001	S2	28.5	0.512	0.403	1.7253	
15 minute summer	S2	1.002	S3	64.2	0.911	0.951	1.8913	
15 minute summer	S3	1.003	S4	87.6	1.244	1.378	2.4252	
15 minute summer	S4	1.004	Ex SW 5	128.0	1.818	1.792	0.2703	
15 minute summer	Ex RE 1	2.000	S3	19.9	1.132	1.188	0.8853	
15 minute summer	Ex RE 2	4.000	S4	21.7	1.233	1.378	0.8020	
15 minute summer	Ex SW 4	5.000	Ex SW 5	-2.3	-0.322	-0.454	0.2284	
15 minute summer	Ex SW 5	1.005	Outfall	125.0	3.142	3.431	0.1591	76.5
15 minute summer	BioRetention	1.000	S1	21.2	1.204	1.150	0.1637	
15 minute summer	AT	3.000	S3	-65.7	-1.833	-0.503	0.0795	

Results for 30 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
15 minute summer	S1	12	4.441	1.041	34.1	1.1779	0.0000	FLOOD RISK
15 minute summer	S2	13	4.428	1.128	75.0	9.7326	0.0000	FLOOD RISK
15 minute summer	S3	10	4.409	1.209	152.4	1.3679	0.0000	FLOOD RISK
15 minute summer	S4	10	4.103	1.017	157.9	1.1502	0.0000	SURCHARGED
15 minute summer	Ex RE 1	9	4.740	0.940	34.1	0.0000	0.0000	FLOOD RISK
15 minute summer	Ex RE 2	9	4.800	0.750	34.1	0.0000	0.0000	FLOOD RISK
15 minute summer	Ex SW 4	11	3.907	0.637	4.1	0.1802	0.0000	SURCHARGED
15 minute summer	Ex SW 5	10	3.894	0.949	157.4	0.2686	0.0000	SURCHARGED
15 minute summer	BioRetention	12	4.499	0.849	45.1	8.7930	0.0000	FLOOD RISK
15 minute summer	Outfall	7	3.138	0.213	152.9	0.0000	0.0000	OK
15 minute summer	AT	10	4.413	1.013	78.0	7.0096	0.0000	FLOOD RISK
Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S1	1.001	S2	42.7	0.607	0.605	1.7253	
15 minute summer	S2	1.002	S3	87.2	1.238	1.292	1.8913	
15 minute summer	S3	1.003	S4	108.4	1.539	1.705	2.4252	
15 minute summer	S4	1.004	Ex SW 5	157.4	2.236	2.204	0.2703	
15 minute summer	Ex RE 1	2.000	S3	28.2	1.604	1.682	0.8853	
15 minute summer	Ex RE 2	4.000	S4	29.3	1.664	1.862	0.8274	
15 minute summer	Ex SW 4	5.000	Ex SW 5	-4.1	-0.529	-0.830	0.2284	
15 minute summer	Ex SW 5	1.005	Outfall	152.9	3.844	4.198	0.1591	111.1
15 minute summer	BioRetention	1.000	S1	31.9	1.813	1.733	0.1637	
15 minute summer	AT	3.000	S3	-78.0	-1.961	-0.597	0.0795	

Results for 100 year Critical Storm Duration. Lowest mass balance: 99.59%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S1	12	4.405	1.005	48.4	1.1369	0.0000	FLOOD RISK
15 minute summer	S2	12	4.391	1.091	69.5	3.0044	0.0000	FLOOD RISK
15 minute summer	S3	11	4.354	1.154	138.5	1.3056	0.0000	FLOOD RISK
15 minute summer	S4	11	4.022	0.936	152.4	1.0586	0.0000	SURCHARGED
15 minute summer	Ex RE 1	10	4.740	0.940	29.6	0.0000	0.0000	FLOOD RISK
15 minute summer	Ex RE 2	10	4.800	0.750	29.6	0.0000	0.0000	FLOOD RISK
30 minute summer	Ex SW 4	19	3.831	0.561	2.8	0.1587	0.0000	SURCHARGED
15 minute summer	Ex SW 5	11	3.836	0.891	148.7	0.2521	0.0000	SURCHARGED
30 minute summer	BioRetention	20	4.433	0.783	39.7	8.1123	0.0000	FLOOD RISK
15 minute summer	Outfall	8	3.138	0.213	147.0	0.0000	0.0000	OK
15 minute summer	AT	11	4.351	0.951	69.8	6.9997	0.0000	FLOOD RISK
Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S1	1.001	S2	37.0	0.526	0.524	1.7253	
15 minute summer	S2	1.002	S3	67.0	0.951	0.992	1.8913	
15 minute summer	S3	1.003	S4	103.8	1.474	1.634	2.4252	
15 minute summer	S4	1.004	Ex SW 5	148.7	2.112	2.081	0.2703	
15 minute summer	Ex RE 1	2.000	S3	23.9	1.356	1.423	0.8853	
15 minute summer	Ex RE 2	4.000	S4	25.3	1.437	1.608	0.8274	
30 minute summer	Ex SW 4	5.000	Ex SW 5	-2.8	-0.354	-0.555	0.2284	
15 minute summer	Ex SW 5	1.005	Outfall	147.0	3.696	4.037	0.1591	95.7
30 minute summer	BioRetention	1.000	S1	28.5	1.618	1.547	0.1637	
15 minute summer	AT	3.000	S3	-69.8	-1.755	-0.534	0.0795	

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 99.39%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute summer	S1	19	4.497	1.097	39.5	1.2413	0.0000	FLOOD RISK
30 minute summer	S2	21	4.475	1.175	114.8	25.2877	0.0000	FLOOD RISK
15 minute summer	S3	9	4.497	1.297	152.8	1.4672	0.0000	FLOOD RISK
15 minute summer	S4	11	4.183	1.097	175.3	1.2408	0.0000	SURCHARGED
15 minute summer	Ex RE 1	9	4.740	0.940	42.9	0.0000	0.0000	FLOOD RISK
15 minute summer	Ex RE 2	9	4.800	0.750	42.9	0.0000	0.0000	FLOOD RISK
15 minute summer	Ex SW 4	11	3.992	0.722	4.7	0.2043	0.0000	SURCHARGED
15 minute summer	Ex SW 5	11	3.967	1.022	165.2	0.2893	0.0000	SURCHARGED
30 minute summer	BioRetention	20	4.599	0.949	54.0	9.8348	0.0000	FLOOD RISK
15 minute summer	Outfall	7	3.138	0.213	160.2	0.0000	0.0000	OK
15 minute summer	AT	9	4.506	1.106	83.9	7.0243	0.0000	FLOOD RISK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute summer	S1	1.001	S2	39.4	0.560	0.558	1.7253	
30 minute summer	S2	1.002	S3	94.5	1.342	1.401	1.8913	
15 minute summer	S3	1.003	S4	111.0	1.576	1.746	2.4252	
15 minute summer	S4	1.004	Ex SW 5	165.2	2.346	2.313	0.2703	
15 minute summer	Ex RE 1	2.000	S3	35.6	2.022	2.121	0.8853	
15 minute summer	Ex RE 2	4.000	S4	36.4	2.066	2.313	0.8274	
15 minute summer	Ex SW 4	5.000	Ex SW 5	-4.7	-0.604	-0.948	0.2284	
15 minute summer	Ex SW 5	1.005	Outfall	160.2	4.029	4.400	0.1591	138.6
30 minute summer	BioRetention	1.000	S1	30.5	1.732	1.655	0.1637	
15 minute summer	AT	3.000	S3	-83.9	-2.110	-0.642	0.0795	

7.5 **Appendix E – Maintenance Schedule**

SuDS Maintenance Schedule

New Wharf, Shoreham- By- Sea

Planning Ref: AWDM/0671/25

For

Oakfield Construction Ltd

Rev - P

Reference **C3919**

Date **05th December 2025**

Revision	Date of Issue	Comments	Prepared By	Checked By
P	05/12/2025	Initial Issue	MR	CS

1 Maintenance

1.1 Introduction

- 1.1.1 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.
- 1.1.2 The maintenance schedule for the proposed development will be split down into two separate categories; SuDS features and regular private drainage.

1.2 SuDS at New Wharf, Shoreham-by-Sea

- 1.2.1 As listed above, in section 5.1.2, the SuDS features used on site will be **Bioretention System and Attenuation Tank**.
- 1.2.2 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

1.3 SuDS Drainage Maintenance Specification

1.3.1 Attenuation Tank

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

Operation and maintenance requirements for attenuation tank		
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

1.3.2 Bio retention systems

In order to maintain the functioning of the bio retention systems, the following maintenance requirements should be adhered to:

Table 18.3 Operation and maintenance requirements for bio retention systems		
Maintenance Schedule	Required Action	Typical Frequency
Regular Inspections	Inspection infiltration surfaces for silting and ponding, record de-watering time of the facility and assess standing water levels in underdrain (if appropriate) to determine if maintenance is necessary	Quarterly
	Check operation of underdrains by inspection of flows after rain	Annually
	Assess plants for disease infection, poor growth, invasive species etc and replace as necessary	Quarterly
	Inspect inlets and outlets for blockages	Quarterly
Regular maintenance	Remove litter and surface debris and weeds	Quarterly (or more frequently for tidiness or aesthetic reasons)
	Replace any plants, to maintain planting density	As required
	Remove sediment, litter and debris build-up from around inlets or from forebays	Quarterly to biannually
Occasional maintenance	Infill any holes or scour in the filter medium, improve erosion protection if required	As required
	Repair minor accumulations of silt by raking away surface mulch, scarifying surface of medium and replacing mulch	As required
Remedial actions	Remove and replace filter medium and vegetation above	As required but likely to be > 20 years

1.4 General Drainage Maintenance Specification

1.4.1 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

1.4.2 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

STORM SHARK

ADVANCED HYDRODYNAMIC VORTEX SEPARATOR

Operating Manual & Instructions for

PCC - Pre-cast Concrete Chamber Installation



turtle enviro
DRAINNOVATION



ATTENTION:

Important notes, please read
this document carefully
before commencement of
your STORMSHARK
installation



Contents

General Information

Product Description

Working Principles

Installation requirements

Installation into a PCC Pre- Cast Concrete Chamber

Operating and maintenance instructions

Maintenance Instructions

Example Record Sheets

Professional Approval Certificate Example

Commissioning and Audit Protocol

Maintenance Record Sheets

General Information

This Manual should be completed and a copy left with the owner of the STORMSHARK unit. The information below should be completed by the installer of the STORMSHARK or from the Construction Company or Management Company, who will be responsible for the plant once it is installed.

Location of the plant

Name of the site	
Address	
Postcode	
Telephone	
Email	

Operator of the plant

Company / Municipality	
Address	
Postcode	
Responsible Person	
Telephone	
Email	

Construction Company

Company / Municipality	
Address	
Postcode	
Responsible Person	
Telephone	
Email	

Design Details

Type of connected area	
Installation Date	
Commissioning Date	
No. of STORMSHARKS	

Product Description

All 8 sizes of the STORMSHARK have the same operational components.

1. Inlet

2. Deflector plate

3. Flow breakers

4. Sludge trap

5. Balancing weir

6. Outlet



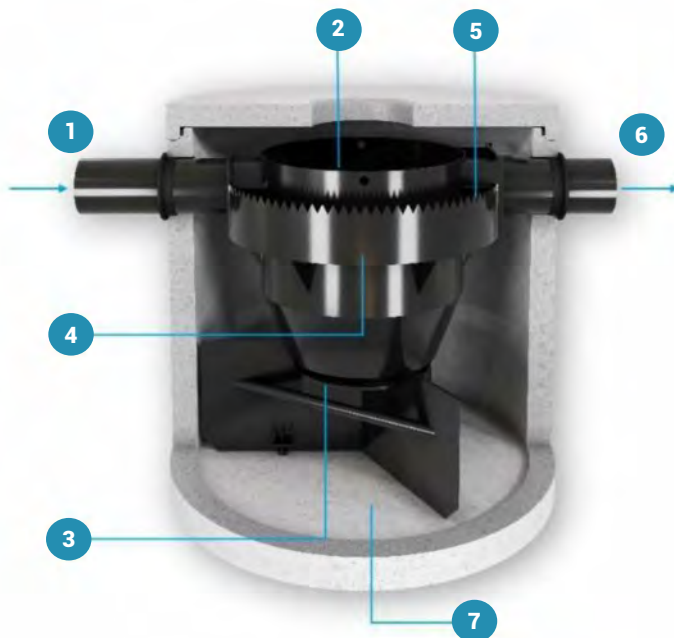
The STORMSHARK must only be handled and lifted by competent persons. Avoid any concentrated point loading. Unloading, storage and transport at site are the responsibility of the Purchaser.

Backfill and excavation works are by others, in accordance with site designs, site ground conditions and legal requirements.

If you are in any doubt as to the function, applicability or safety of the device as supplied at site, you must seek Professional Advice from your supplier and/or a Professional Engineer.

The water quality flow rates and hydraulic peak capacity for the site would have been fully designed.

Working Principles

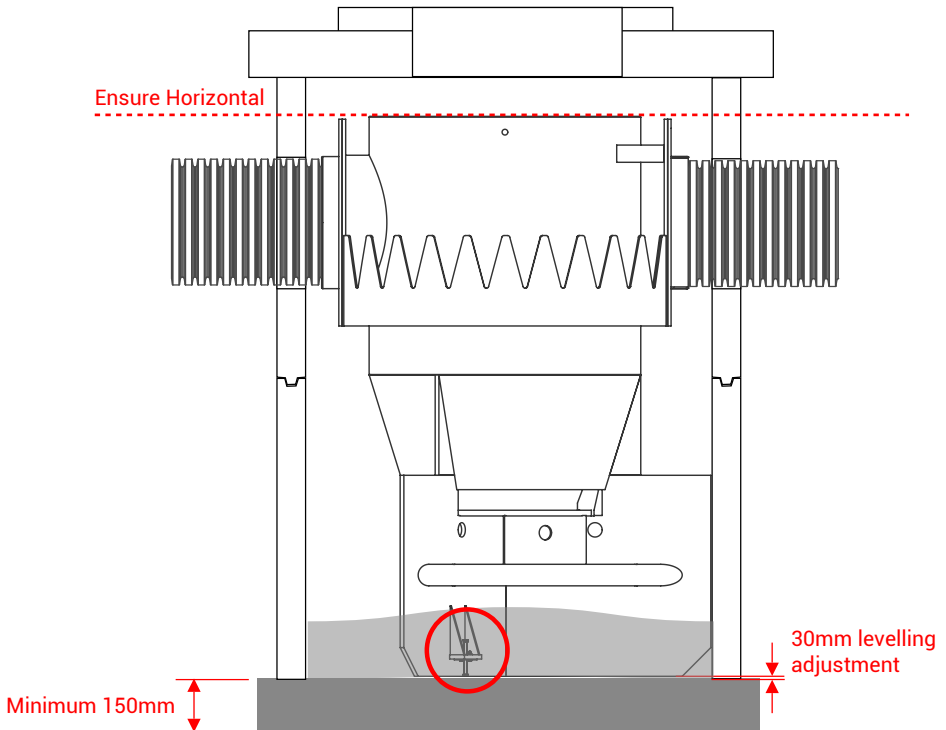


1. Incoming stormwater is deflected into a radial flow pattern.
2. Vortex flow ensures solids settle to the sludge chamber, floatables are retained at surface.
3. Solids pass down into the sludge chamber below the treatment chamber. Remobilisation of the retained solids is not possible, flow baffles prevent this.
4. Cleaned water flows up the outer chamber in an even flow distribution.
5. Water flows over the toothed balancing weir to the annular flow channel surrounding the treatment chamber.
6. Clean stormwater passes to the outlet to discharge to the water environment.
7. Retained solids are easily removed by vacuum hose, once the retention safety grill* is lifted using the lifting chain supplied and fitted within the unit.

* The SSK750 models do not have the retention grill.

Installation requirements

For STORMSHARK models SSK1200, SSK1500, SSK1800, SSK2000, SSK2500 and SSK3000 installed into PCC Pre-cast concrete chambers of Ø 1200 mm - Ø 3000 mm



1. The installed product **MUST** be absolutely horizontal in its final position
2. The STORMSHARK unit is may be delivered on 30mm high adjustable feet; if so, the inlet and outlet openings must be 30 mm higher to allow any adjustments to be made.
3. The chamber base or pad, should be minimum 150mm concrete or compacted sand , dependant on ground conditions and prevailing water table.
4. Please note that the STORMSHARK unit should be filled at the base with 100mm of concrete after installation within a concrete chamber, to stabilise the flow breaker plates. If using other chamber materials than concrete then consult your supplier.

Installation of a STORMSHARK

Application:

The STORMSHARK can be described as a an Advanced Hydrodynamic Separator or as a Vortex Particle Separator. It is intended to be used for the treatment of contaminated stormwater runoff from roofs, traffic areas and other contaminant generating areas (e.g. commercial sites, industrial sites, airports, harbours).

Important instructions: Please note!



The STORMSHARK insert must be protected against contamination and construction debris and physical damage during installation!



1. Excavate the chamber pit, whilst supporting the wall according to legal requirements and ground conditions.

Install a horizontal, 150mm thick support compacted sand or concrete pad.

***If in doubt you must consult a professional engineer.**

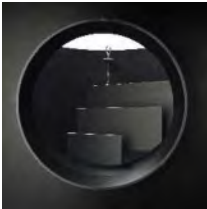


2. Place the chamber and check the horizontal positioning safely. Align the inlet opening to the correct position to suit the site layout. Maintain compliance with all site safety rules.

Installation of a STORMSHARK (continued)



3. Install the STORMSHARK insert within the chamber, so that the inlet and outlet are aligned correctly for the chamber and/or site drainage layout.



4. This slide shows which orifice is the STORMSHARKS inlet. This is the inlet pipe deflector plate on the inside of the treatment chamber.



5. Position the STORMSHARKS insert in the chamber so that the inlet and outlet are approximately aligned with the opening.



6. Make sure that the sides of the STORMSHARK unit are evenly spaced from the chamber walls around the whole of the unit. This optimises performance. It also facilitates the assembly of the stabilty anchors



7. Once the unit is centralized, undo the screws of the Lifting Bar and remove them and the Bar itself.

Installation of a STORMSHARK (continued)



8. The STORMSHARK insert now has to be aligned with the concrete chamber holes (where pre-drilled, or where drilled at site). The insertion of the grommet seal is necessary. If in doubt consult your chamber supplier



9. To align, use the adjustment options with the adjustable feet and the adjustable fitting plate for the pipework.

***Rocker pipes to inlet and outlet are always recommended, particularly where ground settlement might arise.**



10. Make good the pipe connections. Ensure that the seals are coated with sufficient lubricant (not containing oil). To connect, push the pipes from the outside through the seal of the chamber wall and the seal of the STORMSHARK insert.



11. Check the overall horizontal alignment of the STORMSHARK insert again and adjust, as described in point 9. Check there is no undue strain on both inlet and outlet pipes.



12. Now insert the fixing anti-buoyancy anchors through the wall of the STORMSHARK unit. Fasten them with the supplied threaded bar and bolt to the chamber wall using the fixing plates supplied.

Installation of a STORMSHARK (continued)



13. Secure the STORMSHARK unit to the wall anchors by locking the two nuts supplied. Cross check that the distance between the chamber wall and the balancing weir is evenly spaced all around the unit, i.e. that the unit is centred within the chamber.



14. After completing the installation, make one final audit of these check points again:

1. Seating and position of the pipes in the seals
horizontal position of the STORMSHARK insert
2. Central positioning of the unit, i.e. that the width between toothed balancing weir and the chamber wall is constant
3. Fixing anchors firmly locked and attached to the wall



15. Maintenance lifting cable must be extended to the appropriate length to suit the depth of chamber.



Please Note: As a further precaution, we recommend filling the base of the chamber with 100mm of concrete to prevent buoyancy, to enhance protection and stability of the unit overall at both high and excessive flow rates. This can be access via the rubbish/debris grid

Operating and maintenance instructions:

Due to the solids and pollutants in stormwater runoff, stormwater treatment systems must be checked and cleaned at regular intervals. The following Notes provide guidance for the typical work necessary or associated with the effective operation of a STORMSHARK:

Annual maintenance:

At intervals between 6 months and 3 years, the sludge trap must be emptied as site conditions or local regulations or site specific contracts require. The amount of sludge depends on the local stormwater conditions and will vary between sites.

For stormwater runoff with untypically low or high solids loads, these periods may vary. This can be observed and determined for a Programmed Maintenance Schedule, after the first few years of operation.

The STORMSHARK Chamber is a Confined Space. It is not necessary to enter a STORMSHARK for routine maintenance. Local regulations must be fully observed in the event of planned or unplanned man entry. If in doubt you must consult with a Professional Engineer who can advise you.

Equipment and materials typically required

Suction and flushing vehicle or submersible sludge pump with hoses

Generator when there is no power connection nearby

High-pressure cleaner or flushing lance for connection to the pump

Important Pollution Prevention Notes

The water pumped out of the chamber and the sludge trap may only be discharged into a foul sewer or a combined sewer where local regulations allow. In no case may the water be discharged into a surface water course, a stormwater sewer or a groundwater infiltration system.

If there is no possibility to discharge the water, a mobile water treatment system may be used.

The treated water can be discharged into a receiving water or storm sewer in accordance with local permits and regulations.

Maintenance Instructions

1. First remove the layer of floatables and oils on the water surface. Then lower the water level down to the level of the retention safety grill* by means of the suction hose
2. Remove any coarse debris from the retention safety grill and then pull up the grill using the maintenance lifting cable.
3. Suck the sludge and the solids from the sludge trap chamber. Make sure that you clear each section of the trap. If necessary, rinse with water.
4. Close the grate, check the lock and finally secure close the cover of the system.

*For the SSK1200 models it is preferable to use a 2" or 3" suction hose.

If you are in any doubt you must consult a Professional Engineer or Competent Person to advise you. Your supplier will be able to direct you if they do not provide such a service themselves.

Example Record Sheets

Professional Approval Certificate Example

For the construction or modification of stormwater treatment systems

Project details

Project name	
Designation of sedimentation plant	
Professional / Expert (Name)	
Address	
Postcode	
Telephone	
Email	

Contractor

Company (Name)	
Address	
Postcode	

Location of the STORMSHARK

Address	
Postcode	

1. I have installed the
- Piping system

Sedimentation plant

New system

Modified the installation checked the install as professional expert

The treated stormwater is/will be discharged into (tick as appropriate):

- ☐ a groundwater infiltration system
- ☐ receiving surface water
- ☐ stormwater sewer
- ☐ combined sewer

2. The drainage system complies with the requirements of the valid standards.
3. The pipes, components and components used for the system comply with the relevant product standards.
4. I have received the installation instructions of the manufacturer and installed the system according to these instructions.

The installation has been checked as complying with the valid standards and the general accepted ruled of technology. The design corresponds to the planning documents including the proper

Date/Signature Builder,Expert

Commissioning and Audit Protocol STORMSHARK

Please use this as an example template. Modify to suit local conditions.

Building Project Owner represented by

Specialist Company represented by

No	Feature	Remarks
1.	The STORMSHARK insert was fixed in the chamber by means of fixing anchors.	
2.	The STORMSHARK insert was aligned.	
3.	The uniform distance of the balancing weir to the chamber wall was checked.	
4.	The bottom of the chamber was filled with 100 mm of concrete.	
5.	The Maintenance Lifting Cable is accessible and appropriately secured.	

The instruction for the operation of the plant has been given. The required operating documents and existing operating and maintenance instructions according to the installation were handed over completely.

Signature Contactor

Signature Owner's

Maintenance Record Sheets

Please use this as an example template. Modify to suit local

Maintenance interval	State Remark	Maintenance work	Name and Signature
Date: 1 st Sept 20		Inspection of the system for visible damage Emptying and cleaning of the sludge trap Grate is closed and locked Maintenance Lifting Cable is accessible and secured	A N Other

Date:			
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Date:			
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Date:			
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Maintenance Record Sheets

Maintenance interval	State Remark	Maintenance work	Name and Signature
Date:			

Date:			
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Date:			
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Date:			
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Maintenance Record Sheets

Maintenance interval	State Remark	Maintenance work	Name and Signature
Date:			

Date:			
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Date:			
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Date:			
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