Consulting Civil Engineers

Foul and Surface Water Drainage Report

111 Commercial Road, Poole, Dorset BH14 0JD

Planning Ref: APP/20/00660/F

For

Watts Holt

Rev - **P**

Reference **C2903**

Date **10th November 2023**

Revision	Date of Issue	Comments	Prepared By	Checked By
P	10/11/2023	Initial Issue	LH	CS

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Contents

1 Introduction

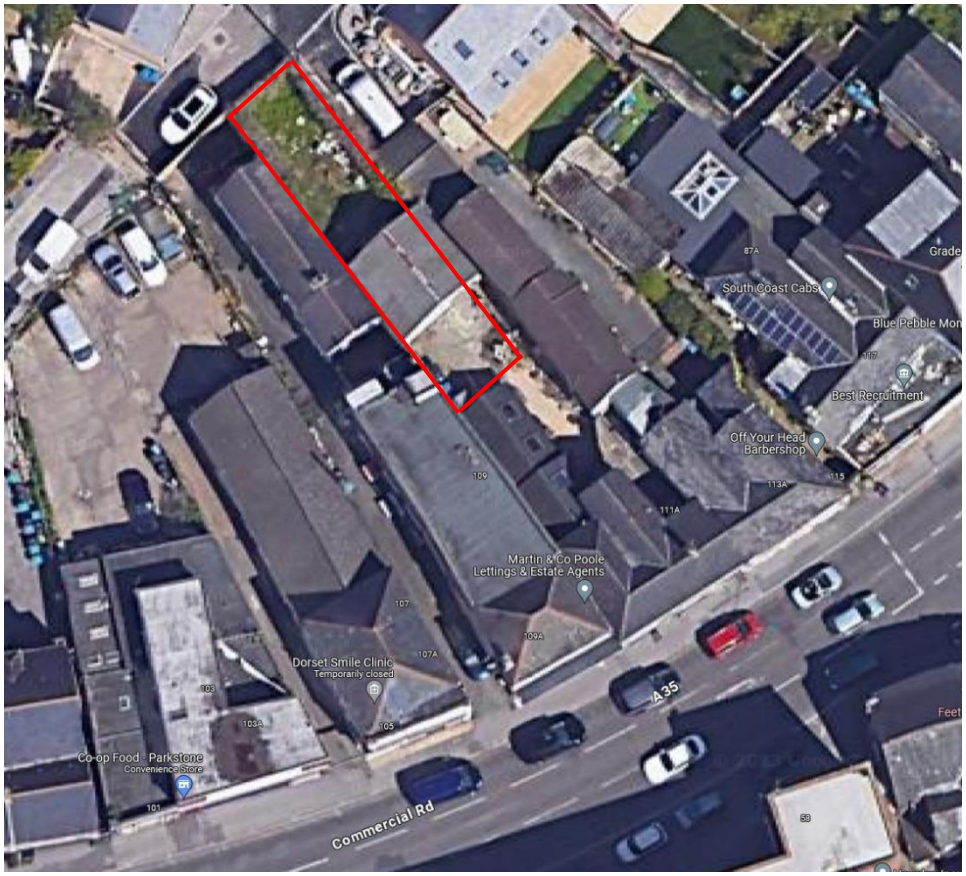
1.1.1 CGS Civils Ltd has been appointed to undertake a drainage strategy report for a proposed development at 111 Commercial Road in Poole.

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 7. The condition is in place on Decision Notice from June 2021, with the planning reference: **APP/20/00660/F.** The condition requires the following to be included:

- The results of an assessment into the potential for disposing of surface water by means of Sustainable Drainage System (SuDS).
- Details of a management and maintenance plan for the drainage scheme
- The appropriate design standard for the surface water drainage scheme must be the 1 in 100 year return period with a 45% allowance for climate change.

1.1.3 The existing site consists of a warehouse located adjacent to the existing 111 Commercial Road. The proposed development will consist of the severing of the plot in two, the demolition of the existing warehouse and construction of a 4-bedroom dwelling with amenity space and on-plot parking. The proposed development is located as OS Grid Reference SZ 03455 91560 and has the post code BH14 0JD.

Fig 1. Site Location



2 Executive Summary:

2.1.1 The Surface water will be discharged to a local surface water sewer via a new saddle connection on an existing sewer, this connection is to be made downstream of an existing hydro-brake chamber. All roof areas are to be collected into a positive drainage network before discharging into the sewer at a restricted rate of 1.0l/s. whilst all hard paved areas are to be constructed from permeable surface to allow runoff to freely drain to ground via infiltration. This connection is subject to Wessex Water approval under a Section 106 agreement.

2.1.2 The foul water will discharge to the local foul water sewer via a direct connection into an existing manhole. This connection is subject to Wessex Water approval under a Section 106 agreement.

3 Site Geology

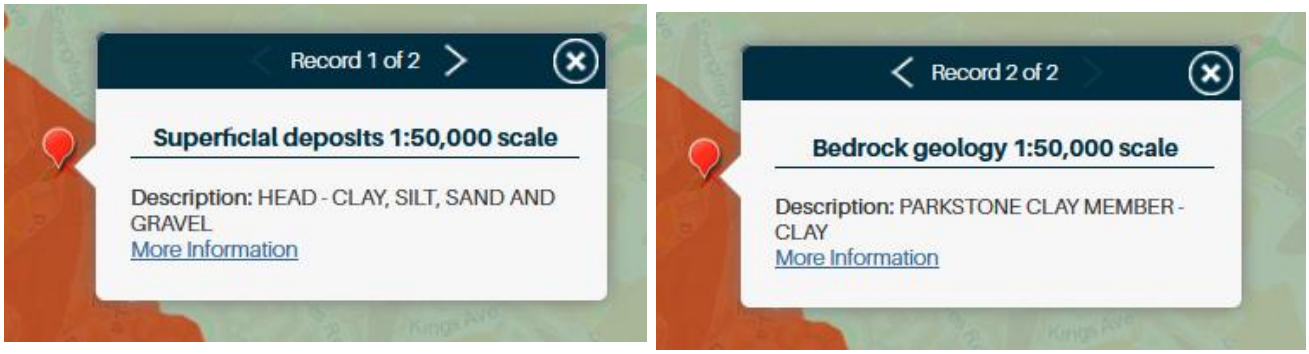
3.1 British Geological Survey information

3.1.1 The British Geological Survey confirms the bedrock geology to be made up of Parkstone Clay Member. The BGS website confirms the superficial deposits on site to be made up of Head Formation which is comprised of 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 SZ09SW1510 (Located approx. 72m North West of the site) – Sand and Clay

Fig 2. British Geological Survey



4 Existing Drainage

4.1.1 It is not currently known how the existing warehouse discharges surface water runoff, however, it is presumed to discharge into an existing foul water chamber located on site as a combined discharge.

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	There is scope for rainwater harvesting in the form of water butts.
Discharge to Ground	Despite favourable ground conditions, the use of conventional soakaways is not viable due to lack of space. Hard paved areas will be permeable to allow as much infiltration as possible.
Discharge to Watercourse	N/A None nearby
Discharge to Surface Water Sewer	Yes – Discharge into existing surface water manhole located within Chalice Close. Discharge restricted to 1.0l/s.
Discharge to Other Sewer	N/A due to above

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**
Flow Control	**0.725m Head @ 1l/s discharge**

5.3 Surface Water Drainage

5.3.1 Despite the favourable ground conditions on site confirmed by local borehole logs. The use of conventional soakaways is not deemed viable due to the lack of space present on site. It is therefore proposed that all surface water runoff from roof areas is to be discharged into a local surface water sewer located within Chalice Close. It is imperative that this connection is made downstream of the existing Hydro-Brake chamber as a connection onto this will potentially result in flooding upstream within Chalice Close. The surface water discharge is to be restricted down to 1.0l/s through the use of an orifice flow control chamber. Due to the small area of runoff that is to be discharged, there is no requirement for any SuDS features apart from permeable paving. The network has sufficient capacity to cater for the 1 in 100-year +45% storm. All hard paved runoff is to be discharged to ground via a permeable constructed surface, this has been designed to cater for the 1 in 100-year +45% storm and to infiltrate at an assumed rate of $1x10^{-5}$m/s.

5.3.2 Hydraulic calculations have been carried out which can be found at Appendix C.

Fig 3. Existing Hydro-Brake chamber

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.

- Residential Roofs
- Individual Property driveways and residential car parks
- Low traffic roads

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

Table 3: Pollution Hazard Index and Destination of runoff for the proposed Site					
Land Use	**Destination of Runoff**	**Pollution Hazard Level**	**Total 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

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

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

5.4.11 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 4: SuDS mitigation index

Table 4 Mitigation Indices						
Runoff Source	**Destination of Runoff**	**Mitigation Index Source**	**Type of SuDS Component**	**Total Suspended Solids (TSS)**	**Metals**	**Hydrocarbons**
Individual driveways, residential car parks and low traffic roads	Ground water	Table 26.4	Permeable Pavement	0.7	0.6	0.7

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 Foul water drainage

5.5.1 The foul water will discharge into the local foul water sewer via a new direct connection into an existing private chamber located on site.

6 Summary and Conclusions

6.1.1 CGS Civils has been instructed by Watts Holt to produce a Drainage statement under National Planning Policy Framework (NPPF) to support the Planning Application **APP/20/00660/F** which is for the demolition of an existing warehouse and development of a single 4-bedroom dwelling with associated access and parking.

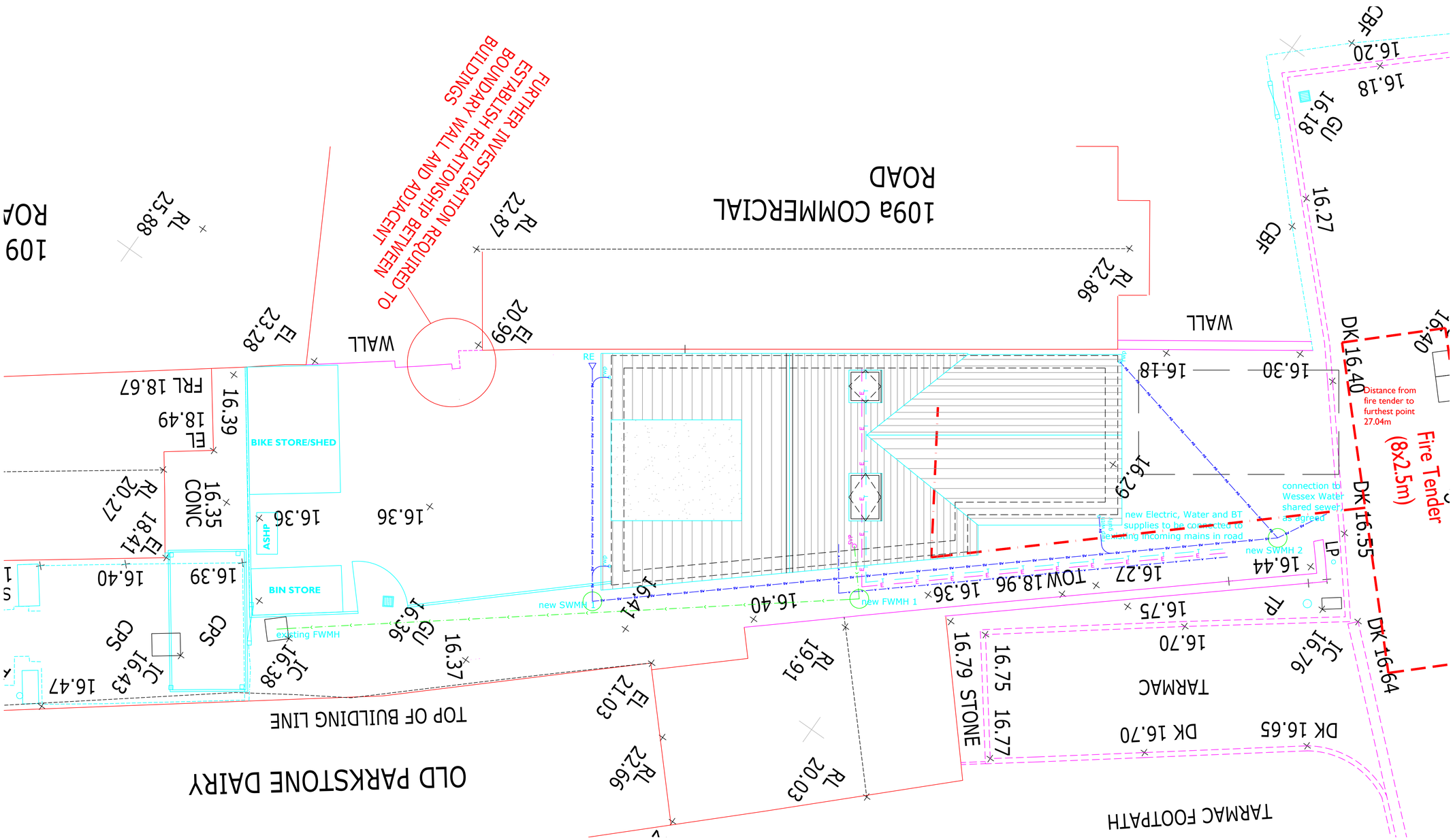
6.1.2 The Surface Water runoff from roof areas is to be discharged into a local surface water sewer via a direct connection into an existing sewer located with Chalice Close. It is proposed that the discharge rate is to be restricted down to 1.0l/s whilst having sufficient capacity within the network to cater for the 1 in 100-year +45% storm. All hard paved areas are to be constructed from a permeable construction to allow all runoff to discharge directly to ground via infiltration at an assumed infiltration rate of 1x10-5m/s and is designed to cater for the 1 in 100-year +45% storm.

6.1.3 The Foul water will discharge into an existing foul water chamber located on site which ultimately discharges into an existing foul water sewer located within Commercial Road.

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

7 Appendices

7.1 Appendix A – Site Plan



NOTES

1. The contents of this drawing are copyright of Watts Holt.
2. It may not be copied, reproduced or altered in anyway without the written authority.
3. Do not scale. Figured dimensions only to be used.
4. Check dimensions on site before work proceeds, report any discrepancies.
5. If in doubt please ask!

N.B. Drainage to specialist design

KEY

- RWP ○ — Rainwater downpipe position
- SVP ○ — Soil vent pipe position
- ○ ####MH — Inspection chamber/manhole position; SWMH - Surface water manhole; FWMH - Foul water manhole
- ELECS — Electric meter box position
- SD HD — Combined smoke/heat alarm and sounder, mains powered with battery backup
- FD30 — Fire rated door & frame to 30mins fire protection
- Ventilation extract @15l/s in bathrooms + 30l/s in kitchen and utility
- EW — Escape window, as described in Part B, paragraph 2.10 of the building regs
- T — Phone line connected to supply
- W — Water supply min 750mm below ground connected to incoming main in road
- E — Electric supply min 450mm below ground connected to incoming main in road
- Foul Water drain run min 1:80 fall
- SW — Surface water drain run min 1:100 fall

THE CONSTRUCTION (DESIGN AND MANAGEMENT) REGULATIONS 2015 DESIGNER'S DUTIES

(Approved Code of Practice and Guidance - CDM 2015)

SITE SPECIFIC - HAZARD/RISK IDENTIFICATION RECORD SHEET

PRINCIPAL DESIGNER WATTS HOLT
STRUCTURAL ENGINEER RMS STRUCTURES LTD

1. Unknown above and below ground services - risk of injury by electrocution, explosion etc.
2. Risk of collision on narrow road with limited access to the site especially for turning around. Pick up, drop offs and storage of materials need to be considered.
3. Due to the proximity of the surrounding buildings there is the potential for collapse of excavation trenches due to made up/poor ground conditions, etc and excessive loads.
4. There are no other significant design related risks noted at this stage.

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Scale 100mm @ A1

No.	Revision.	Date	By
A	Fire travel distances	13.07.23	JB

Project
Rear of 111 Commercial Road, Poole

Client / Brand
Marson Projects Ltd

Drawing Title
Site Plan

scale @ A1 1:100 | checked .
date May '23 | drawn JB

23111 01 A

Marson Projects Ltd

Rear of 111 Commercial Road, Poole

7.2 Appendix B – Drainage Layout

Site Specific Notes

1. The proposed scheme consists of the demolition of an existing warehouse and construction of a single 4-bedroom dwelling with associated access and parking.
2. Due to lack of space for conventional soakaways on site, it is proposed that all surface water runoff from roof areas is to be discharged into a local surface water sewer located within Chalice Close via a new connection into an existing sewer downstream of an existing Hydro-Brake chamber. The discharge is to be restricted to 1.0l/s and the network has sufficient capacity to cater for the 1 in 100-year +45% storm without the need for additional storage.
3. All hard paved areas are to be constructed from a permeable surface to allow runoff to freely discharge to ground via infiltration. The permeable paving has been designed to an assumed infiltration rate of $1x10^{-5}$m/s and to cater for the 1 in 100-year +45% storm.
4. The foul water from the site is to be discharged into an existing foul water chamber located in the south eastern corner of the site. This chamber is confirmed to discharge into an existing foul water sewer located within Commercial Road.

DRAINAGE LEGEND

EXISTING FEATURES

- Ex FWD — Existing foul water sewer/drain and manhole
- Ex SWD — Existing surface water sewer/drain and manhole

PROPOSED FEATURES

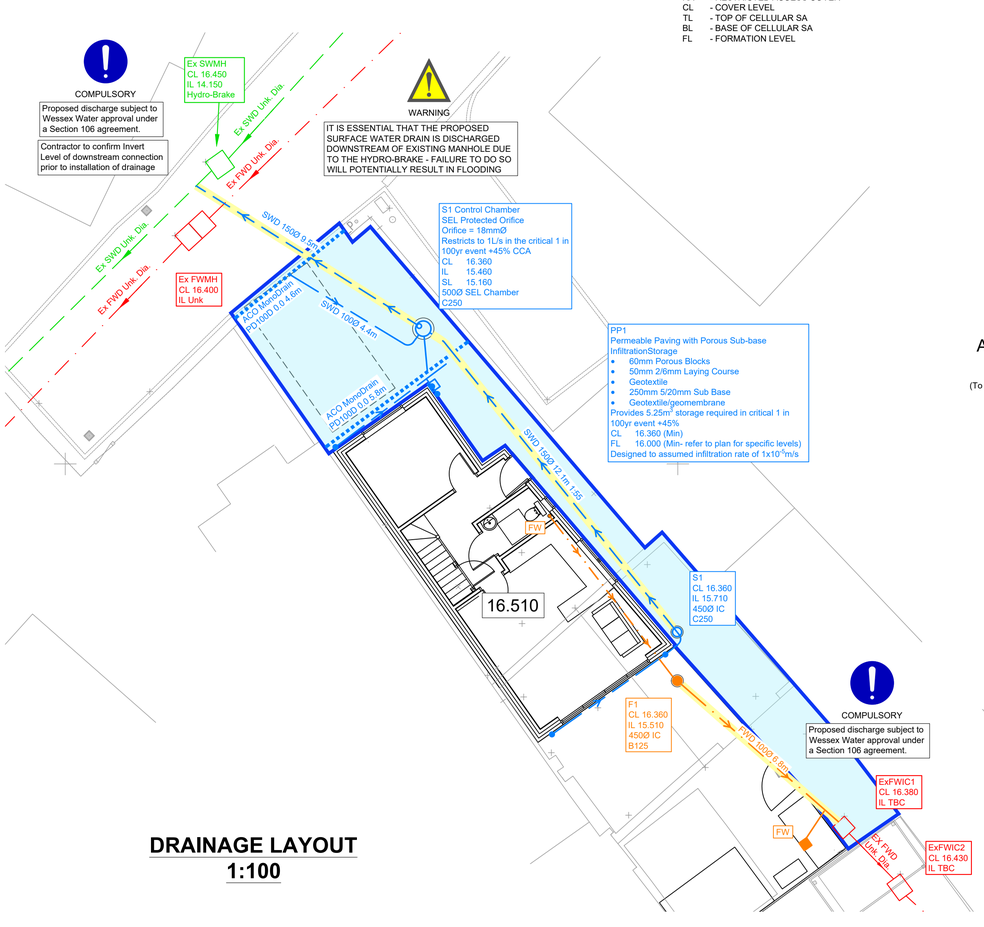
- Pipes at shallow depth - with concrete surround Type 'Z' Bedding or concrete slab protection to Building Regulation Part 'H' Diagram 11
- SWD — Surface Water Drainage
- FWD — Foul Drainage
- CD — Channel drain
- Rainwater pipe
- Storm water inspection chamber (450Ø)
- Extent of permeable paving with porous sub-base
- Storm water orifice flow control chamber (500Ø)
- FW — Soil stack (type TBC by architect/m&e engineer)
- Foul water inspection chamber (450Ø)
- 00.000 — Finished floor level
- 100Ø 4.5m 1:100 Z BED — Pipe info - diameter, length, gradient, bedding type

ABBREVIATIONS

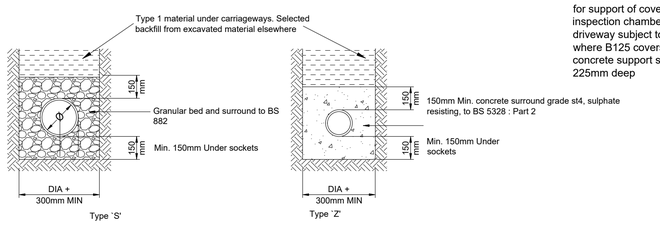
MH	- MANHOLE
IC	- INSPECTION CHAMBER
AC	- ACCESS CHAMBER
CP	- CATCHPIT
BC	- BRAKE CHAMBER
RE	- RODDING EYE
IL	- INVERT LEVEL
SL	- SUMP LEVEL
RA	- RESTRICTED ACCESS COVER
CL	- COVER LEVEL
TL	- TOP OF CELLULAR SA
BL	- BASE OF CELLULAR SA
FL	- FORMATION LEVEL

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

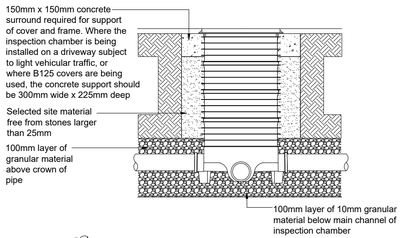
DESIGN SUBJECT TO THE CONFIRMATION OF:
EXTERNAL LEVELS DESIGN
LOCATION AND DEPTH OF EXISTING UTILITIES

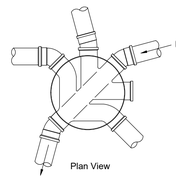


DRAINAGE LAYOUT
1:100



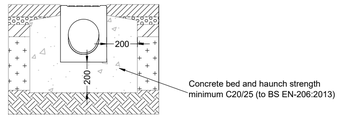
Pipe bedding details in private Areas





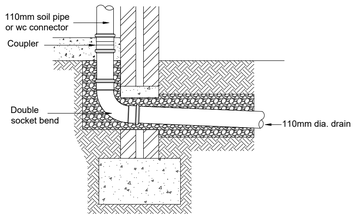
1. In all installations, the main channel of the inspection chamber should always be used. Where the chamber is being used as a change of direction for the drainage system, short radius bends of 11¼°, 15°, 30° and 45° can be used in the inlet and outlet to achieve the required angle.
2. Side inlet branch connections enter the inspection chamber approx. 55mm above the invert of the main channel
3. 320mm dia. chambers are supplied with 2no. blanking plugs for the side inlets and 460mm dia. chambers are supplied with 3no. blanking plugs.

460mmØ INSPECTION CHAMBER DETAIL



Aco Monodrain Construction Detail in Block Paving

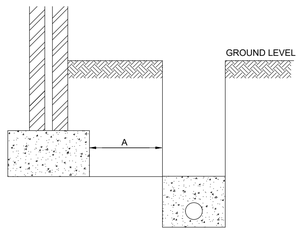
(To be read in conjunction with Aco installation specification)



Soil pipe / wc connection

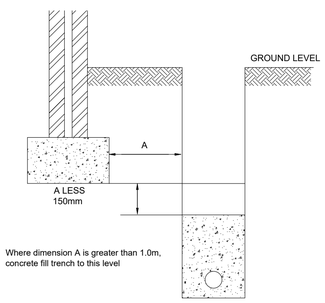
SEL CONTROFLOW 500 ORIFICE CHAMBER

SEL Environmental LTD
Phone: 01254 589987
Email: sales@selenvironmental.com



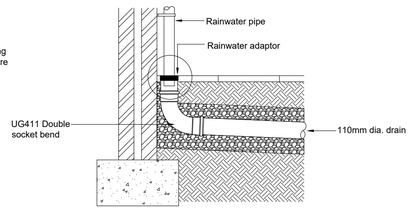
Where dimension A is less than 1.0m, concrete fill trench to level of underside of foundations.

Pipes near buildings

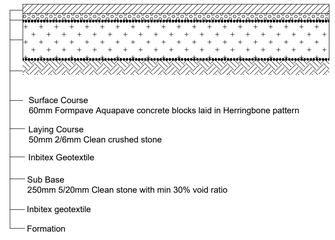


Where dimension A is greater than 1.0m, concrete fill trench to this level

Pipes near buildings



Rainwater pipe connection



Formpave permeable block paving private driveway construction

To be read in accordance with Formpave details and specification

CONSTRUCTION DETAILS
1:20

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 LARGER SIZED PIPES ETC. SHOULD BE SOFFIT TO SOFFIT 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 295 AND BS65 (SWS ONLY), OR CONCRETE PIPES TO BE EN 1916 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 ADOPTABLE SEWERS SHALL BE CONSTRUCTED TO THE STANDARDS AND SPECIFICATION LAID DOWN DOWN IN 'SEWERS FOR ADOPTION' 6th EDITION, WITH A VIEW TO ADOPTION UPON COMPLETION OF WORKS.
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, INCLUDING THE RELOCATION OF SEWERS OR DRAINS, SO THAT AN AS CONSTRUCTED DRAWING CAN BE PREPARED UPON COMPLETION OF THE PROJECT.
14. 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.
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 ONTO ADOPTABLE AREAS AND VICE VERSA.
17. ALL EXISTING MANHOLE COVER'S, GULLIES, ETC, ARE TO BE RAISED/LOWERED 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 INSTALLATION
20. MANHOLE AND CHAMBER COVER GRADES:

- 'A15' IN ALL LANDSCAPED AREAS AND ON FOOTPATHS
- 'B125' IN ALL DRIVEWAYS
- 'C250' IN PRIVATE PARKING AREAS
- 'D400' IN CARRIAGEWAY/ACCESS ROAD

Prefixed to drawing numbers shall signify the following:-

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

REV	DATE	DESCRIPTION	BY	CHK	APP
PL1	20.11.23	REVISED TO SUIT NEW SITEPLAN	LH	CS	CS
P-	17.11.23	PRELIMINARY ISSUE	LH	CS	CS

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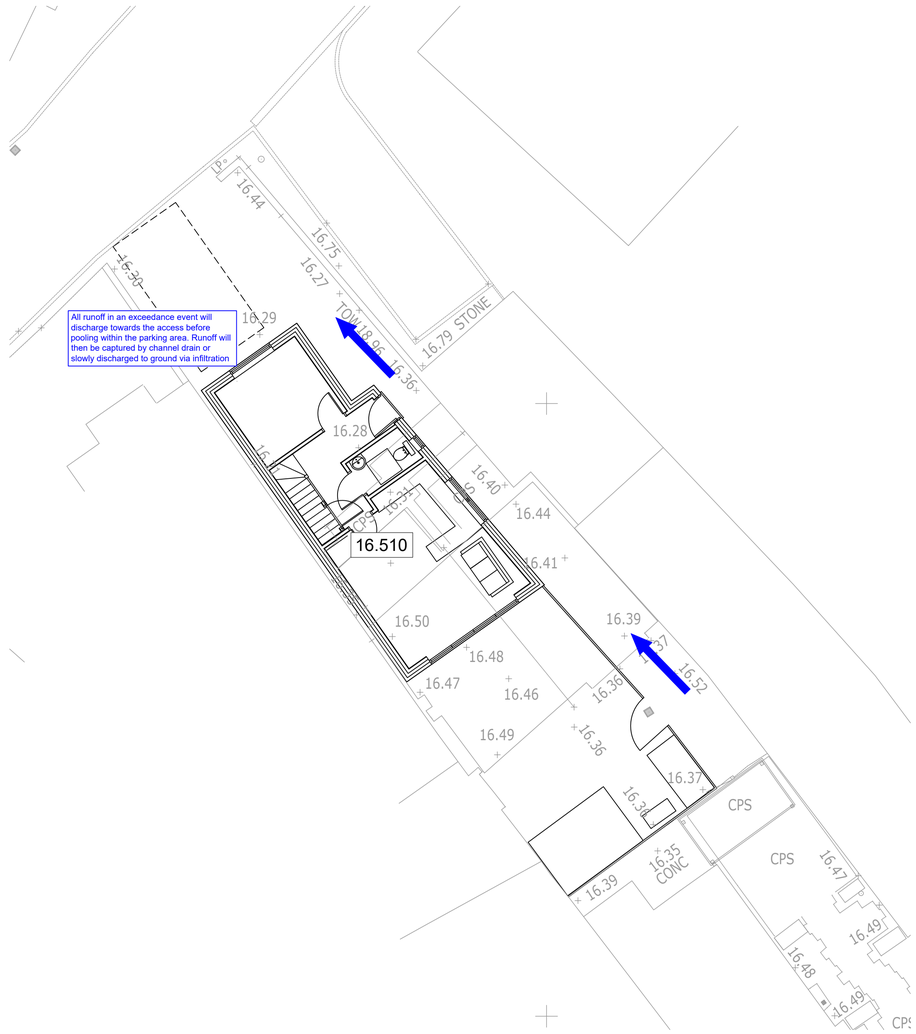
Consulting Civil Engineers

CLIENT: WATTS HOLT
ARCHITECT: WATTS HOLT
JOB TITLE: 111 COMMERCIAL ROAD POOLE
DRAWING TITLE: DRAINAGE LAYOUT

DRAWN	ENGINEER	CHECKED	APPROVED
LH	C SLADE	CS	CS

DATE	SCALE @ A1
NOV 2023	AS SHOWN

JOB No.	STATUS	DRAWING No.	REV.
C2903	PL	101	PL1



Prefixed to drawing numbers shall signify the following:-

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

REV	DATE	DESCRIPTION	BY	CHK	APP
PL1	20.11.23	REVISED TO SUIT NEW SITEPLAN	LH	CS	CS
P-	17.11.23	PRELIMINARY ISSUE	LH	CS	CS

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Consulting Civil Engineers

CLIENT: WATTS HOLT

ARCHITECT: WATTS HOLT

JOB TITLE: 111 COMMERCIAL ROAD POOLE

DRAWING TITLE: IMPERMEABLE AREAS & OVERLAND FLOW ROUTE PLAN

DRAWN	ENGINEER	CHECKED	APPROVED
LH	C SLADE	CS	CS

DATE	SCALE @ A1
NOV 2023	1:100

JOB No.	STATUS	DRAWING No.	REV.
C2903	PL	401	PL-

FOR PLANNING ONLY

7.3 Appendix C – Surface Water Calculations

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)	0.350
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	✓
Maximum Rainfall (mm/hr)	50.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Node Type	Manhole Type	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
S1	0.002	5.00	16.360	Manhole	Adoptable	450	40400.746	9113.548	0.600
S2	0.003		16.360	Manhole	Adoptable	500	40391.585	9124.251	0.900
PP		5.00	16.380	Manhole	Adoptable	100	40406.235	9107.896	0.360
PP1	0.007		16.360	Manhole	Adoptable	100	40390.400	9126.300	0.360

Links (Input)

Name	US Node	DS Node	Length (m)	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)
1.000	S1	S2	14.088	15.760	15.460	0.300	47.0	150
2.000	PP	PP1	24.279	16.020	16.000	0.020	1213.9	100

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Normal	Additional Storage (m³/ha)	0.0
Summer CV	1.000	Skip Steady State	x	Check Discharge Rate(s)	x
Winter CV	1.000	Drain Down Time (mins)	240	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 %)
2	0	0	0
10	0	0	0
30	0	0	0
100	45	0	0

Node S2 Online Orifice Control

Flap Valve	x	Design Depth (m)	0.725	Discharge Coefficient	0.650
Replaces Downstream Link	✓	Design Flow (l/s)	2.0		
Invert Level (m)	15.460	Diameter (m)	0.018		

Node PP1 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.03600	Invert Level (m)	16.000	Slope (1:X)	1213.0
Side Inf Coefficient (m/hr)	0.03600	Time to half empty (mins)	49	Depth (m)	0.250
Safety Factor	2.0	Width (m)	3.500	Inf Depth (m)	
Porosity	0.30	Length (m)	20.000		

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	15.772	0.012	0.4	0.0020	0.0000	OK
120 minute summer	S2	72	15.601	0.141	0.5	0.0277	0.0000	OK
120 minute summer	PP	78	16.035	0.015	0.0	0.0001	0.0000	OK
120 minute summer	PP1	78	16.034	0.034	0.7	0.5400	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	1.000	S2	0.4	0.149	0.014	0.1192	
120 minute summer	S2	Orifice		0.3				0.7
120 minute summer	PP	2.000	PP1	0.0	-0.047	-0.028	0.0375	
120 minute summer	PP1	Infiltration		0.2				

Results for 10 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
30 minute summer	S1	23	15.788	0.028	0.6	0.0045	0.0000	OK
30 minute summer	S2	24	15.789	0.329	1.5	0.0644	0.0000	OK
120 minute summer	PP	78	16.059	0.039	0.1	0.0003	0.0000	OK
120 minute summer	PP1	78	16.059	0.059	1.2	1.0423	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)
30 minute summer	S1	1.000	S2	0.6	0.149	0.023	0.1403	
30 minute summer	S2	Orifice		0.4				1.0
120 minute summer	PP	2.000	PP1	-0.1	-0.056	-0.059	0.0926	
120 minute summer	PP1	Infiltration		0.4				

Results for 30 year Critical Storm Duration. Lowest mass balance: 100.00%

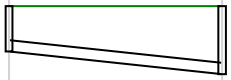
Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute summer	S1	40	15.861	0.101	0.7	0.0161	0.0000	OK
60 minute summer	S2	42	15.862	0.402	1.5	0.0789	0.0000	OK
120 minute summer	PP	82	16.075	0.055	0.1	0.0004	0.0000	OK
120 minute summer	PP1	82	16.075	0.075	1.5	1.3730	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)
60 minute summer	S1	1.000	S2	0.6	0.126	0.023	0.2133	
60 minute summer	S2	Orifice		0.5				1.7
120 minute summer	PP	2.000	PP1	-0.1	-0.051	-0.066	0.1302	
120 minute summer	PP1	Infiltration		0.4				

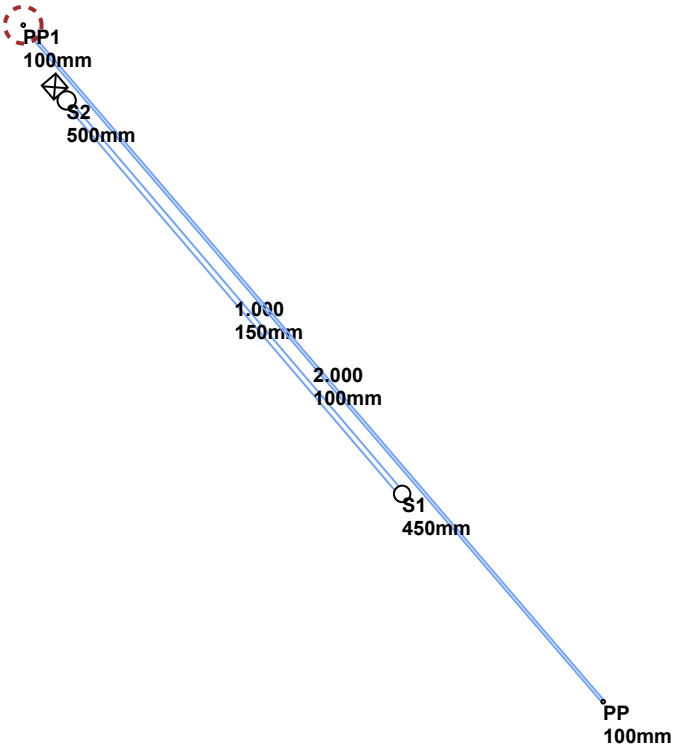
Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute summer	S1	43	16.298	0.538	1.4	0.0856	0.0000	FLOOD RISK
60 minute summer	S2	43	16.298	0.838	1.9	0.1642	0.0000	OK
120 minute summer	PP	96	16.157	0.137	0.2	0.0011	0.0000	FLOOD RISK
120 minute summer	PP1	96	16.157	0.157	2.6	3.0561	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)
60 minute summer	S1	1.000	S2	0.7	0.149	0.025	0.2480	
60 minute summer	S2	Orifice		0.7				3.0
120 minute summer	PP	2.000	PP1	-0.2	-0.036	-0.118	0.1900	
120 minute summer	PP1	Infiltration		0.4				

Node Name		S1	S2
A4 drawing Hor Scale 500 Ver Scale 100 Datum (m) 6.000			
Link Name		1.000	
Section Type		150mm	
Slope (1:X)		47.0	
Cover Level (m)		16.360	16.360
Invert Level (m)		15.760	15.460
Length (m)		14.088	

Node Name	PP	PP1
A4 drawing Hor Scale 500 Ver Scale 100 Datum (m) 6.000		
Link Name	2.000	
Section Type	100mm	
Slope (1:X)	1213.9	
Cover Level (m)	16.380	16.360
Invert Level (m)	16.020	16.000
Length (m)	24.279	



7.4 Appendix D – Borehole Logs

WELL BORING at Parkstone | County Dorset 329 27

Geol. map 329 NS. 1 in. map New Series 329 | 6 in. map

Made by Duke & Ockenden Date 1905

Sunk feet. Bored 200 feet.

Communicated by Duke & Ockenden SZ09SW/1510

Height above Ordnance Datum 70 Rest level of water 38 feet down

Yield 4000 g.p.h.*

Quality (with copy of analysis on separate sheet) SZ 034 916

GEOLOGICAL FORMATION.	NATURE OF STRATA.	THICKNESS Feet.	THICKNESS Inches.	DEPTH Feet.	DEPTH Inches.
	Dug well	38	—	38	—
	Blowing Sand	22	—	60	—
	Hard Brown sand (like rock)	20	—	80	—
	Hard clay & Sand	5	—	85	—
	Hard white clay	9	—	94	—
Bg[S] ? Broadst. Clay 628	Hard white and red clay	5	—	99	—
	Hard rock	4	—	103	—
	Hard pink clay	7	—	110	—
	Hard white clay	7	—	117	—
	Dark clay	25	—	142	—
	Rock	3	—	145	—
	Fine Sand & clay	21	—	166	—
	Sand rock & veins of clay	20		186 ~~200~~	
	Sand & rock	14		200	

Site ¼ mile N.W. of Parkstone Station
at premises of
Dorset Dairies Direct Milk Supply Co. Ltd.
Park Street
Parkstone

GSM
7/3/82
2067

*Yield tested at rate of 4000 galls. per hour and pumped at this rate for over a week, but water was so heavily charged with fine silt, and would not clear, the lining tubes were withdrawn and the work abandoned.

Visited and sited Δ on Dorset 44 SW/W.
Now Humphries Products Ltd. (Engineering Works)
They have been there since 1939. Are shortly vacating the premises.
4.1.60. O.M.
OP.C.60.

m. of H
notified

Geological Survey and Museum,
Jermyn Street, London S.W.1
(B10619). Wt.15824—8122. 2000. 11/33. Gp.136. C.&A.

5209 SW/1648 SZ09/16

WELL BORING at Parkstone County Dorset

Geol. map 329 N.S. 1 in. map New Series 329 6 in. map 329 44 S.W.

Made by Duke & Ockenden Date 1905

Sunk feet. Bored 200 feet.

Communicated by Duke & Ockenden

Height above Ordnance Datum 90 Rest level of water 38 feet down

Yield 4000 g.p.h.* SZ 034 916

Quality (with copy of analysis on separate sheet)

GEOLOGICAL FORMATION.	NATURE OF STRATA.	THICKNESS. Feet.	THICKNESS. Inches.	DEPTH. Feet.	DEPTH. Inches.
PARKSTONE CLAY	Dug well	38	—	38	—
PARKSTONE SAND	Blowing Sand	22	—	60	—
	Hard Brown sand (like rock)	20	—	80	—
	Hard blue Sand	5	—	85	—
OAKDALE BEDS	Hard white clay	9	—	94	—
	Hard white and red clay	5	—	99	—
POOLE FM CLAY	Hard rock	4	—	103	—
	Hard pink clay	7	—	110	—
	Hard white clay	7	—	117	—
	Dark Clay	25	—	142	—
	Rock	3	—	145	—
OAKDALE SAND.	Fine Sand & clay	21	—	166	—
	Sand rock veins of clay	20	—	186	—
	Sand & rock	14	—	200	—

Site ¼ mile N.W. of Parkstone Station at premises of Dorset Dairies Direct Milk Supply Co. Ltd. Part Street Parkstone

* Yield tested at rate of 4000 galls per hour and pumped at this rate for over a week, but water was so heavily charged with fine silt, and would not clear, that lining tubes were withdrawn and the work abandoned.

GSM 44 SW 187. 6067

Visited and sited S on Dorset 44 SW/W. Now Humphries Products Ltd. (Engineering Works) They have been there since 1939. Are shortly vacating the premises. O.D. C.6.C. L6.48 RM.

M of H notified

GEOLOGICAL SURVEY AND MUSEUM, JERMYN STREET, LONDON. S.W. 1.

(B10619). Wt. 15824—S123. 2500. 11/25. Gp. 160. O.A.

BGS ID: 453957 : BGS Reference: SZ09SW1510
British National Grid (27700) : 403400,91600

SZ09/16

329/27

329/27

"Bagshot Sands" 60·96 60·96

agreed RDE 12/1/79

7.5 Appendix E – Maintenance Schedule

Consulting Civil Engineers

Maintenance Schedule

111 Commercial Road, Poole, Dorset BH14 0JD

Planning Ref: APP/20/00660/F

For

Watts Holt

Rev - **P**

Reference **C2903**

Date **10th November 2023**

Revision	Date of Issue	Comments	Prepared By	Checked By
P	10/11/2023	Initial Issue		

Contents

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 111 Commercial Road, Poole

1.2.1 As listed above, in section 5.1.2, the SuDS features used on site will be **Permeable Paving**

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 Permeable Paving

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

Table 21.3 Operation and maintenance requirements for permeable paving

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

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 all 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
Inspections 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