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New Residential Development
At
16 Avenue Road
London NW8

Discharge of Planning Condition for SUDS

Application Ref: 2016/5375/P

Document History and Status

Revision	Status	By	Approved	Date
00	draft	ad		25 01 2020
01	Issued for discharge of Planning	ad	mor	06 02 2020

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Introduction

Planning permission was granted in 2016 for the redevelopment of the residential property at 16 Avenue Road, London NW8.

The new property will comprise of a detached residence arranged over sub-basement, basement, ground, first and second floors.

The planning permission approved a SUDS strategy that included:

- Green roofs
- Rainwater reuse
- Attenuation storage tank

The Planning Condition is as follows:

No	Condition	Reason
6	Prior to commencement of development details of a sustainable urban drainage system shall be submitted to and approved in writing by the local planning authority. Such system shall be based on a 1:100 year event with 30% provision for climate change and demonstrating 50% attenuation of all runoff. The system shall be implemented as part of the development and thereafter retained and maintained.	Reason: To reduce the rate of surface water run-off from the buildings and limit the impact on the stormwater drainage system in accordance with policies CS13 and CS16 of the London Borough of Camden Local Development Framework Core Strategy and policies DP22, DP23 and DP32 of the London Borough of Camden Local Development Framework Development Policies.

The purpose of this report is to confirm the drainage design meets the condition.

Surface water drainage has been designed for a 1 in 100 year event plus 30% climate change allowance and provides 50% attenuation of peak surface water flows of the site prior to redevelopment; in accordance with the London Plan SPG CI 3.4.8. this equates with the target set in the Planning Condition.

Terms of Reference

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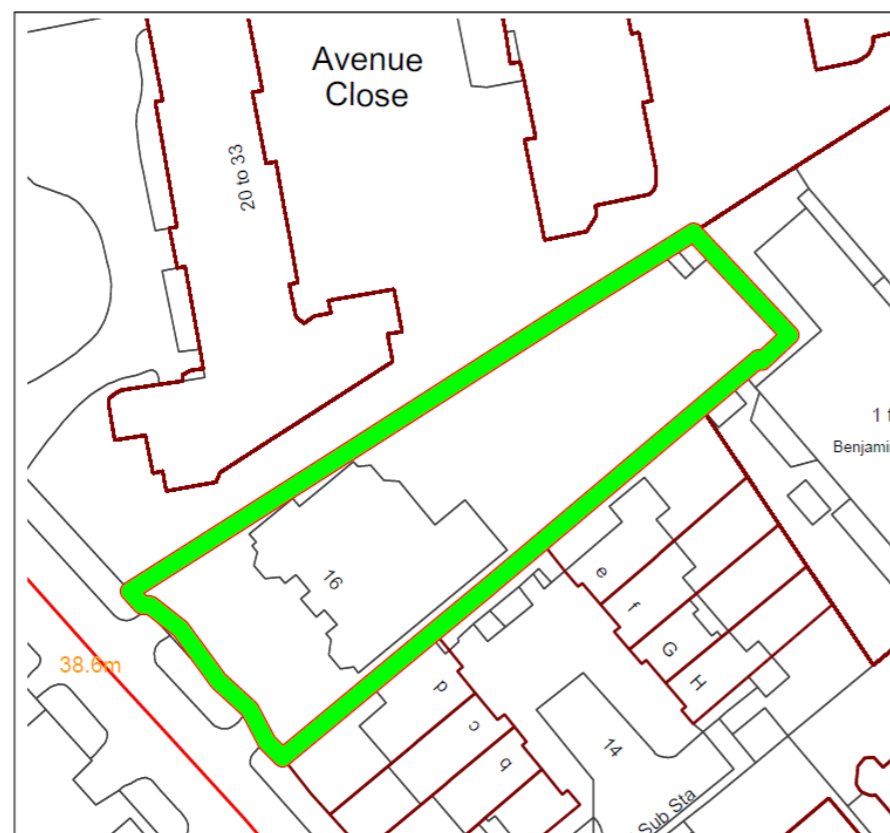
Ross and Partners are working within a design team of co-consultants to develop the project. The information contained within the report is based upon design team meetings with our co-professionals, desk top studies and design calculations.

The Site

The existing site is broadly rectangular in plan and relatively level such that there are no significant slopes. The longitudinal axis of the site runs from west to east.

The property/site can only be accessed from the Avenue Road entrance. The remainder of the site is contained within boundary "garden" walls.

There are existing residential homes on either side. To the north is a residential apartment block; to the south are several dwelling houses. These properties fall within the requirements of the Party Wall Act.



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Site Geology

A specific geotechnical site investigation and desk study has been carried out by Soil Consultants and is presented in their report 9911A/AW/KOG dated February 2016. The reader is invited to refer to this report for further and more specific matters relating to the site geology.

The investigations reveal the following general ground conditions

Made Ground

Within older urban areas, much of the surface has been partially or wholly disturbed by human activity and is known as Made Ground.

Made Ground depths encountered to date extend to a thickness of up to 0.5m.

Terrace Gravels

Lynch Hill Gravel is a post-diversionary Thames River Terrace deposit and generally consists of gravel, which is sandy and clayey in parts. Terrace Gravel is a mixture of quartz sand, comminuted quartz and mainly brown flint and chert gravel. Terrace gravels are not documented to exist locally at shallow depths.

London Clay

London Clay is well documented locally and is generally a weathered bluish to brownish clay with silty sandy bands and Limestone nodules, becoming firm grey fissured silty clay with depth. It is generally characterised by a high plasticity, high shrinkage potential, low to very low compressibility and low hydraulic conductivity.

The base of this strata was not proven.

Lambeth Group

These can be described as a variable series of clay, loam, sand and pebble beds which are locally cemented into sandstone or conglomerate. The sands are generally yellow, greenish, or brown and contain layers of mottled clay occasionally with bands of lignite. The base of this stratum is formed of greenish sand with flint pebbles where Thanet Sands are present below. It is anticipated that the Lambeth Group will be underlain by Thanet Sands.

Soil Infiltration Potential

A falling head test was carried out to determine the potential for using infiltration for surface water disposal. Unfortunately infiltration rates are poor (5.15×10^{-7} m/s) and infiltration is not viable on this site.

Existing Site Drainage

Site CCTV surveys reveal the existing property drains via a single 150 mm diameter drain which conveys both foul and surface water drainage into the combined 1372 x 914mm combined sewer located in Avenue Road.



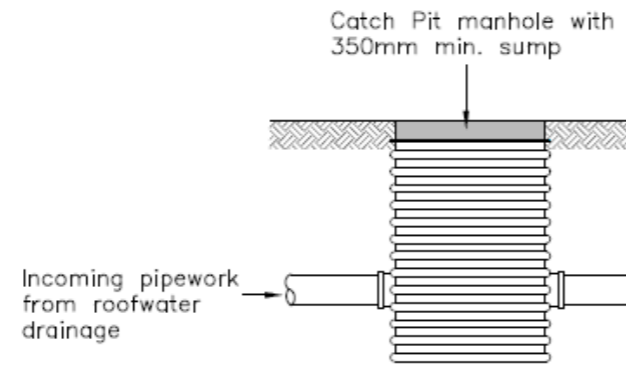
SUDS Features

The following SUDS features are incorporated in the design.

Surface Water Management for Roofs

Flat roof areas will be living roofs that will reduce the amount of impermeable surface within the development and will be able to attenuate some of the initial storm runoff. The green roofs will reduce the rainwater run-off through evapotranspiration and the rate of run-off is slowed down through having to pass through the drainage systems, vegetation and substrate. This will bring biodiversity benefit.

Rainwater falling on roofs shall be collected and conveyed via the above ground rainwater system into rainwater downpipes. These will discharge into the below ground surface water drains via a catch pit to filter out silt.



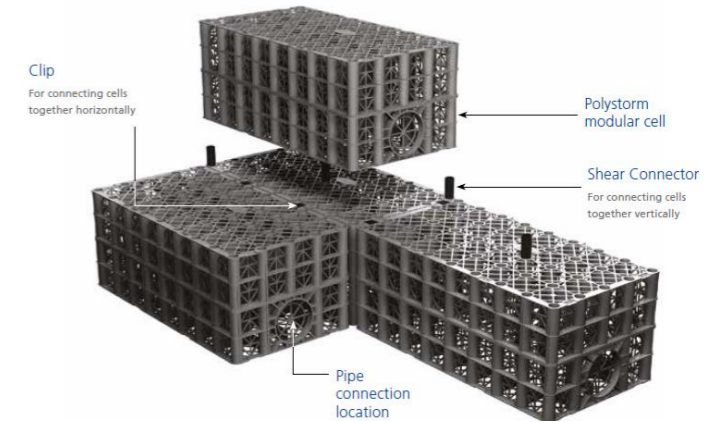
Surface Water Management for hard-standings

All surfaces are proposed as impermeable. Within carparking areas, the surface will fall towards slotted drainage channels. These will be "Permachannel" units manufactured by Polypipe. Permachannel are designed to provide stormwater collection as well as an oil/silt interceptor and treatment system.



Attenuation

Surface water from roofs and hard-standings are conveyed into a below ground geo-cellular storage system. The outflow from the tanks are limited to 5l/s via flow control chamber. When the amount of rainfall exceeds the 1.32l/s maximum permitted rate of discharge, stormwater will temporarily back up within the void and discharge over an elongated period of time. This will significantly reduce the peak run-off rates that presently discharge from the site into the public sewer.



Pollution Control

It is proposed that this is achieved from roof runoff via silt traps that filter sediment prior to infiltration.

Surface runoff from residential carparking areas is collected in the slotted permachannel system. This provides gravity separation of oils and silts at source, whilst trapped effluent is naturally treated by aerobic digestion.

It is proposed that cellular storage system incorporates an integral biomat which provides oil retention and water treatment. Permavoid Biomat has been specifically designed to remove hydrocarbon pollutants from surface water run-off. It comprises of a buoyant geocomposite located inside the Permavoid unit. The composite interacts with oil deposits, allowing formation of a 'biofilm' on its solid surface and providing the opportunity for nutrient recycling which would allow active biofilm development. The system provides an environment which encourages the growth of oil-degrading microorganisms as moisture, oil and oxygen from the atmosphere are all present supplied with a large surface area for oil absorption and biofilm attachment.

Discharge rainwater to the combined sewer

It is proposed the site foul and surface water drainage are kept separate and are discharged separately into the Thames Water Sewer in Avenue Road. The existing outfalls will be retained.

Suds System

The following SUDS features are incorporated in the design.

Existing Rate of Surface Water Run Off

The existing run off rate is calculated for various storm events using the modified rational method where:

$$Q = 2.78 Ai$$

Where A = Catchment Area and i = rainfall intensity

Existing Impermeable Area of the site that positively drains into the public sewer = 530m²

The surface water run off that discharges into the public sewer based upon a 1 year, 30 year and 100 year storm event is:

$$Q_1 = 2.78 \times 0.0530 \times 32\text{mm/hr} = 4.71 \text{ l/s}$$

$$Q_{30} = 2.78 \times 0.0530 \times 79\text{mm/hr} = 11.63 \text{ l/s}$$

$$Q_{100} = 2.78 \times 0.0530 \times 101\text{mm/hr} = 14.88 \text{ l/s}$$

Target Rate of Surface Water Run Off

The London Plan Policy 5.13 and Sustainable Design and Construction Supplementary Planning Guidance 2014 (SPG) sets out Sustainable Drainage aspirations for developments and requires developers to aim for greenfield runoff rate from their developments. Greenfield runoff rates are defined as the runoff rates from a site, in its natural state, prior to any development. Typically, this is between 2 l/s/ha and 8 l/s/ha. On previously developed sites **SPG CI 3.4.8** sets minimum expectation targets of 50% attenuation of peak surface water flows of the site prior to redevelopment CI 3.4.8. this equates with the target set in the Planning Condition

$$\text{This equates to } 50\% \times 14.88 \text{ l/s} = 7.44 \text{ l/s}$$

Proposed Rate of Surface Water Run Off

Proposed Impermeable Area of the site: 800m²

Of this the front 170 m² cannot be attenuated due to space restrictions. The quantity of surface water run off from the front area based upon an 1 in 100 year storm plus 30% allowance for climate change is:

$$Q = 2.78 \times 0.0170 \times 135\text{mm/hr} = 6.38 \text{ l/s}$$

It follows therefore the remaining 630 m² must be limited to a maximum discharge rate of 1.06 l/s. This will be achieved via an orifice controlled hydrobrake.

Therefore total surface water discharge rate from the proposed development based upon a 1 in 100 year storm event plus a 30% climate change allowance is:

$$Q_{100 + 30\% \text{ cc}} = 7.44 \text{ l/s}$$

The volume of attenuation storage = 47 m³. This will be achieved via proprietary attenuation storage crates within the rear garden.

Proposed Drainage Drawings

GENERAL NOTES:

1. Do not scale this drawing in either paper or digital form. Use figured dimensions only.
2. All 'Ross & Partners' drawings to be read in conjunction with all relevant Architect's drawings and any discrepancies reported to all relevant parties.
3. This drawing is to be read in conjunction with other 'Ross & Partners' drawings and 'Ross & Partners' Structural Specification documents and any discrepancies reported to all relevant parties.
4. Setting out will be in accordance with the Architect's dimensions and as discussed and agreed between Client, Contractor and the Architects and any discrepancies reported to all relevant parties.
5. For General Notes refer to drawing No. 11940/DR/S-000

DRAINAGE LEGEND

	New SW Drain
	New PW Drain
	New Corroded Drain
	Existing SW Drain
	Existing PW Drain
	Proposed SW Rising Mesh
	Proposed PW Rising Mesh
	Slotted Drain
	Proposed Geocellular Storage Tank
	Proposed SW P/U/s
	Proposed PW P/U/s

ALL RWP's TO CONVEY SURFACE WATER RUNOFF INTERNALLY TO THE BASEMENT SW PUMPING CHAMBER

POLYPIPE HEAVY DUTY POLYSTYRENE ATTENUATION TANK
 TANK SIZE - 8m x 8m
 TOP LEVEL - 88.6 m
 BOTTOM LEVEL - 87.8 m
 STORAGE VOLUME - 48m³

4	S1	88	Existing in situ	17/02/2020
3	S2	88	Existing in situ	17/02/2020
2	S3	88	Existing in situ	17/02/2020
1	S4	88	Existing in situ	17/02/2020
Rev.	Rev.	Rev.	Drawn by	Date

CLIENT
 Jackson Coles LLP

ARCHITECT

DATE

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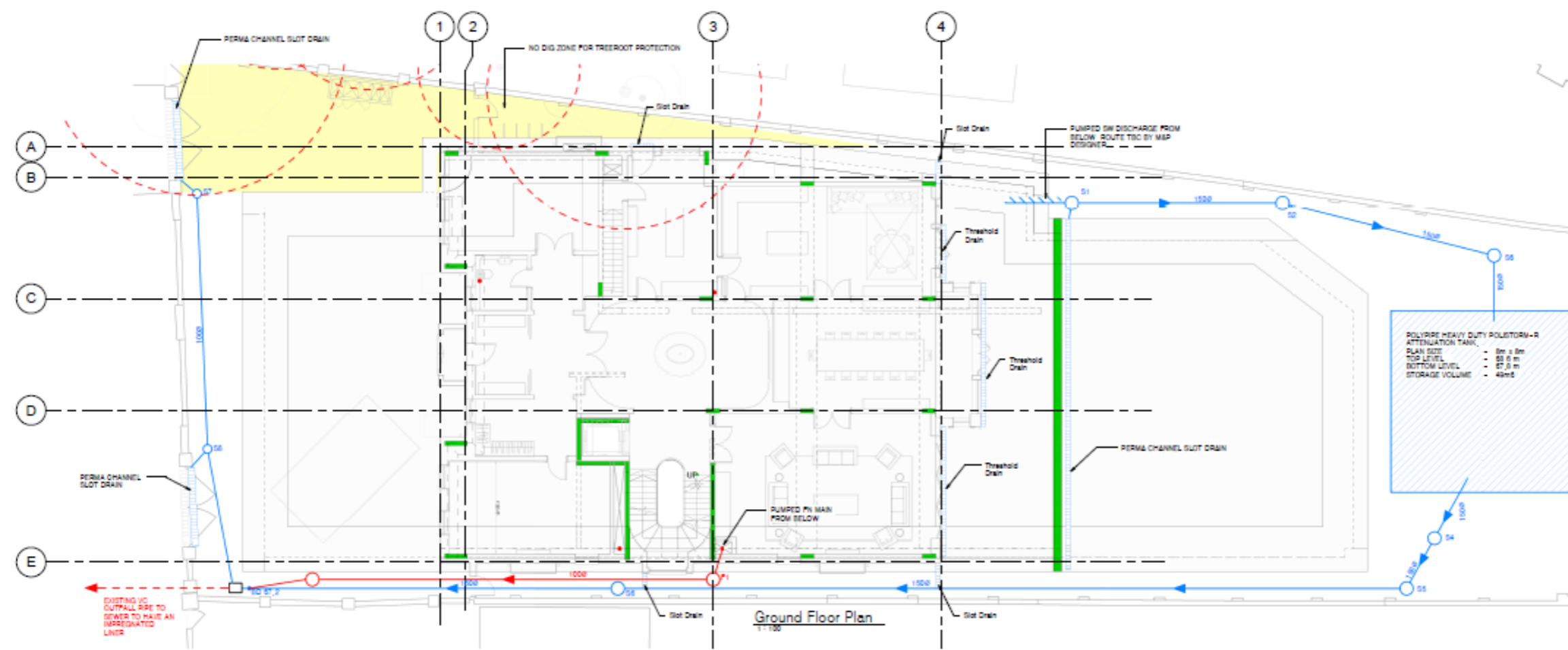
ADDRESS
 16 Avenue Road
 London, NW8 6DP

PROJECT
 GROUND FLOOR PLAN DRAINAGE

DATE
 17/02/2020

SCALE
 1:100 @ A1

NO.
 11940/DR/GF/S-223 P3

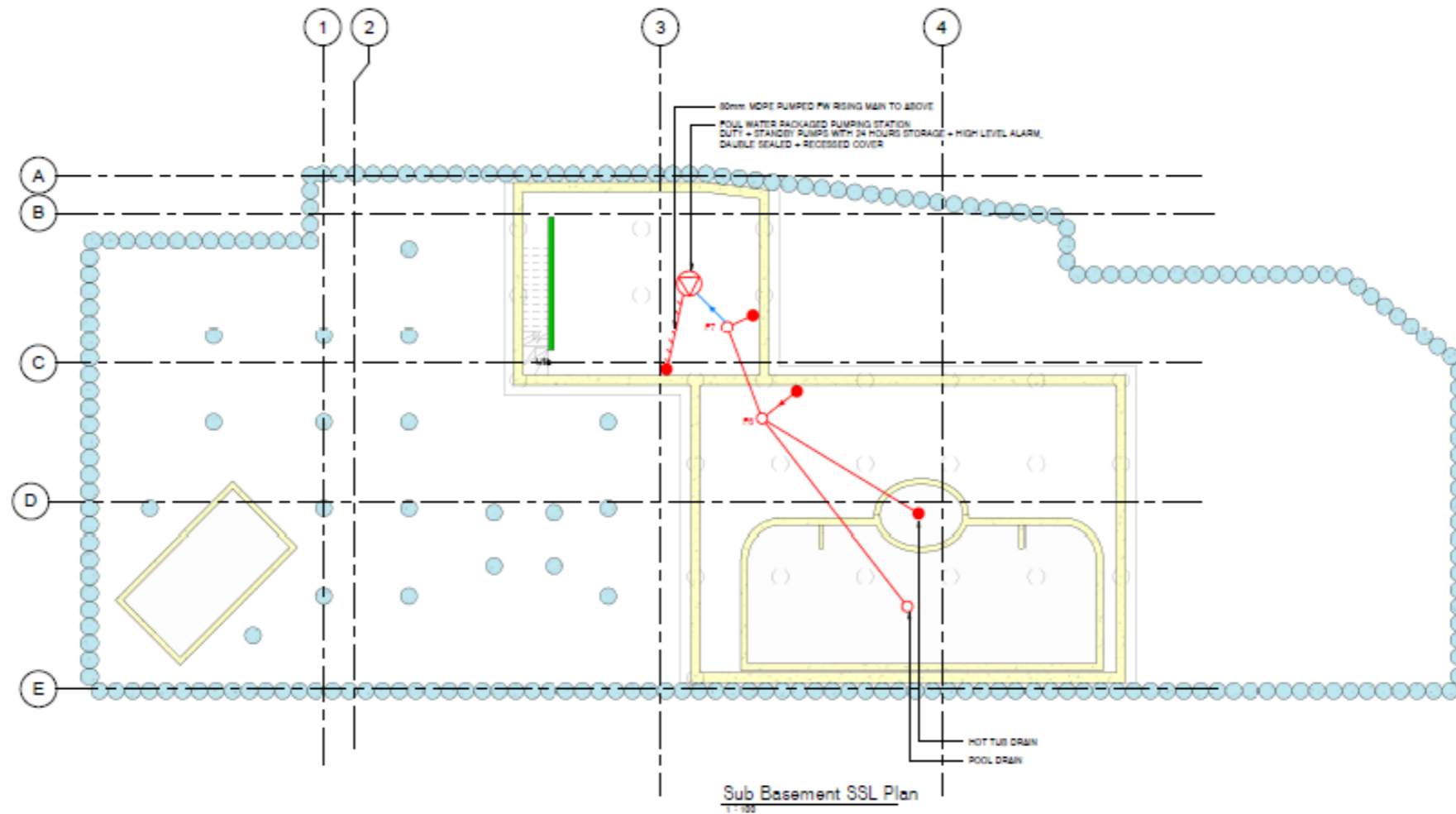


MANHOLE SCHEDULE

Manhole Reference	Cover Level	Invert Level	Internal Chamber Size (mm)	Cover Size	Cover Reference	Comments
CMH1	38.77	34.650	800x600	610x450		EXISTING MANHOLE TO BE RETAINED. CDM RISK: CONTRACTOR TO EXERCISE CONFINED ACCESS WORKING AND BREATHING APPARATUS FOR PERSONNEL ENTERING THIS MANHOLE.
S1	39.40	38.80	1000 DIA	600x600	BROADSTEL SEALED AND LOCKING INTERNAL RECESSED	
S2		38.70	1000 DIA	600x600	BROADSTEL SEALED AND LOCKING INTERNAL RECESSED	
S3		38.60	1000 DIA	600x600	BROADSTEL SEALED AND LOCKING INTERNAL RECESSED	
S4		37.78	1200 DIA	600x600	BROADSTEL SEALED AND LOCKING INTERNAL RECESSED	
S5		37.75	1200 DIA	600x600	BROADSTEL SEALED AND LOCKING INTERNAL RECESSED	
S6		37.39	1200 DIA	600x600	BROADSTEL SEALED AND LOCKING INTERNAL RECESSED	
S7	38.60	37.70	1000 DIA	600x600	BROADSTEL SEALED AND LOCKING INTERNAL RECESSED	
S8	38.50	37.50	1000 DIA	600x600	BROADSTEL SEALED AND LOCKING INTERNAL RECESSED	
F1	39.25	38.60	1000 DIA	600x600	BROADSTEL SEALED AND LOCKING INTERNAL RECESSED	
F2	38.70	38.20	1000 DIA	600x600	BROADSTEL SEALED AND LOCKING INTERNAL RECESSED	
F3	34.845	34.14	1500x750	600x600	BROADSTEL SEALED AND LOCKING INTERNAL RECESSED	
F4	tbc	34.00	1500x750	600x600	BROADSTEL SEALED AND LOCKING INTERNAL RECESSED	
F5	tbc	tbc	1500x750	600x600	BROADSTEL SEALED AND LOCKING INTERNAL RECESSED	
F6	tbc	tbc	1500x750	600x600	BROADSTEL SEALED AND LOCKING INTERNAL RECESSED	
F7	tbc	tbc	1500x750	600x600	BROADSTEL SEALED AND LOCKING INTERNAL RECESSED	

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DRAINAGE LEGEND	
	New DW Drain
	New FW Drain
	New Coloured Drain
	Existing DW Drain
	Existing FW Drain
	Proposed DW Rising Msh
	Proposed FW Rising Msh
	Proposed Geocellular Storage Tank
	Proposed DW P/tra
	Proposed FW P/tra



No.	Rev.	By	Description	Date
1	01	AA	Issued in addition	17/09/2019
2	02	AA	Revised the layout for substructure	01/10/2019
3	01	AA	Issue For Marking	13/10/2019
4	01	AA	Deliverable Issue For Workstart	06/11/2019

Client

Project Name: Jackson Coles LLP

Architect

Not Noted

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Address: 10 Avenue Road, London, NWS 0DP

Project: SUB-BASEMENT SSL PLAN Drainage

Drawn: AA, Check: MOR, Date: OCTOBER 2019
 Scale: For Pricing, Ratio: 1 : 100 @ A1

Reference: 11940/DR/B1/S-221 Page: P3

SUDS Maintenance

This section sets out the recommendations for the maintenance of the surface water drainage systems for the development. Regular maintenance is required to ensure that the surface water drainage system operates efficiently and does not cause flooding to the property or surrounding buildings and land.

Such work is part of the day-to-day responsibility of all owners and occupiers.

Maintenance is most effective when carried out regularly, on a planned cycle.

Good maintenance needs the regular investment of small amounts of time and money, but the cost of preparing and carrying out a planned maintenance programme should be far less than the costs resulting from a series of unplanned major repairs, and will help plan future financial commitments.

Maintenance is the routine work which is necessary to protect the drainage system.

When carried out on a planned basis, maintenance helps to prevent the types of failure which occur predictably within the life drainage system

Maintenance falls into three main categories:

- Inspection to assess condition, report any problems and decide whether repair or other work is necessary.
- Specific tasks such as clearing debris from inspection chambers and pipes.
- Minor repairs such as fixing loose covers.

Maintenance differs from repair which is work carried out to put right defects or damage and work to return the drainage system to a good condition on a long-term basis.

Maintenance Regime

The following pages sets out a recommended regime of :

- Regular and routine maintenance
- Some occasional Tasks
- Likely remedial works

SUDS Feature	Regime	Tasks	Frequency
Permeable Paving	Regular Maintenance	Surface Brushing for appearance and to reduce silt accumulation	Monthly
		Brushing and Suction Sweeping or jet wash and suction sweep particularly for block paving in autumn	Annually
		Remove weeds and leaves	As required
	Ocassional Tasks	Jetting and suction where silt has accumulated in joints or voids. Replace grit and vibrate surface to lock for permeable block paving	Monthly
Remedial Work	Where there has been sinkage or surface damage, remove block and grit and reinstate to design profile	As required	
Geocellular Tanks	Regular Maintenance	Check Inlets, outlets, vents and overflows	Monthly for 3 months then annually
	Ocassional Tasks	JRemove sediment from pre-treatment catch pits	6 monthly or as required
	Remedial Work	Repair inlets, outlets vents etc	As required
Roofs	Regular Maintenance	Remove all debris from surface and gutters	Monthly for 3 months then every six months particularly in autumn
	Ocassional Tasks	Rodding of down pipes	Annually
	Remedial Work	Repair gutters and outlets	As required
General Drainage	Regular Maintenance	Inspect gullies, channels, inspection chambers to ensure they are in good operative condition	Monthly for 3 months then annually
		Remove sediment from gullies, catch pits and channels	
	Ocassional Tasks	Survey drain runs for sediment build up and other defects and remove where necessary	Every 5 years
	Remedial Work	Repair pipework, gullies, channels and flow controls	As required

SUDS Feature	Regime	Tasks	Frequency
Silt Traps and Catch Pits	Regular Maintenance	Debris removal from catchment surface (where may cause risks to performance)	Every 3 months
		Clear grate or slot	Monthly
	Occasional Tasks	Inspection of silt accumulation	Monthly and after heavy storms
		Removal of silt	As required but at least annually
Remedial Work	Repair of inlets/outlets	As required	
Flow control chambers and devices	Regular Maintenance	Inspect and identify any areas that are not operating correctly. If necessary take remedial action	Monthly for the first 6 months then every six months
		Inspection of flow control chamber to assess if system is draining down correctly and that the orifice or flow control device is not blocked. Assess if there are any silt accumulations in the chamber sump.	Monthly and after heavy storms
	Occasional Tasks	Removal of accumulated silt from silt trap and catchpit sumps	Annually or as required
	Remedial Work	Repair and rehabilitation of inlets, outlet overflows and vents	As required
Permachannel	Regular Maintenance	Clear grate or slot	
	Occasional Tasks	Inspection of silt accumulation	Monthly and after heavy storms
		Removal of silt	Annually or as required
Remedial Work	Repair of inlets, outlets and gratings	As required	

Maintenance Records

It is important to keep a record of the checks that have been completed and the frequency. This will inform planned preventative maintenance schedule. A suggested template is illustrated below.

Date	Action	Inspector	Result	Works required /undertaken
e.g 12/10/2019	Silt traps inspected		Mild silt accumulation	Further review in 1 month