PRICE & MYERS

369-377 Kentish Town Road

Planning Condition Report

Submitted to discharge planning condition 16

Prepared by: **Alfie Ruff MEng**
Reviewed by: **Tom Spawton MEng**
Job Number: **26778**

Date	Revision	Notes/Amendments/Issue Purpose
July, 2022	0	To discharge planning condition 16
July, 2022	1	Revised following comments
October, 2022	2	Hydro-Brake maintenance added
October, 2022	3	Management company added
December, 2022	4	Updated in accordance with comments

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Introduction

This report has been compiled to discharge planning condition 16 for the proposed mixed-use development at Kentish Road Road, NW5 2TJ in the London Borough of Camden (LBC) (Planning Permission Ref: 2019/0910/P). The development has been granted full planning permission.

The EA's indicative floodplain map shows that the site is in Flood Zone 1, therefore is not at risk of flooding from main rivers and watercourses. A Flood Risk Assessment was submitted and approved at planning stage. This report will focus on the associated planning condition outlined below and should be read in conjunction with the drainage layout drawings which have been appended to this document in Appendix D.

Planning Condition 16

Condition 16 of the Planning Conditions Schedule states:

'Sustainable urban drainage

A) Prior to commencement of development, full details of the sustainable drainage system including blue roof providing 20m³ attenuation, shall be submitted to and approved in writing by the local planning authority. This shall include the following:

- *An updated FRA and SuDS proforma to reflect latest drainage design proposals, as per sketch 26778/SK600;*
- *Volumes of proposed attenuation on the drainage sketch and advice from a blue roof specialist that the site can be drained effectively as proposed;*
- *Evidence to demonstrate that the drainage system would operate effectively and that a hydrobrake can be properly incorporated to discharge the site runoff and still provide positive drainage to the public sewer network via the existing sewer network; this should provide realistic design cover and invert levels that, at least, reflect the existing site and drainage levels.*

Such a system should be designed to accommodate all storms up to and including a 1:100 year storm with a 40% provision for climate change, such that flooding does not occur in any part of a building or in any utility plant susceptible to water, and shall demonstrate a runoff as close to greenfield as feasible with a minimum 50% reduction in run off rate. Details shall include a lifetime maintenance plan, and shall thereafter be retained and maintained in accordance with the approved details.

B) Prior to occupation of the development, evidence that the sustainable drainage system has been implemented in accordance with the approved details as part of the development shall be submitted to the Local Authority and approved in writing. The systems shall thereafter be retained and maintained in accordance with the approved maintenance plan.'

Existing Drainage

The Thames Water sewer records (Appendix A) show that there is a 1549 x 991mm combined sewer in Kentish Town Road to the east. There is also a 1219mm storm relief sewer in Kentish Town.

The topographical survey (Appendix B) shows that there are existing gullies within the site boundary. A GPR survey was undertaken (Appendix C) which shows that the gully connections exit site to the west towards the public combined sewer but the connection was not proved and so further investigation on site will be required to determine whether it can be reused.

Drainage Strategy Overview

The surface water drainage strategy consists of blue roofs that serve the roof drainage and channel drains that serve the external areas. The blue roofs will be designed by a specialist and will restrict the discharge rate to a total of 2 l/s. The discharge rate from the entire site is proposed to be restricted to 4.5 l/s by a Hydro-Brake flow control device and the remaining attenuation storage is provided in the proposed manholes and pipework. The surface water drainage proposals are shown on drawing 26778/6001 P01 available within Appendix D.

Existing Run-off Rate

The total site area is approximately 370m^2 or 0.037 ha, which is all currently impermeable.

The existing run-off rate for the 1 in 100-year storm event was calculated using the modified rational method as shown below:

Qx = 2.78 x i x A

Where 'x' is the return period in years, 'A' is the catchment area in ha and 'i' is the rainfall intensity in mm/hr as estimated from Micro Drainage software.

Q1 = 2.78 x 46.1 x 0.037 = 4.70 l/sec
Q30 = 2.78 x 112.2 x 0.037 = 11.60 l/sec
Q100 = 2.78 x 147.3 x 0.037 = 15.20 l/sec

The existing Greenfield run-off rates for storm events of several different return periods were calculated using the Greenfield Runoff Estimator tool from uksuds.com as shown in the table below. Supporting documentation is contained in Appendix E.

Qbar = 0.19 l/sec
Q_1 = 0.16 l/sec
Q_{30} = 0.42 l/sec
Q_{100} = 0.59 l/sec

Revised Below Ground Drainage Design

The below ground drainage design has been developed from the sketch that was submitted at planning stage, 26778/SK600. The previous design proposed permeable paving in the external areas, blue roofs and a flow control restricting to 1.8 l/s. It also noted that the existing connection to the public sewer would be reused.

The permeable paving has been removed from the revised design (Appendix D) as it is impractical to implement with the proposed structural works. Surface water will be collected from the external areas with channel drains along the perimeter of the site.

The revised design proposes a new connection to the public combined sewer in Kentish Town Road to the east. The preference is to reuse the existing connection from the gullies located in the existing site but further investigation is required to confirm whether it is possible.

The surface water discharge rate is proposed to be restricted to 4.5/s, which is the minimum rate possible whilst maintaining a 100mm opening within the Hydro-Brake flow control device in accordance with section C7.12.3a of the Sewerage Sector Guidance Appendix C – The Design and Construction Guidance (May 2021). Proposed design drawings and hydraulic characteristics for the Hydro-Brake are contained within Appendix F.

Blue Roof Drainage Strategy

The design of the blue roof systems is being carried out by a specialist. There are two blue roof systems proposed; Blue Roof Type 4 located to the south east and Blue Roof Type 5 located to the north west. Blue Roof Type 4 is proposed to restrict the total discharge rate to 1.44 l/s and Blue Roof Type 5 to 0.42 l/s. The blue roofs serve a total impermeable area of 183m^2. The calculations from the blue roof specialist are available within Appendix G.

The blue roofs provide a total of approximately 10.3m^3 of attenuation storage. The planning condition states that the blue roofs are to provide 20m^3 of attenuation storage, however, this is not possible based on the current proposals as the available roof areas have reduced since the initial planning application and the roofs have been designed to restrict to the minimum possible rates.

Hydraulic Calculations

A hydraulic analysis of the proposed surface water drainage scheme has been carried out in MicroDrainage and the results are available within Appendix H. The critical results have been provided for the 15 minute – 1440 minute storm durations based on the FSR rainfall data for the 1, 30 and 100 year + 40% climate change return period storm events, in accordance with Section 3.13 of Camden Planning Guidance for Water and Flooding (March 2019) (CPGWF). The results show that no flooding will occur for all storm events up to and including the 100 year + 40% climate change event which is in accordance with Section 3.4 of CPGWF guidance for surface water drainage. A revised Camden SuDS Proforma is available in Appendix I.

Exceedance

The exceedance flow paths positively drain the surface water away from the building thresholds toward perimeter channel drain, this has been shown on the exceedance flow paths included in Appendix J.

Surface Water Maintenance and Management Plan

The successful implementation and operation of a SuDS system depends on a robust and clear maintenance strategy being implemented. The following measures should form part of the site's proposed management plan.

The site drainage system is proposed to remain private. The SuDS will be maintained by Hotblack Desiato and will form part of the overall maintenance regime for the site.

SuDS Element	Maintenance		
	Activity	**Required Action**	**Typical Frequency**
Blue/Green Roofs	**Monitoring / Inspections**	Inspect all components including, drains, membranes and roof structure for proper operation, integrity of waterproofing and structural stability	Annually and after severe storms
		Inspect soil substrate for evidence of erosion channels and identify any sediment sources	
		Inspect drain inlets to ensure unrestricted runoff from the drainage layer to the conveyance or roof drain system	
		Inspect underside of roof for evidence of leakage	
	Regular Maintenance	Remove debris and litter to prevent clogging of inlet drains and interference with plant growth	Half yearly and annually or as required
		During establishment i.e. year one, replace dead plants as required	Monthly -but usually responsibility of manufacturer
		Post establishment, replace dead plants where > 5% of coverage	Annually in autumn
		Remove fallen leaves and debris from deciduous plant foliage	Half yearly or as required
		Remove nuisance and invasive vegetation, including weeds	
		Mow grasses, prune shrubs and manage other planting (if appropriate) as required – clippings should be removed and not allowed to accumulate	
	Remedial Actions	If drain inlet has settled, cracked or moved, investigate and repair as appropriate	As required

SuDS Element	Maintenance		
	Activity	**Required Action**	**Typical Frequency**
		If erosion channels are evident, these should be stabilised with extra soil substrate similar to the original material, and sources of erosion damage should be identified and controlled	

VORTEX FLOW CONTROL UNIT MAINTENANCE SCHEDULE

The flow control unit's function is to control the flow of surface water from the site. The units are located at the downstream end of the system.

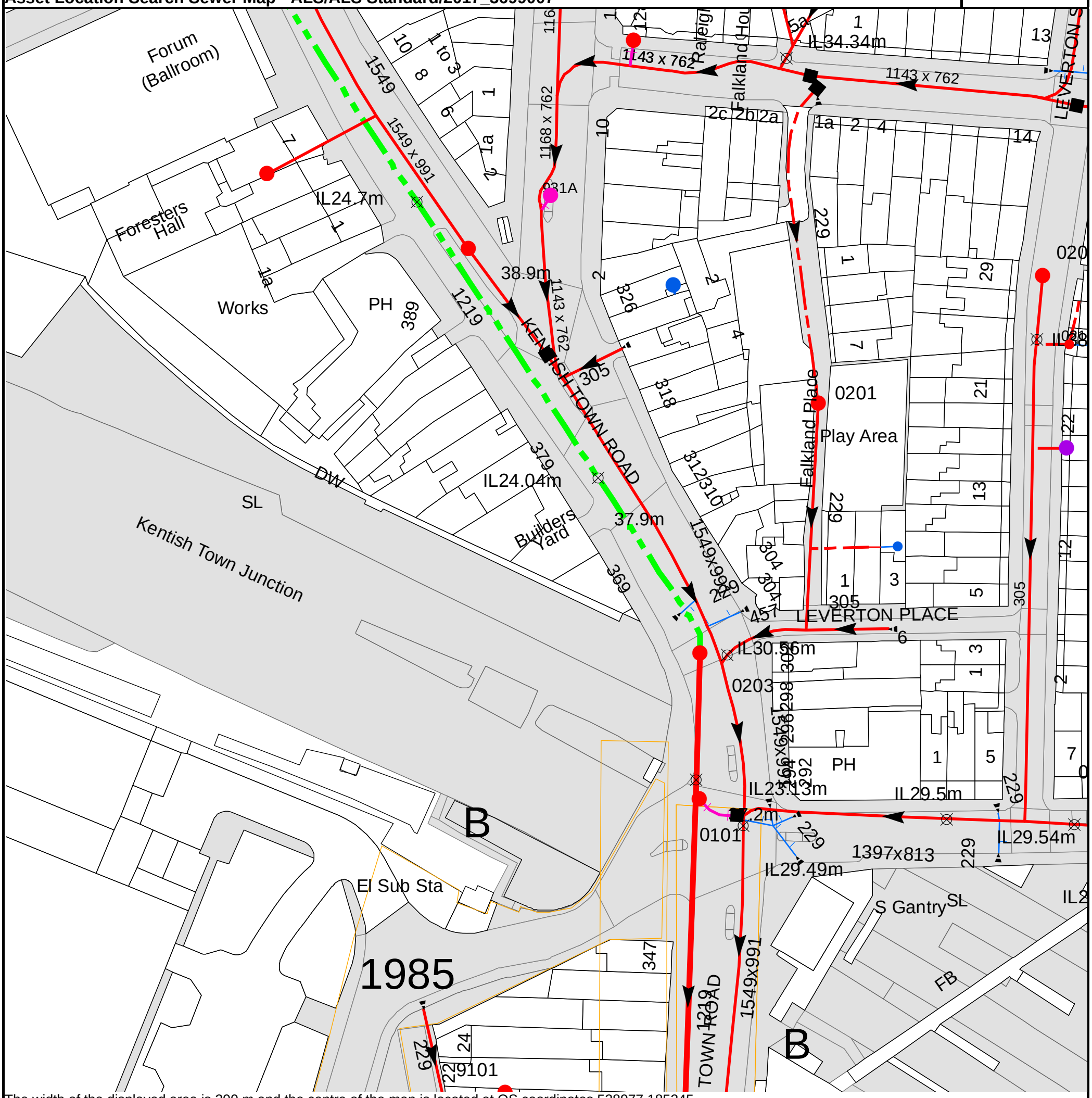
Maintenance Schedule for Hydrobrakes

MAINTENANCE SCHEDULE	REQUIRED ACTION	FREQUENCY
Before start	Removal of any inappropriate material from within the chambers and dispose off-site.	At start
Regular Maintenance	Removal of debris (which could include leaves, rubbish and branches) from areas served by the drainage (where it may cause risk to performance).	Monthly
Remedial Actions	For blockages resulting in flooded manhole chambers, drain down manhole chamber and unblock.	As required
Monitoring	Inspect unit and hose down is required.	Monthly at the start for three months, then six monthly.

Source : http:/www.hydro-international.biz/stormwater/flowcontrol_maintenance.php

Appendix A
Thames Water Sewer Records

Asset Location Search Sewer Map - ALS/ALS Standard/2017_3699007



The width of the displayed area is 200 m and the centre of the map is located at OS coordinates 528977,185245

The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

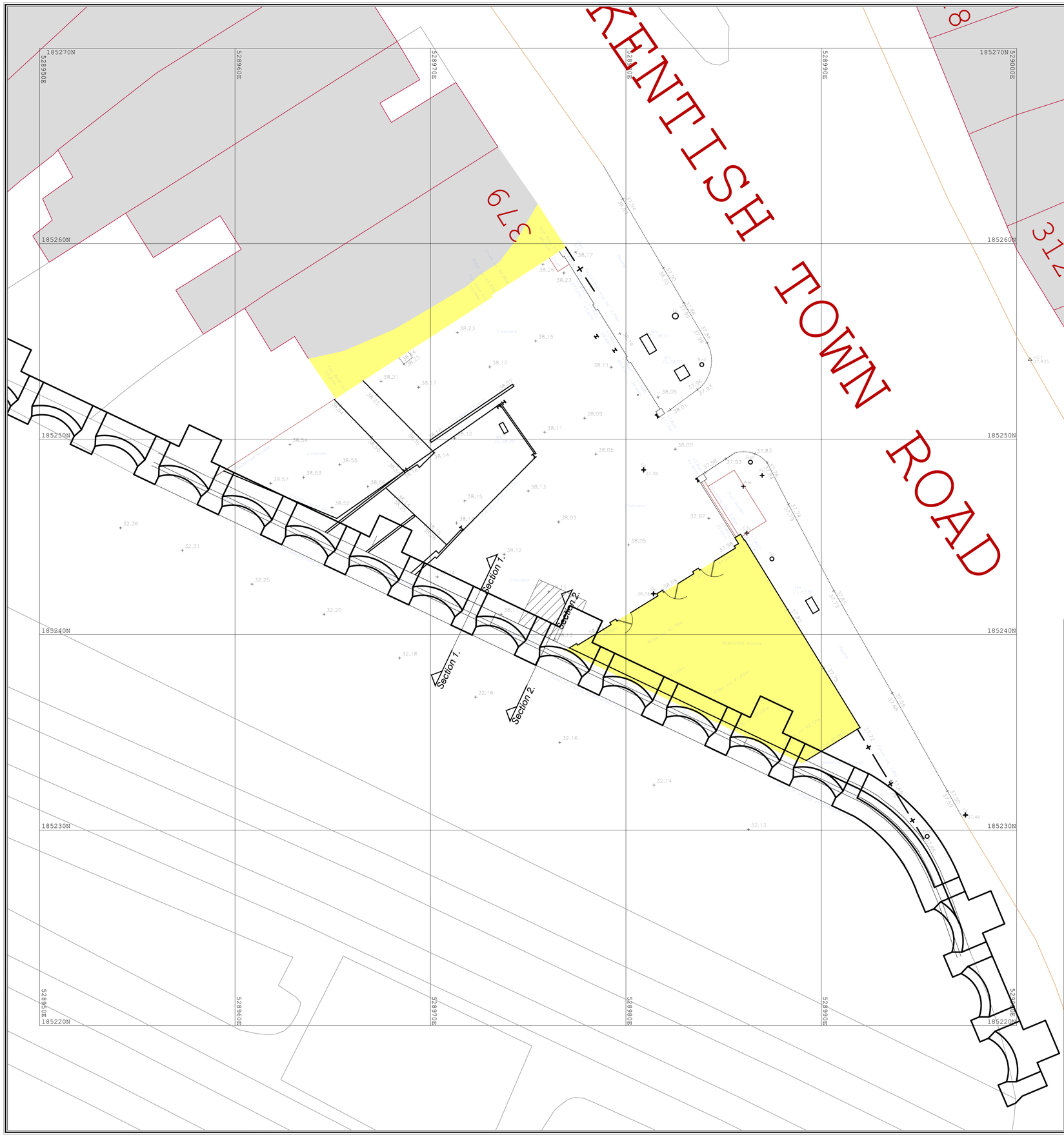
Based on the Ordnance Survey Map with the Sanction of the controller of H.M. Stationery Office, License no. 100019345 Crown Copyright Reserved.

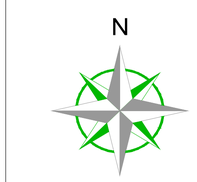
NB. Levels quoted in metres Ordnance Newlyn Datum. The value -9999.00 indicates that no survey information is available

Manhole Reference	Manhole Cover Level	Manhole Invert Level
0201	38.47	36.57
021A	n/a	n/a
02AG	n/a	n/a
0202	40.68	39.43
931B	n/a	n/a
931A	38.9	n/a
9303	n/a	n/a
0101	n/a	n/a
0203	37.35	23.64
021D	n/a	n/a
021C	n/a	n/a
93DD	n/a	n/a

The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

Appendix B
Topographical Survey





Survey Control Details.

Stn.	Eastings.	Northings.	Level.
HC1.	529000.683	185254.073	37.835
HC2.	529008.346	185241.941	37.608	

OS Note:

Some services may have been omitted due to parked vehicles. The Ordnance Survey tile is to be used as a guide only.

OS Buildings *Surveyed Buildings*

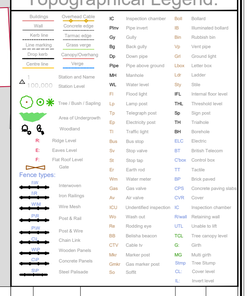
This survey has been orientated to the Ordnance Survey (O.S) National Grid (OSGB36) via Global Navigational Satellite Systems (GNSS) and the O.S. Active Network (OS Net).

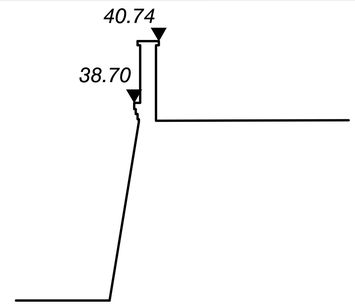
A true OSGB36 coordinate has been established near to the site centre via a transformation using the OSTN02 & OSGM02 transformation models.
The survey has been correlated to this point and a further one or more OSGB36 points established to create a true O.S. bearing for angle orientation.

No scale factor has been applied to the survey therefore the coordinates shown are arbitrary & not true O.S. Coordinates which have a scale factor applied.

Please refer to Survey Station Table to enable establishment of the on-site grid.

Topographical Legend:





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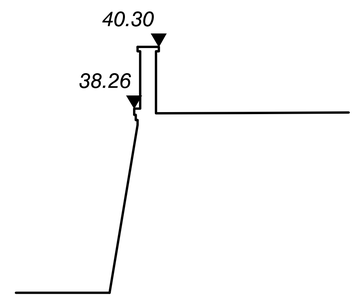
Section 1.



Datum: 30.00m.
Section 2.

Rev	Date	Description	Drawn	Q. Ref

greenhatch group

- Topographical Surveys
- Site Engineering
- Utility / CCTV Surveys
- Measured Building Surveys
- 3D Laser Scanning
- Revit & BIM Models

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PROJECT
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TITLE
Topographical Survey

SCALE	DATE
A1@ 1: 100	18.10.17
DRAWN	QUALITY REF
HC	GH1727

Level datum	OS GPS
Grid orientation	OS GPS
Job number	28520
Drawing No.	Rev.
28520_01_PS	0

Comments
This plan should only be used for its original purpose. Greenhatch Group accepts no responsibility for this plan if supplied to any party other than the original client.
All dimensions should be checked on site prior to design and construction.
Drainage information (where applicable) has been visually inspected from the surface and therefore should be treated as approximate only.

Notes:

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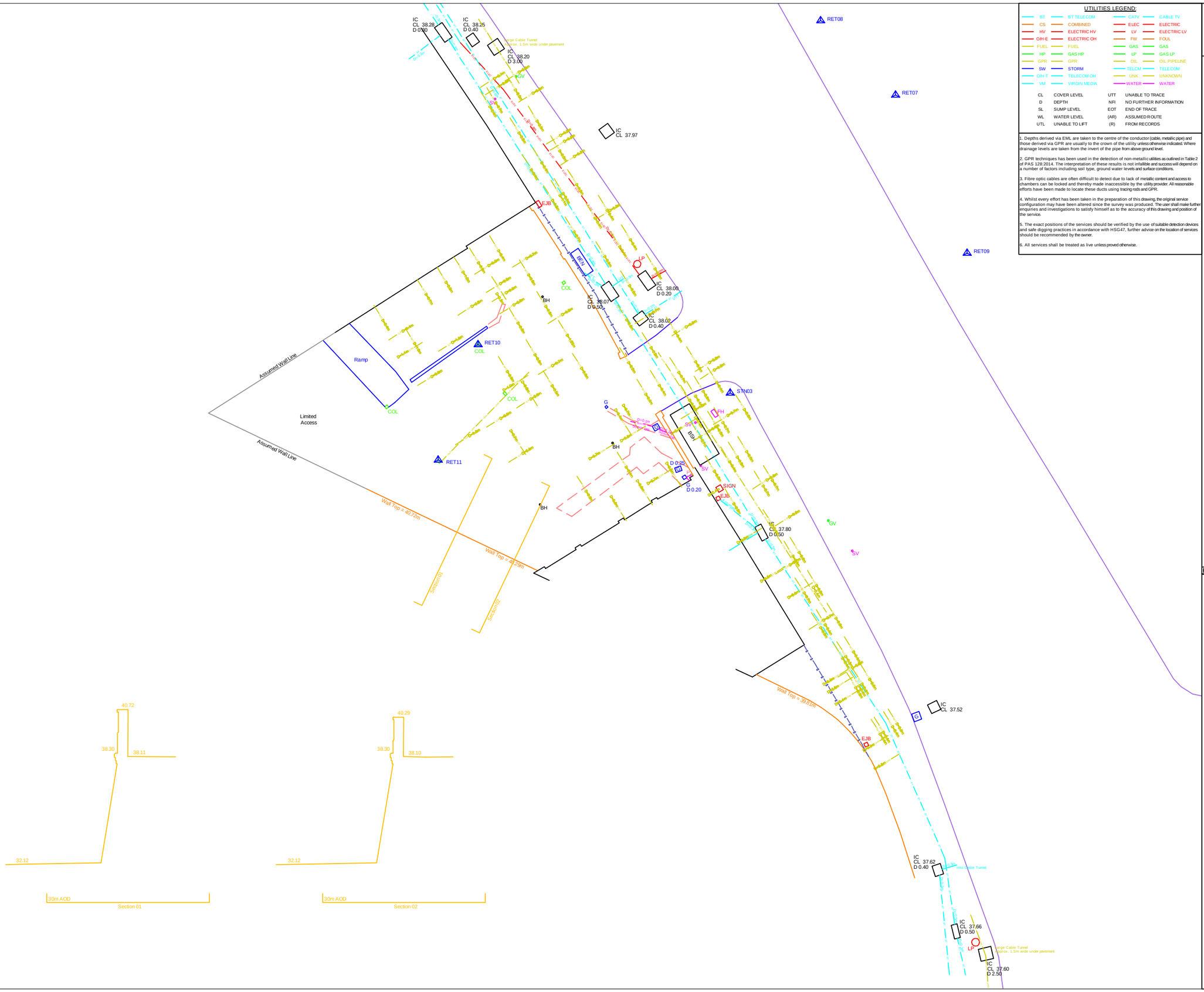
Appendix C
GPR Survey



UTILITIES LEGEND:

BT	BT TELECOM	CATV	CABLE TV
CS	COMBINED	ELEC	ELECTRIC
HV	ELECTRIC HV	LV	ELECTRIC LV
OH-E	ELECTRIC OH	FW	FOUL
FUEL	FUEL	GAS	GAS
HP	GAS HP	LP	GAS LP
GPR	GPR	OIL	OIL PIPELINE
SW	STORM	TELCM	TELECOM
OH-T	TELECOM OH	UNK	UNKNOWN
VM	VIRGIN MEDIA	WATER	WATER

CL	COVER LEVEL	UTT	UNABLE TO TRACE
D	DEPTH	NFI	NO FURTHER INFORMATION
SL	SUMP LEVEL	EOT	END OF TRACE
WL	WATER LEVEL	(AR)	ASSUMED ROUTE
UTL	UNABLE TO LIFT	(R)	FROM RECORDS

1. Depths derived via EML are taken to the centre of the conductor (cable, metallic pipe) and those derived via GPR are usually to the crown of the utility unless otherwise indicated. Where drainage levels are taken from the invert of the pipe from above ground level.

2. GPR techniques has been used in the detection of non-metallic utilities as outlined in Table 2 of PAS 128:2014. The interpretation of these results is not infallible and success will depend on a number of factors including soil type, ground water levels and surface conditions.

3. Fibre optic cables are often difficult to detect due to lack of metallic content and access to chambers can be locked and thereby made inaccessible by the utility provider. All reasonable efforts have been made to locate these ducts using tracing rods and GPR.

4. Whilst every effort has been taken in the preparation of this drawing, the original service configuration may have been altered since the survey was produced. The user shall make further enquiries and investigations to satisfy himself as to the accuracy of this drawing and position of the service.

5. The exact positions of the services should be verified by the use of suitable detection devices and safe digging practices in accordance with HSG47, further advice on the location of services should be recommended by the owner.

6. All services shall be treated as live unless proved otherwise.

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NOTES

This drawing is related to OS Grid and Ordnance Survey Newlyn Level Datum. The drawing is orientated to North

ABBREVIATIONS:

BA	BARRIER	LBN	LITTER BIN
BE	BEAM	LI	LIGHT
BEN	BENCH	LP	LAMP POST
BG	BOX GUTTER	MA	MAST
BH	BOREHOLE	MB	METAL BASE
BO	BOLLARD	MF	MANHOLE FOUL
BS	BUS STOP	MH	MANHOLE
BSH	BUS SHELTER	MRK	MARKER
CATS	CATS EYE	MS	MANHOLE STORM
CATV	CATV COVER	NB	NOTICE BOARD
CB	CONTROL BOX	P	PIPE
CCTV	CCTV CAMERA	PB	POST BOX
CL	COVER LEVEL	PI	PILE
COL	COLUMN	PM	PARKING METER
COMMS	COMMUNICATIONS COVER	PO	POST
CONC	CONCRETE	RG	ROAD GULLY
CP	CATCHPIT	RL	RAILING
DU	DUCT	ROD	RODDING EYE
ECP	ELECTRIC CABLE PIT	RP	RAINWATER PIPE
EJB	ELECTRIC JUNCTION BOX	RS	ROAD SIGN
EP	EARTHING POINT	SFL	SOFFIT LEVEL
EPP	ELECTRIC POLE PYLON	SIGN	SIGN
FA	FIRE ALARM	SR	SPEED RESTRICTION
FE	FIRE EXTINGUISHER	SL	SUMP LEVEL
FIG	FEEDS INTO GROUND	SV	STOP VALVE
FH	FIRE HYDRANT	TB	TICKET BARRIER
FLT	FLOODLIGHT	TCB	TELEPHONE CALL BOX
G	GULLY	TH	TRIAL HOLE
GBN	GRIT BIN	TI	TELECOM IC
GV	GAS VALVE	TL	TRAFFIC LIGHT
HIC	HEATING IC	TP	TELEGRAPH POLE
IC	INSPECTION COVER	WL	WATER LEVEL
IL	INVERT LEVEL	WM	WATER METER
LA	LADDER	WS	WINDOW SAMPLE

Rev	Description	Checked By	Date

Project
Kentish Town Car Wash

Drawing Title
Topographic, Utility and Section Survey

MURPHY
WORLD-CLASS INFRASTRUCTURE

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QA System - Checks		Date
Drawn By:	A Mazzey	16/05/22
Checked:	A Mistry	16/05/22

Contract No:	Drawing Status:	Scale:	Paper Size:
FOL901	INFORMATION	1:200	A3

Drawing No
FOL901-JMS-XX-XX-DR-0001

Revision
0

Appendix D
Drainage Plans

DRAINAGE LEGEND

Site Boundary	
New FW Drain	
New SW Drain	
New Combined Sewer	
Rising Main	
Demolished/Abandoned	
Indicative Blue Roof Extents	

DRAINAGE KEY

RWP	Rainwater Down Pipe
FWP	Foul Waste Pipe
FG	Floor Gully
CD/BS	Channel Drain / Brick Slot
FCMH1	Flow Control Chamber (SW only)
C1	Combined Water Manhole Chamber

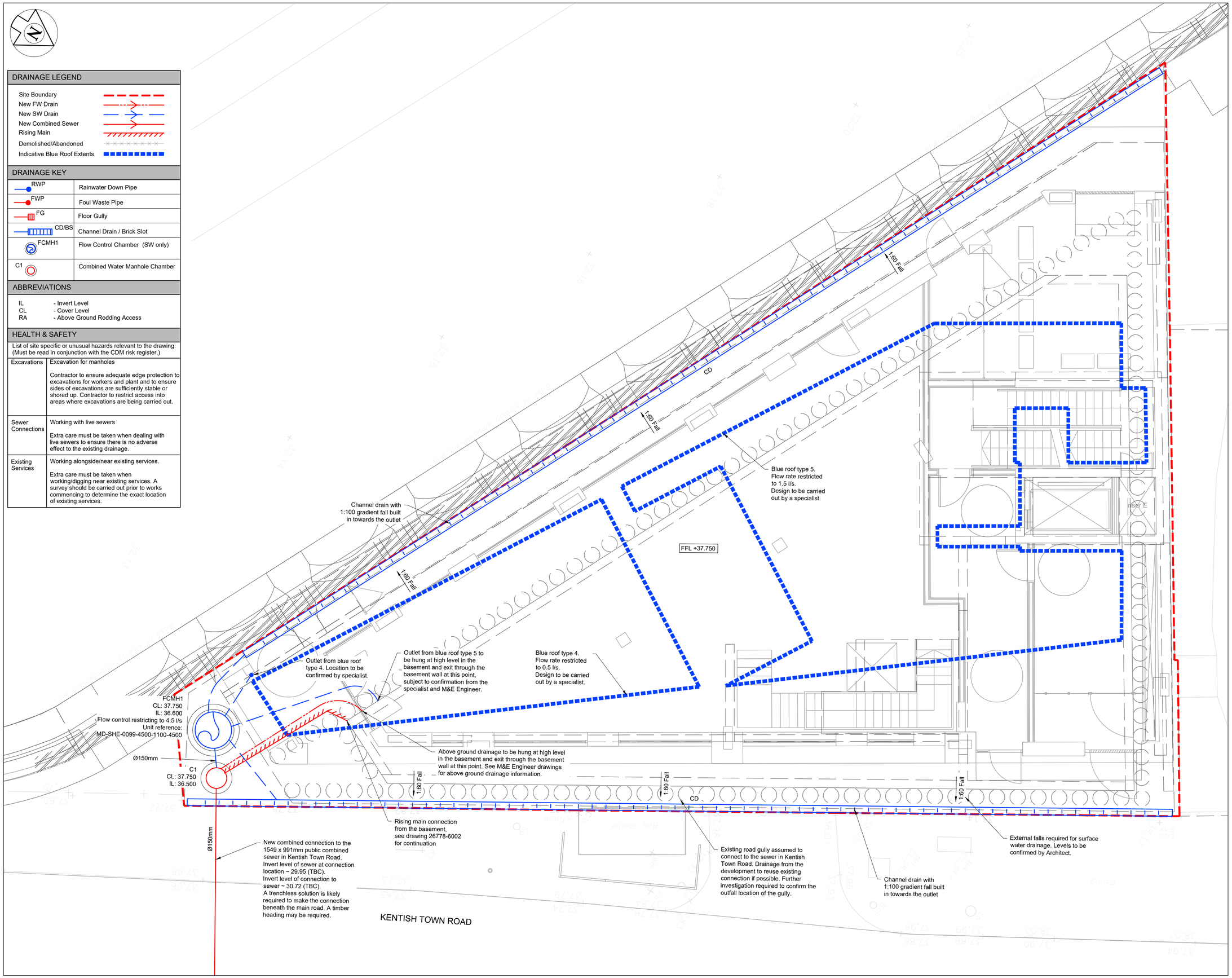
ABBREVIATIONS

IL - Invert Level
CL - Cover Level
RA - Above Ground Rodding Access

HEALTH & SAFETY

List of site specific or unusual hazards relevant to the drawing: (Must be read in conjunction with the CDM risk register.)

Excavations	Excavation for manholes Contractor to ensure adequate edge protection to excavations for workers and plant and to ensure sides of excavations are sufficiently stable or shored up. Contractor to restrict access into areas where excavations are being carried out.
Sewer Connections	Working with live sewers Extra care must be taken when dealing with live sewers to ensure there is no adverse effect to the existing drainage.
Existing Services	Working alongside/near existing services. Extra care must be taken when working/digging near existing services. A survey should be carried out prior to works commencing to determine the exact location of existing services.



NOTES :

1. This drawing is to be read in conjunction with all relevant Architect's, Engineer's and specialists' drawings and specifications.
2. Do not scale from this drawing in either paper or digital form. Use written dimensions only. To check that this drawing has been printed to the intended scale this bar should be 50mm long @ A1 or 25mm long @ A3.
3. Health & Safety :
   All specific drawing notes are to be read in conjunction with the project "Information Pack" and "Site Rules".
4. All drainage shown indicatively only.
5. Finish floor level (FFL) and external levels to be confirmed by the Architect.
6. The location of all RWPs and FWPs to be confirmed by the Architect and M&E Engineer.
7. All pipework to be 100mm in diameter U.N.O.
8. Internal pipework to be cast iron. All external pipework to be uPVC.
9. Blue-roof outlets to restrict the surface water flows to a total of 2 l/s. Design to be carried out by the blue-roof specialist.
10. New connection to the Thames Water public combined sewer subject to Section 106/107 agreement.
11. All existing disused drainage to be demolished/ abandoned.

Rev	Date	Drawn	Eng	Amendment
P02	20.07.22	DLa	TS	Issued for Information
P01	13.07.22	DLa	TS	Issued for Information

KENTISH TOWN ROAD

BELOW GROUND DRAINAGE LAYOUT

GROUND FLOOR

Status
FOR INFORMATION
NOT FOR CONSTRUCTION

Drawn	AC	Eng	YA
Scales	1:50 at A1		1:100 at A3
Drawing No	26778/6001	Rev	P02
Doc Ref.	0000-PAM-ZZ-00-DR-C-6001		

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Appendix E
Greenfield Runoff Rate Calculations

HR Wallingford
Working with water

Greenfield runoff estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by:	Enrique Rodriguez Madrid
Site name:	26778 Kentish Town
Site location:	NW5 2TJ

This is an estimation of the greenfield runoff rate limits that are needed to meet normal best practice criteria in line with Environment Agency guidance "Preliminary rainfall runoff management for developments", W5-074/A/TR1/1 rev. E (2012) and the SuDS Manual, C753 (Ciria, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Site coordinates

Latitude:	51.55135° N
Longitude:	0.14106° W

Reference:	6507932
Date:	2018-12-18T15:16:49

Methodology	FEH Statistical

Site characteristics

Total site area (ha)	0.1

Methodology

Qmed estimation method	Calculate from BFI and SAAR
BFI and SPR estimation method	Specify BFI manually
HOST class	N/A
BFI / BFIHOST	0.2
Qmed (l/s)	NaN
Qbar / Qmed Conversion Factor	1.14

Hydrological characteristics

	Default	Edited
SAAR (mm)	641	641
Hydrological region	6	6
Growth curve factor: 1 year	0.85	0.85
Growth curve factor: 30 year	2.3	2.3
Growth curve factor: 100 year	3.19	3.19

Notes:

(1) Is Q_{BAR} < 2.0 l/s/ha?

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consents are usually set at 5.0l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set in which case blockage work must be addressed by using appropriate drainage elements

(3) Is SPR/SPRHOST ≤ 0.3?

Interpolating for a 0.037Ha:
1 in 1=0.16 l/s
1 in 30=0.42 l/s
1 in 100=0.59 l/s

Greenfield runoff rates

	Default	Edited
Qbar (l/s)	NaN	0.5
1 in 1 year (l/s)	NaN	0.42
1 in 30 years (l/s)	NaN	1.14
1 in 100 years (l/s)	NaN	1.59

This report was produced using the greenfield runoff tool developed by HR Wallingford and available at www.uksuds.com. The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at http://uksuds.com/terms-and-conditions.htm. The outputs from this tool have been used to estimate storage volume requirements. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, CEH, Hydrosolutions or any other organisation for use of this data in the design or operational characteristics of any drainage scheme.

Appendix F
Hydro-Brake Drawing and Specification

Technical Specification

Control Point	Head (m)	Flow (l/s)
Primary Design	1.100	4.500
Flush-Flo™	0.329	4.500
Kick-Flo®	0.693	3.636
Mean Flow		3.933

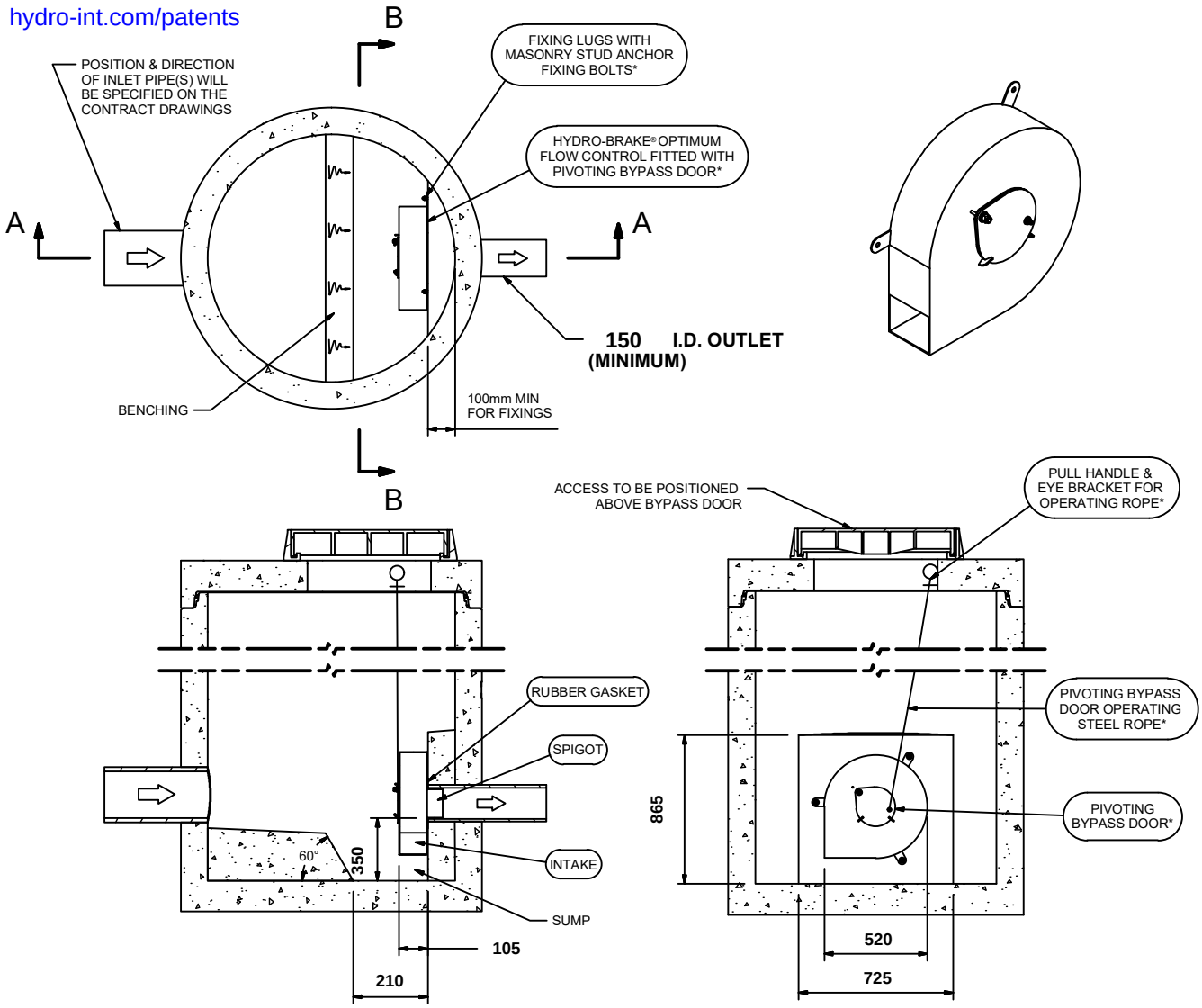
Hydro-Brake® Optimum Flow Control including:

- 3 mm grade 304L stainless steel
- Integral stainless steel pivoting by-pass door allowing clear line of sight through to outlet, c/w stainless steel operating rope
- Beed blasted finish to maximise corrosion resistance
- Stainless steel fixings
- Rubber gasket to seal outlet
- Indicative Weight: 127 kg

BBA APPROVAL INSPECTION TESTING CERTIFICATION CERTIFICATE 08/4596

WRc Approved PT/329/0412

hydro-int.com/patents



SECTION A-A

SECTION B-B

IMPORTANT: ⬭ LIMIT OF HYDRO INTERNATIONAL SUPPLY
THE DEVICE WILL BE HANDED TO SUIT SITE CONDITIONS
FOR SITE SPECIFIC DETAILS AND MINIMUM CHAMBER SIZE REFER TO HYDRO INTERNATIONAL
ALL CIVIL AND INSTALLATION WORK BY OTHERS
* WHERE SUPPLIED
HYDRO-BRAKE® FLOW CONTROL & HYDRO-BRAKE® OPTIMUM FLOW CONTROL ARE REGISTERED TRADEMARKS FOR FLOW CONTROLS DESIGNED AND MANUFACTURED EXCLUSIVELY BY HYDRO INTERNATIONAL

THIS DESIGN LAYOUT IS FOR ILLUSTRATIVE PURPOSES ONLY. NOT TO SCALE.

DESIGN ADVICE

The head/flow characteristics of this SHE-0099-4500-1100-4500 Hydro-Brake® Optimum Flow Control are unique. Dynamic hydraulic modelling evaluates the full head/flow characteristic curve.
The use of any other flow control will invalidate any design based on this data and could constitute a flood risk.

Hydro International®

DATE	7/19/2022 2:34 PM
SITE	369-377 Kentish Town Road
DESIGNER	Alfie Ruff
REF	26788

SHE-0099-4500-1100-4500
Hydro-Brake® Optimum

© 2022 Hydro International Ltd, Shearwater House, Clevedon Hall Estate, Victoria Road, Clevedon, BS21 7RD. Tel; 01275 878371 Fax; 01275 874979 Web; www.hydro-int.com Email; enquiries@hydro-int.com

aruff@pricemyers.com

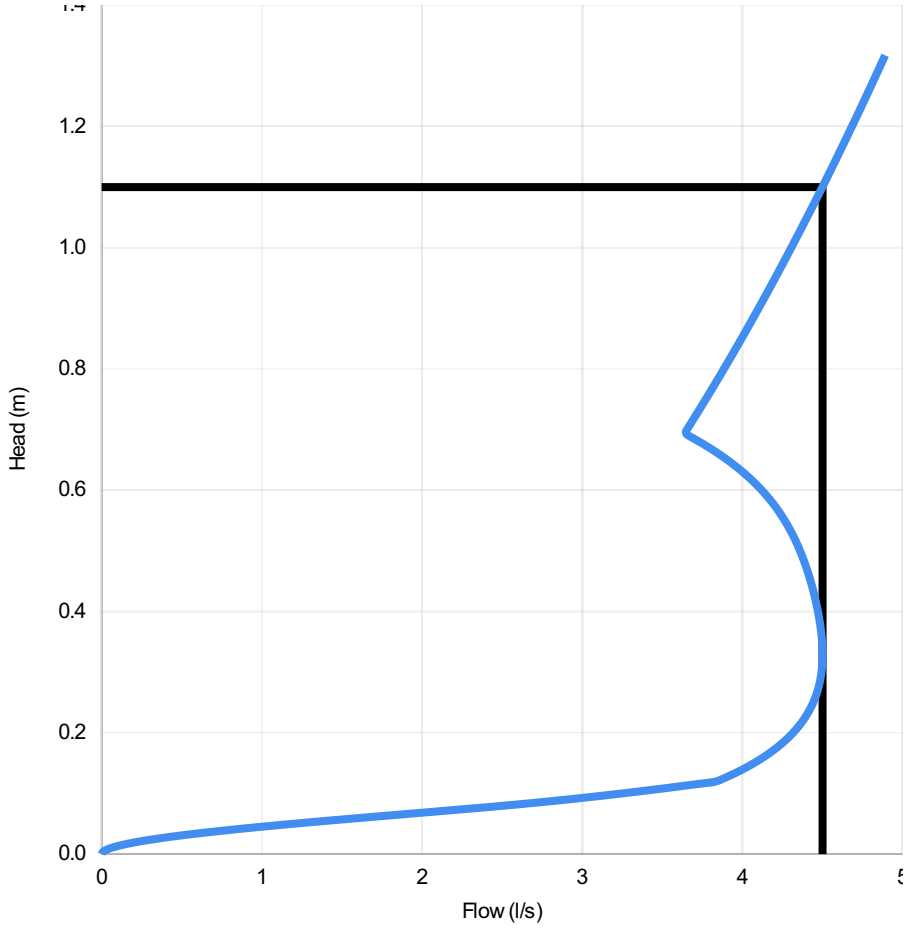
Technical Specification

Control Point	Head (m)	Flow (l/s)
Primary Design	1.100	4.500
Flush-Flo	0.329	4.500
Kick-Flo®	0.693	3.636
Mean Flow		3.933

BBA APPROVAL INSPECTION TESTING CERTIFICATION
CERTIFICATE No 08/4596

WRc APPROVED
PT/329/0412

hydro-int.com/patents



Head (m)	Flow (l/s)
0.000	0.000
0.038	0.729
0.076	2.338
0.114	3.668
0.152	4.082
0.190	4.276
0.228	4.397
0.266	4.464
0.303	4.495
0.341	4.499
0.379	4.485
0.417	4.458
0.455	4.420
0.493	4.370
0.531	4.305
0.569	4.217
0.607	4.096
0.645	3.932
0.683	3.713
0.721	3.702
0.759	3.790
0.797	3.876
0.834	3.960
0.872	4.042
0.910	4.122
0.948	4.200
0.986	4.277
1.024	4.352
1.062	4.426
1.100	4.499

DESIGN ADVICE

The head/flow characteristics of this SHE-0099-4500-1100-4500 Hydro-Brake Optimum® Flow Control are unique. Dynamic hydraulic modelling evaluates the full head/flow characteristic curve.

! **The use of any other flow control will invalidate any design based on this data and could constitute a flood risk.**

Hydro International®

DATE	19/07/2022 14:34
Site	369-377 Kentish Town Road
DESIGNER	Alfie Ruff
Ref	26788

SHE-0099-4500-1100-4500

Hydro-Brake Optimum®

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Appendix G
Blue Roof Calculations

Radmat Building Products Ltd
Holland House
Valley Way, Rockingham Road
Market Harborough LE16 7PS
Tel 01858 410372
techenquiries@radmat.com

Client:

Project: Kentish Town Carwash

Reference: BR-7486-02 Designer: N.Todd Date: 29/06/2022

Location: Kentish Town

Roof Location: Roof Type 4

Roof Details:

BlueRoof	94 m²	x 100 %
Additional Area	21 m²	x 100 %
Effective Area	115 m²	

Storage Details:

Length	94 m
Width	1 m
Depth	65 mm
Porosity	95 %

Rainfall Details - FEH Method:

Return Period	100 years
Climate Change Factor	40 %

Summer Storm Profile

Duration	Intensity mm	mm/h	Required storage(m³)
5 min	25.1	301.8	2.7
10 min	35.9	215.2	3.7
15 min	44.1	176.5	4.4
30 min	56.7	113.5	5.0
45 min	64.0	85.4	5.2
60 min	69.2	69.2	5.3
2 hours	88.6	44.3	5.5
6 hours	120.2	20.0	4.2
24 hours	146.8	6.1	1.3

Outflow Details:

Attenuation Control	Orifice Plate
Control Diameter	26 mm
Discharge rate	1.44 l/s
Outlet	4 No
Flow Per Outlet	0.36 l/s

Result:

Outcome	Pass
Critical Storm Duration	1.95 hrs
Hmax	61 mm
Required Volume	5.5 m³
Time to half empty	31.6 min
Roof Loading	58.51 Kg/m²

Blue Roof calculation service is provided in good faith using the information supplied to us in the brief and the stated parameters in the calculation.
If any of these parameters are incorrect or have been superseded, Radmat should be contacted to provide updated calculations.
References should be made to any relevant codes of practice.
Final determination of the suitability of any system is the sole responsibility of the user.
Radmat obligations in respect of any sale of its products are governed by the respective sales contract.

Radmat Building Products Ltd
Holland House
Valley Way, Rockingham Road
Market Harborough LE16 7PS
Tel 01858 410372
techenquiries@radmat.com

Client:

Project: Kentish Town Carwash

Reference: BR-7486-02 Designer: N.Todd Date: 29/06/2022

Location: Kentish Town

Roof Location: Roof Type 5

Roof Details:

BlueRoof	47 m²	x 100 %
Additional Area	21 m²	x 100 %
Effective Area	68 m²	

Storage Details:

Length	47 m
Width	1 m
Depth	100 mm
Porosity	95 %

Rainfall Details - FEH Method:

Return Period	100 years
Climate Change Factor	40 %

Summer Storm Profile

Duration	Intensity mm	mm/h	Required storage(m³)
5 min	25.1	301.8	1.7
10 min	35.9	215.2	2.3
15 min	44.1	176.5	2.8
30 min	56.7	113.5	3.5
45 min	64.0	85.4	3.7
60 min	69.2	69.2	3.8
2 hours	88.6	44.3	4.3
6 hours	120.2	20.0	4.1
24 hours	146.8	6.1	2.0

Outflow Details:

Attenuation Control	Orifice Plate
Control Diameter	25 mm
Discharge rate	0.42 l/s
Outlet	1 No

Result:

Outcome	Pass
Critical Storm Duration	3.67 hrs
Hmax	98 mm
Required Volume	4.4 m³
Time to half empty	1.4 hrs
Roof Loading	93.62 Kg/m²

Blue Roof calculation service is provided in good faith using the information supplied to us in the brief and the stated parameters in the calculation.
If any of these parameters are incorrect or have been superseded, Radmat should be contacted to provide updated calculations.
References should be made to any relevant codes of practice.
Final determination of the suitability of any system is the sole responsibility of the user.
Radmat obligations in respect of any sale of its products are governed by the respective sales contract.

Appendix H
Hydraulic Calculations

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	100	PIMP (%)	100
M5-60 (mm)	21.000	Add Flow / Climate Change (%)	0
Ratio R	0.439	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.033	4-8	0.004

Total Area Contributing (ha) = 0.037

Total Pipe Volume (m³) = 0.199

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Network Classifications for Storm

PN	USMH Name	Pipe Dia (mm)	Min Cover Depth (m)	Max Cover Depth (m)	Pipe Type	MH Dia (mm)	MH Width (mm)	MH Ring Depth (m)	MH Type
S1.000	SCD1	150	0.850	1.000	Unclassified	1200	0	0.850	Unclassified
S2.000	SDummy 1	150	0.100	0.300	Unclassified	1200	0	0.100	Unclassified
S2.001	SBlue roof	150	0.300	0.661	Unclassified	1200	0	0.300	Unclassified
S1.001	SFCMH1	150	1.000	1.100	Unclassified	1200	0	1.000	Unclassified
S1.002	SC1	150	1.100	1.126	Unclassified	1200	0	1.100	Unclassified

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S1.002	S	37.750	36.474	0.000	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 2 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.800	Storm Duration (mins)	30
Ratio R	0.438		

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Online Controls for Storm

Orifice Manhole: SBlue roof, DS/PN: S2.001, Volume (m³): 0.5

Diameter (m) 0.144 Discharge Coefficient 0.600 Invert Level (m) 38.300

Hydro-Brake® Optimum Manhole: SFCMH1, DS/PN: S1.001, Volume (m³): 1.3

Unit Reference	MD-SHE-0099-4500-1100-4500
Design Head (m)	1.100
Design Flow (l/s)	4.5
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	99
Invert Level (m)	36.600
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.100	4.5	Kick-Flo®	0.693	3.6
Flush-Flo™	0.329	4.5	Mean Flow over Head Range	-	3.9

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	3.2	0.800	3.9	2.000	5.9	4.000	8.2	7.000	10.7
0.200	4.3	1.000	4.3	2.200	6.2	4.500	8.7	7.500	11.1
0.300	4.5	1.200	4.7	2.400	6.5	5.000	9.1	8.000	11.4
0.400	4.5	1.400	5.0	2.600	6.7	5.500	9.6	8.500	11.8
0.500	4.4	1.600	5.4	3.000	7.2	6.000	10.0	9.000	12.1
0.600	4.1	1.800	5.7	3.500	7.7	6.500	10.4	9.500	12.4

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Storage Structures for Storm

Complex Manhole: SBlue roof, DS/PN: S2.001

Cellular Storage

Invert Level (m) 38.300 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	94.0	0.0	0.065	94.0	0.0	0.066	0.0	0.0

Cellular Storage

Invert Level (m) 38.300 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	47.0	0.0	0.100	47.0	0.0	0.101	0.0	0.0

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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 2 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm)	20.800
Region	England and Wales	Ratio R	0.438
Cv (Summer)	0.750		
Cv (Winter)	0.840		

Margin for Flood Risk Warning (mm)	0.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
S1.000	SCD1	15 Winter	1	+0%	30/15 Summer				36.783	-0.117
S2.000	SDummy 1	120 Winter	1	+0%					38.500	-0.150
S2.001	SBlue roof	240 Winter	1	+0%					38.316	-0.134
S1.001	SFCMH1	15 Winter	1	+0%	30/15 Summer				36.685	-0.065
S1.002	SC1	15 Winter	1	+0%					36.550	-0.100

PN	US/MH Name	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	SCD1	0.000	0.11		2.7	OK	
S2.000	SDummy 1	0.000	0.00		0.0	OK	
S2.001	SBlue roof	0.000	0.00		0.2	OK	
S1.001	SFCMH1	0.000	0.14		2.7	OK	
S1.002	SC1	0.000	0.25		2.7	OK	

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 2 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model		FSR M5-60 (mm) 20.800 Cv (Summer)	0.750
Region England and Wales		Ratio R 0.438 Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	0.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
S1.000	SCD1	15 Winter	30	+0%	30/15 Summer				36.947	0.047
S2.000	SDummy 1	120 Winter	30	+0%					38.500	-0.150
S2.001	SBlue roof	120 Winter	30	+0%					38.332	-0.118
S1.001	SFCMH1	15 Winter	30	+0%	30/15 Summer				36.942	0.192
S1.002	SC1	15 Winter	30	+0%					36.567	-0.083

PN	US/MH Name	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	SCD1	0.000	0.22		5.4	SURCHARGED	
S2.000	SDummy 1	0.000	0.00		0.0	OK	
S2.001	SBlue roof	0.000	0.01		0.6	OK	
S1.001	SFCMH1	0.000	0.23		4.5	SURCHARGED	
S1.002	SC1	0.000	0.41		4.5	OK	

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 2 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model		FSR M5-60 (mm) 20.800 Cv (Summer)	0.750
Region England and Wales		Ratio R 0.438 Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	0.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
S1.000	SCD1	15 Winter	100	+0%	30/15 Summer				37.194	0.294
S2.000	SDummy 1	120 Winter	100	+0%					38.500	-0.150
S2.001	SBlue roof	120 Winter	100	+0%					38.340	-0.110
S1.001	SFCMH1	15 Winter	100	+0%	30/15 Summer				37.190	0.440
S1.002	SC1	15 Summer	100	+0%					36.567	-0.083

PN	US/MH Name	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	SCD1	0.000	0.25		6.1	SURCHARGED	
S2.000	SDummy 1	0.000	0.00		0.0	OK	
S2.001	SBlue roof	0.000	0.01		0.9	OK	
S1.001	SFCMH1	0.000	0.23		4.5	SURCHARGED	
S1.002	SC1	0.000	0.41		4.5	OK	

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 2 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm)	20.800
Region	England and Wales	Ratio R	0.438
Cv (Summer)	0.750		
Cv (Winter)	0.840		

Margin for Flood Risk Warning (mm)	0.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	100
Climate Change (%)	40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
S1.000	SCD1	15 Winter	100	+40%	100/15 Summer				37.708	0.808
S2.000	SDummy 1	120 Winter	100	+40%					38.500	-0.150
S2.001	SBlue roof	120 Winter	100	+40%					38.353	-0.097
S1.001	SFCMH1	15 Winter	100	+40%	100/15 Summer				37.703	0.953
S1.002	SC1	15 Winter	100	+40%					36.567	-0.083

PN	US/MH Name	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	SCD1	0.000	0.30		7.4	SURCHARGED	
S2.000	SDummy 1	0.000	0.00		0.0	OK	
S2.001	SBlue roof	0.000	0.02		1.6	OK	
S1.001	SFCMH1	0.000	0.23		4.5	SURCHARGED	
S1.002	SC1	0.000	0.41		4.5	OK	

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Appendix I
Camden SuDS Proforma

Camden

GREATER**LONDON**AUTHORITY

LoDEG

1. Project & Site Details

Project / Site Name (including sub-catchment / stage / phase where appropriate)	369-377 Kentish Town Road
Address & post code	369-377 Kentish Town Road, Kentish Town, NW5 2TJ
OS Grid ref. (Easting, Northing)	E 528980
	N 185250
LPA reference (if applicable)	2019/0910/P
Brief description of proposed work	Redevelopment including change of use from car wash and erection of part six and part seven storey building plus basement.
Total site Area	370 m^2
Total existing impervious area	370 m^2
Total proposed impervious area	370 m^2
Is the site in a surface water flood risk catchment (ref. local Surface Water Management Plan)?	No
Existing drainage connection type and location	Existing road gullies assumed to connect to sewer but connection unproven.
Designer Name	Tom Spawton
Designer Position	Civil Engineer
Designer Company	Price & Myers

2. Proposed Discharge Arrangements

2a. Infiltration Feasibility

Superficial geology classification	None recorded
Bedrock geology classification	London Clay Formation
Site infiltration rate	0 m/s
Depth to groundwater level	? m below ground level
Is infiltration feasible?	No

2b. Drainage Hierarchy

	Feasible (Y/N)	*Proposed (Y/N)*
1 store rainwater for later use	N	N
2 use infiltration techniques, such as porous surfaces in non-clay areas	N	N
3 attenuate rainwater in ponds or open water features for gradual release	N	N
4 attenuate rainwater by storing in tanks or sealed water features for gradual release	Y	Y
5 discharge rainwater direct to a watercourse	N	N
6 discharge rainwater to a surface water sewer/drain	N	N
7 discharge rainwater to the combined sewer.	Y	Y

2c. Proposed Discharge Details

Proposed discharge location	Public combined sewer in Kentish Town Rd
Has the owner/regulator of the discharge location been consulted?	S106 application to be submitted

Camden

GREATERLONDONAUTHORITY

LoDEG

3. Drainage Strategy

3a. Discharge Rates & Required Storage

	Greenfield (GF) runoff rate (l/s)	*Existing discharge rate (l/s)*	*Required storage for GF rate (m^3)*	*Proposed discharge rate (l/s)*
Qbar	0.19			
1 in 1	0.16	4.7		2.7
1 in 30	0.42	11.6		4.5
1 in 100	0.59	15.2		4.5
1 in 100 + CC				4.5
Climate change allowance used		40%		
3b. Principal Method of Flow Control		Vortex flow control		

3c. Proposed SuDS Measures

	Catchment area (m^2)	*Plan area (m^2)*	*Storage vol. (m^3)*
Rainwater harvesting	0		0
Infiltration systems	0		0
Green roofs	0	0	0
Blue roofs	183	141	10.3
Filter strips	0	0	0
Filter drains	0	0	0
Bioretention / tree pits	0	0	0
Pervious pavements	0	0	0
Swales	0	0	0
Basins/ponds	0	0	0
Attenuation tanks	0		0
Total	**183**	**141**	**10.3**

4. Supporting Information

4a. Discharge & Drainage Strategy	*Page/section of drainage report*
Infiltration feasibility (2a) – geotechnical factual and interpretive reports, including infiltration results	Section 4.2 of initial FRA
Drainage hierarchy (2b)	Section 4 of initial FRA
Proposed discharge details (2c) – utility plans, correspondence / approval from owner/regulator of discharge location	S106 application to be submitted
Discharge rates & storage (3a) – detailed hydrologic and hydraulic calculations	Appendix H
Proposed SuDS measures & specifications (3b)	See report and appendices
4b. Other Supporting Details	*Page/section of drainage report*
Detailed Development Layout	See initial planning application
Detailed drainage design drawings, including exceedance flow routes	Appendix D and J
Detailed landscaping plans	N/A
Maintenance strategy	Page 5
Demonstration of how the proposed SuDS measures improve:	
a) water quality of the runoff?	
b) biodiversity?	Blue/Green roof
c) amenity?	

Appendix J
Exceedance Flow Paths

PRICE & MYERS

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Job	369-377 Kentish Town Road - Flow Paths				

KEY:

Surface Water Flow Paths