United Kingdom Accreditation Service

ACCREDITATION CERTIFICATE

UKAS
UNITED KINGDOM ACCREDITATION SERVICE

TESTING LABORATORY
No. 1247

Envirolab

is accredited in accordance with the recognised International Standard ISO/IEC 17025:2005
General Requirements for the competence of testing and calibration laboratories

This accreditation demonstrates technical competence for a defined scope as detailed in and at the locations specified in the schedule to this certificate, and the operation of a laboratory quality management system (refer joint ISO-ILAC-IAF Communiqué dated 18 June 2005).

The schedule to this certificate is an essential accreditation document and from time to time may be revised and reissued by the United Kingdom Accreditation Service. The most recent issue of the schedule of accreditation, which bears the same accreditation number as this certificate, is available from the UKAS website www.ukas.org.

This accreditation is subject to continuing conformity with United Kingdom Accreditation Service requirements. The absence of a schedule on the UKAS website indicates that the accreditation is no longer in force.

R Belt-sm

Accreditation Manager, United Kingdom Accreditation Service

Initial Accreditation date
02 December 1992

This certificate issued on
11 August 2006

The Department of Trade and Industry (DTI) has entered into a memorandum of understanding with the United Kingdom Accreditation Service (UKAS) through which UKAS is recognised as the national body responsible for assessing and accrediting the competence of organisations in the fields of calibration, testing, inspection and certification of systems, products and persons

CASING DEPTH (m)	WATER (m)	STRATA DESCRIPTION	LEGEND	DEPTH (m)	TEST RESULTS		SUB SAMPLING		
					TYPE AND DEPTH	RESULT	FROM (m)	TO (m)	TYPE
		Medium dense SAND and GRAVEL of quartz and flint. (MADE GROUND)		0.0					
				0.55			0.5		D
		Medium dense brown and orange brown slightly clayey SAND and GRAVEL of brick, quartz, flint and ash. (MADE GROUND)		0.7			0.9		D
					P 1.0m	2.5, 3.25			
		Stiff grey brown slightly sandy slightly gravelly CLAY. Gravel consists of brick and ash. (MADE GROUND)		1.1	P 1.25m	2.0, 2.0	1.2		D
		Stiff brown CLAY with roots observed to 2.0m depth. (LONDON CLAY)			P 1.5m	2.0, 1.75			
					P 1.75m	2.25, 2.25			
					P 2.0m	3.0, 3.25			
					P 2.25m	3.0, 3.75			
					P 2.5m	4.5, 4.0			
					P 2.75m	2.75, 2.25			
					P 3.0m	2.5, 2.5			
					P 3.25m	2.5, 2.75			

DRILLING			GROUNDWATER				
TYPE (DIAMETER)	FROM	TO	DEPTH STRUCK	BEHAVIOUR	DEPTH SEALED	DATE	DEPTH OF CASING
101mm	0.0m	5.0m					

REFER TO KEY AT BEGINNING OF THIS APPENDIX FOR EXPLANATION OF SYMBOLS

DRIVEN TUBE SAMPLER BOREHOLE SHEET 1 OF 2

SOILTECHNICS
GEOTECHNICAL ENGINEERS, ENVIRONMENTAL CONSULTANTS
Cedar Barn, White Lodge, Walgrave, Northampton. NN6 9PY.
Tel: (01604) 781877 Fax: (01604) 781007 E-mail: mail@soiltechnics.net

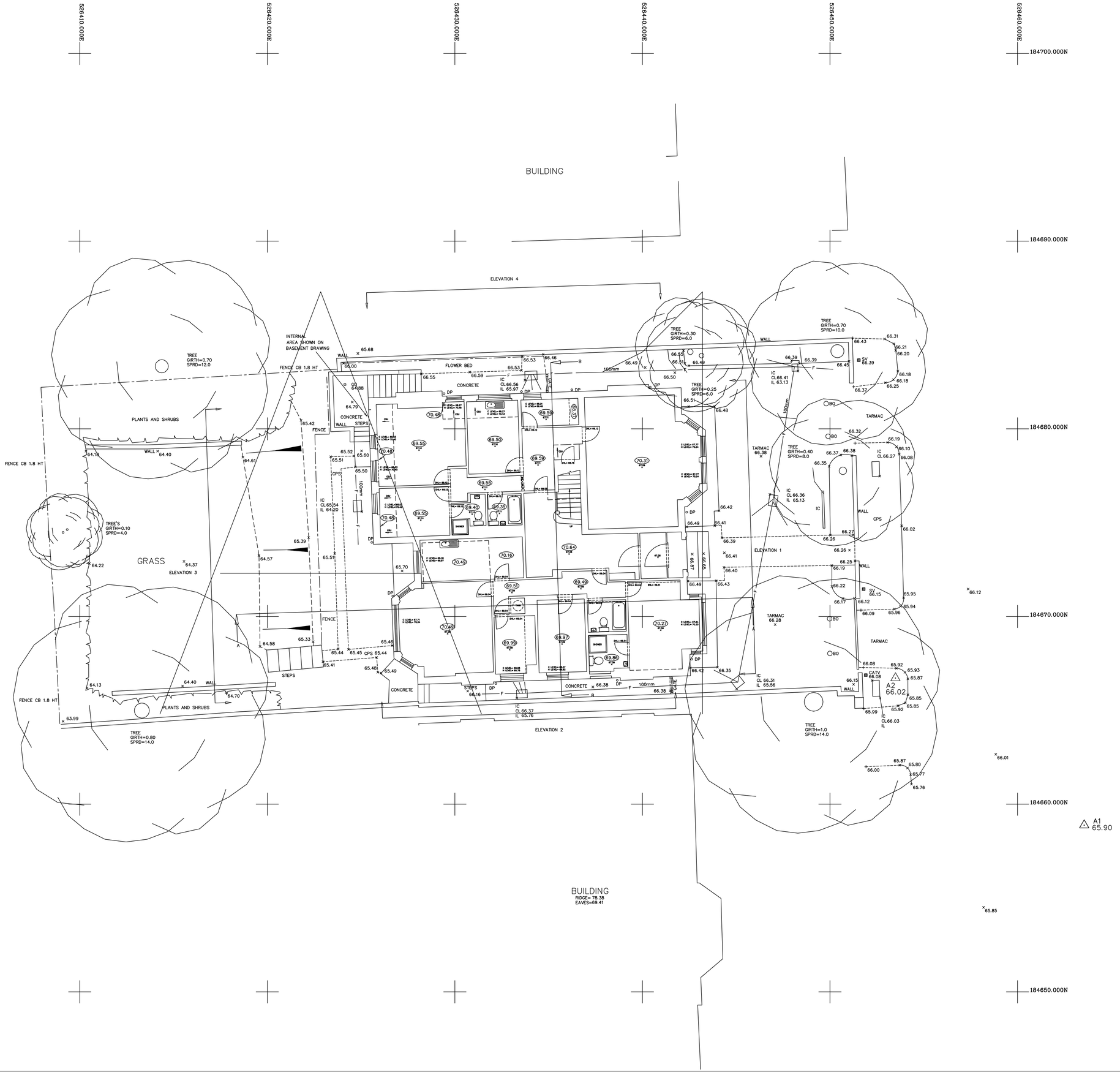
GROUND LEVEL	CO-ORDINATES
LOCATION PLAN ON DRAWING No: STD0953U-02	DATE OF EXCAVATION: 08.03.07

PROJECT: **No's 3, 5 & 7, Fitzjohn's Avenue, London**
Proposed Residential Redevelopment

PROJECT REF.	BOREHOLE No
STD0953U	DTS06

APPENDIX F

TOPOGRAPHICAL SITE SURVEY



Building Abbreviations

BL	Basement Level	HD	Heating Duct
BH	Beam Soffit Height	H	Height
BSL	Beam Soffit Level	RWP	Rain Water Pipe
C	Cill Height from FFL	SL	Soffit Level
DP	Down Pipe	SVP	Soil and Vent Pipe
DPC	Damp Proof Course	VP	Vent Pipe
DH	Door Height	W	Window Height from cill
DHL	Door Head level		Direction of Floor Joist Span
FFL	Finished Floor Level	C Level	Cill Level
2100	Floor to Ceiling Height	H Level	Window Head Level
25.26	or Ceiling Level		Detail Approx.
		CSU	Ceiling slopes up
CH	Ceiling Height	F-H	Floor - Window head Ht

Topographical Abbreviations

A/R	Assumed Route	MKR	Marker
BH	Borehole	MT	Mercury Telecom Cover
BOL	Bollard	OHC	Overhead Cable
BT	British Telecom Cover	OHP	Overhead Pipe
BW	Barbed Wire Fence	OSBM	Ordnance Survey Bench Mark
BWK	Brickwork	PB	Post Box
CATV	Cable TV Cover	PGM	Permanent Ground Marker
CB	Close Boarded Fence	PR	Post & Rail Fence
CCTV	Closed Circuit TV	PW	Post & Wire Fence
CHLK	Chainlink Fence	PWM	Post & Wire Mesh Fence
CHPL	Chestnut Paling Fence	RE	Rodding Eye
CL	Cover Level	RG	Road Gully
CM	Cable Marker	RN	Road Name
CP	Catch Pit	RS	Road Sign
CPL	Catch Pit Base Level	RW	Retaining Wall
DIA	Diameter	RWP	Rain Water Pipe
DK	Drop Kerb	SAP	Sapling
DP	Down Pipe	SC	Stop Cock
EJB	Electricity Junction Box	SPR	Spread
EC	Electricity Cover	STA	Traverse Station
EP	Electricity Pole	SV	Stop Valve
ER	Earthing Rod	SVP	Soil Vent Pipe
FH	Fire Hydrant	SW	Storm Water
FIG	Feed Into Ground	TB	Telephone Box
FW	Foul Water	TBM	Temporary Bench Mark
GU	Gully	TFR	Taken From Records
GV	Gas Valve	TJB	Telephone Junction Box
H	Height	TPT	Trial Pit
IC	Inspection Cover	TL	Traffic Light
IL	Invert Level	TP	Telephone Pole
IR	Iron Railing Fence	UTL	Unable To Lift
KO	Kerb Outlet	UTT	Unable To Trace
LB	Litter Bin	VP	Vent Pipe
LC	Lamp Column	WKH	Water Key Hole
LP	Lamp Post	WM	Water Meter
MH	Manhole	WV	Water Valve
		---	Approximate

Legend

F ——— Foul Water Pipe

S ——— Surface Water Pipe

THIS SURVEY DATA HAS BEEN PREPARED FOR THE CLIENT DETAILED BELOW TO AN AGREED SPECIFICATION. UNLESS OTHERWISE AGREED IN WRITING THE LIABILITY OF STH SURVEYS LTD IS LIMITED TO THE CLIENT OR HIS APPOINTED AGENT AND DOES NOT EXTEND TO USE BEYOND THE LIMITATIONS OF THE SPECIFICATION.

Survey Station Information

STA No.	Easting	Northing	Level	Type
STN A1	526463.554	184658.879	65.90	Nail
STN A2	526453.492	184666.719	66.02	Nail
STN A5	526452.263	184690.736	66.53	Nail
STN A100	526464.723	184622.696	65.17	Nail

Notes

Survey is based on a modified Ordnance Survey National Grid (OSGB36), site centered with a scale factor of 1 applied.

Values have been derived via GPS using the OS active network using the OSTN02 transformation and OSGM02 geoid model.

Level datum: Ordnance Datum Newlyn (ODN).

SURVEYED		CLIENT:
DRAWN		AS STUDIO
SCALE	1:100	

TOPOGRAPHICAL SURVEY GROUND FLOOR

ADDRESS:

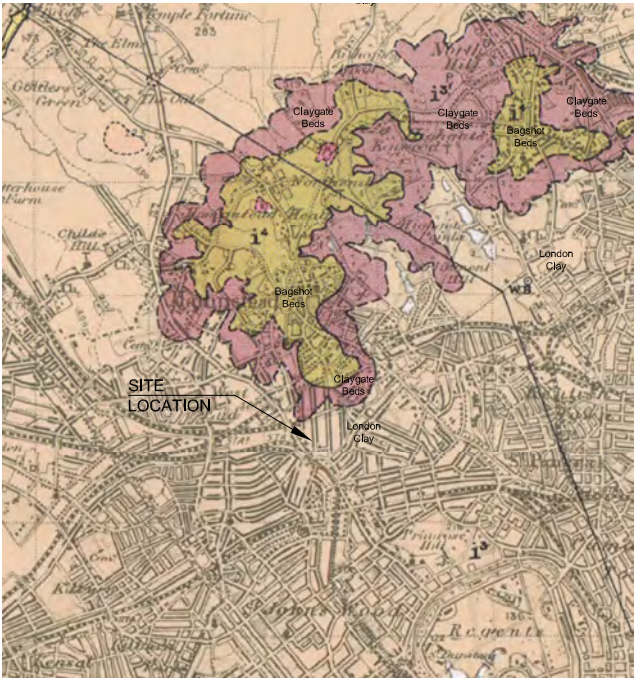
9 MAREFIELD GARDENS
LONDON NW3

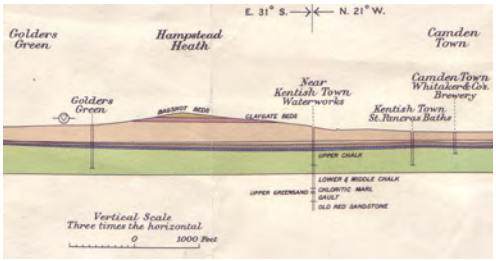
JOB No	DRAWING NUMBER

A1 Sheet - 841mm X 594mm

APPENDIX G

TWS - 8972_BIA_06 – GEOLOGICAL MAP





taylor whalley spyra
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E-mail; tws@tws.uk.com Website; www.tws.uk.com

9 MARESFIELD GARDENS, HAMPSTEAD, LONDON, NW3 5SJ,

GEOLOGICAL MAP AND VERTICAL SECTION

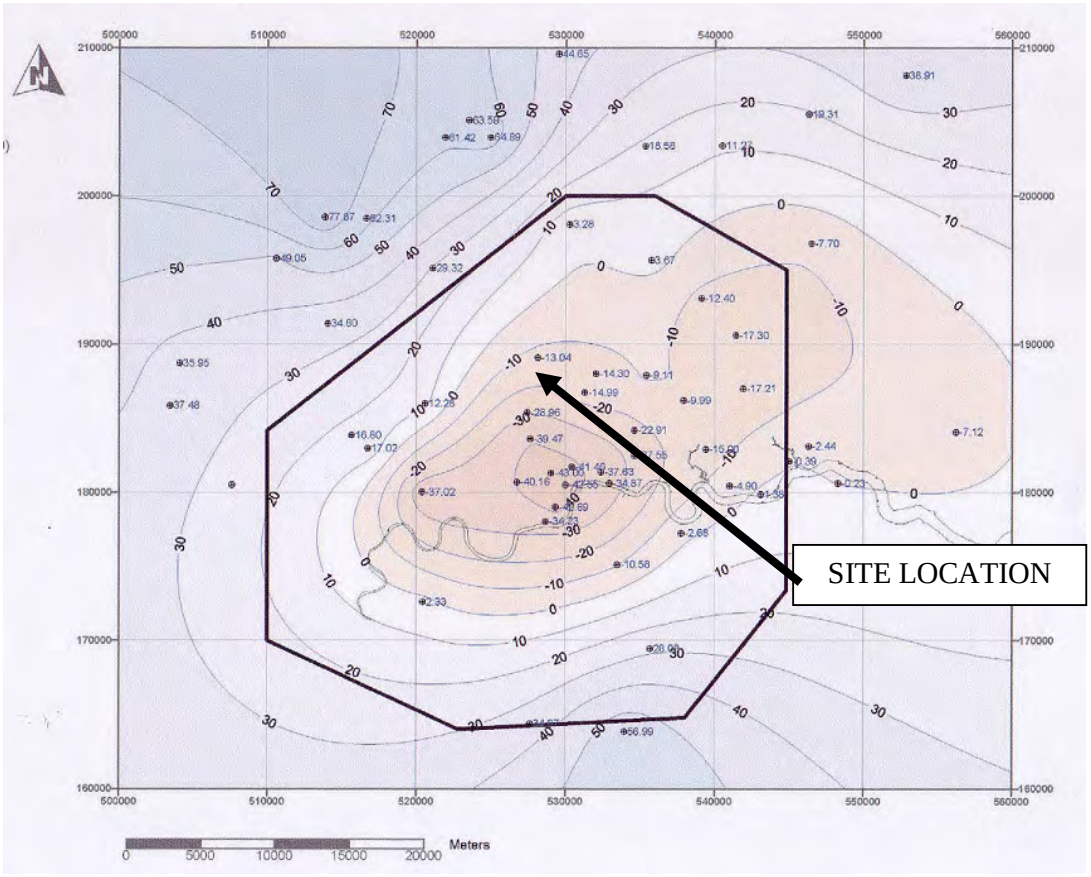
Drawing No. 8972_BIA 06

Scales NTA

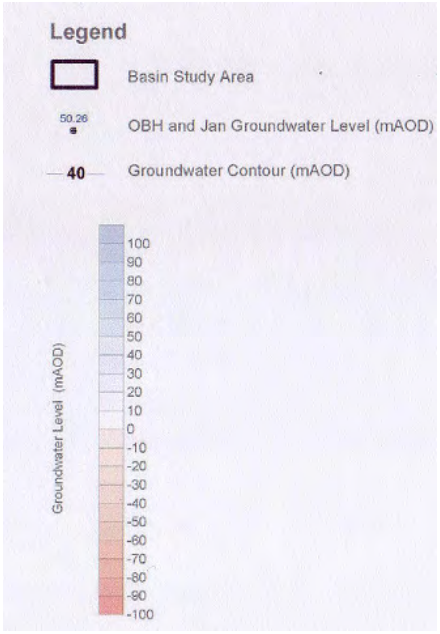
Date 16.06.16

APPENDIX H

ENVIRONMENT AGENCY GROUND WATER LEVELS

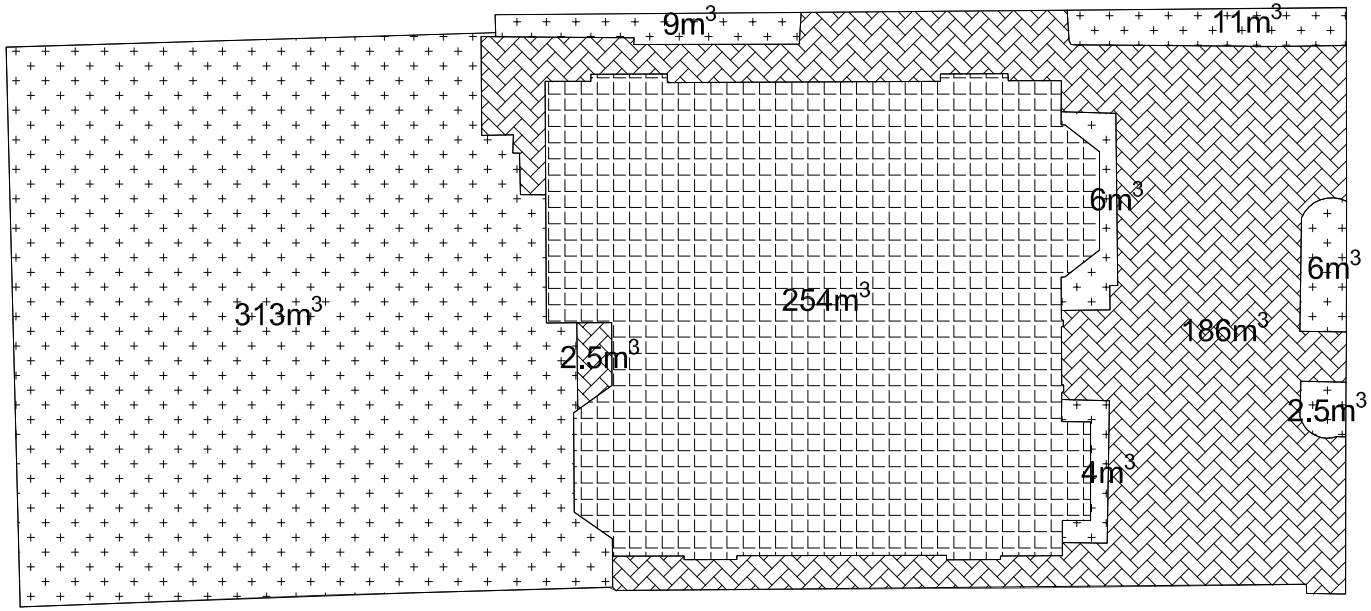


ENVIRONMENT AGENCY GROUND WATER MONITORING LEVELS OF THE LONDON BASIN



APPENDIX I

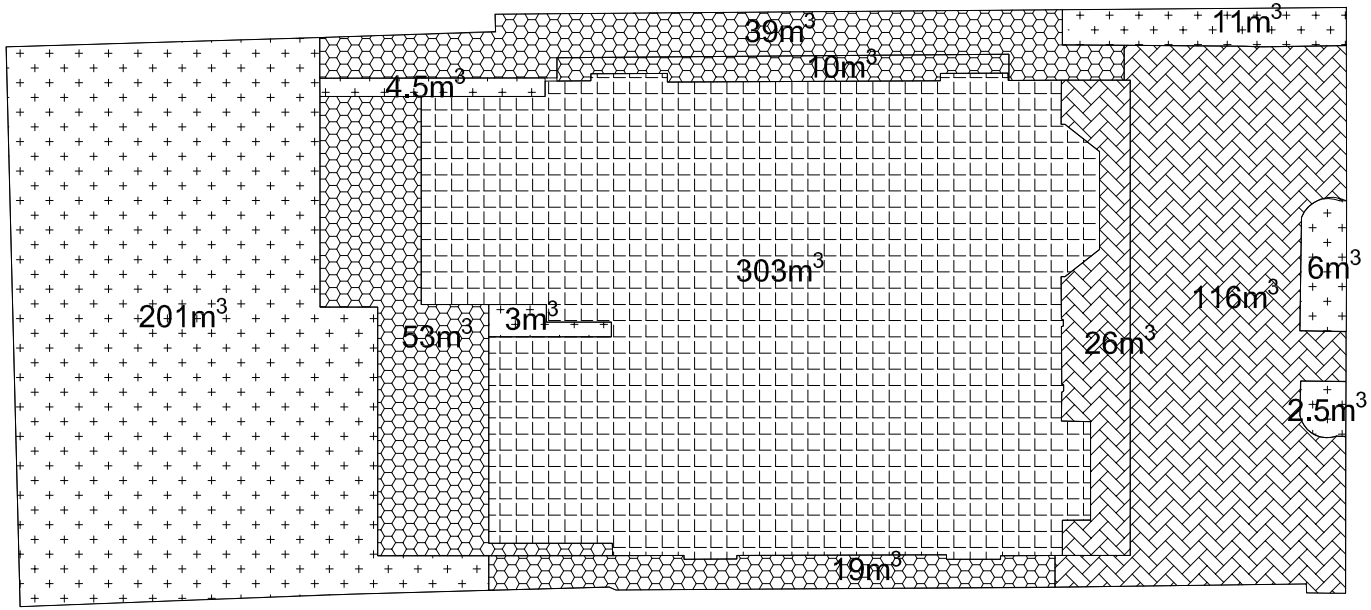
TWS – 8972_ BIA_07 - COMPARISON OF HARD & SOFT LANDSCAPING AREAS WITH PROPOSED SUDS



EXISTING SITE HARD AND SOFT AREAS

KEY OF EXISTING

- Landscaped Area
- Block Paved Area
- Building



PROPOSED SITE HARD AND SOFT AREAS

KEY OF PROPOSED

- Landscaped Area
- Block Paved Area
- Building
- Hard standing/buildings that drains to SUDS

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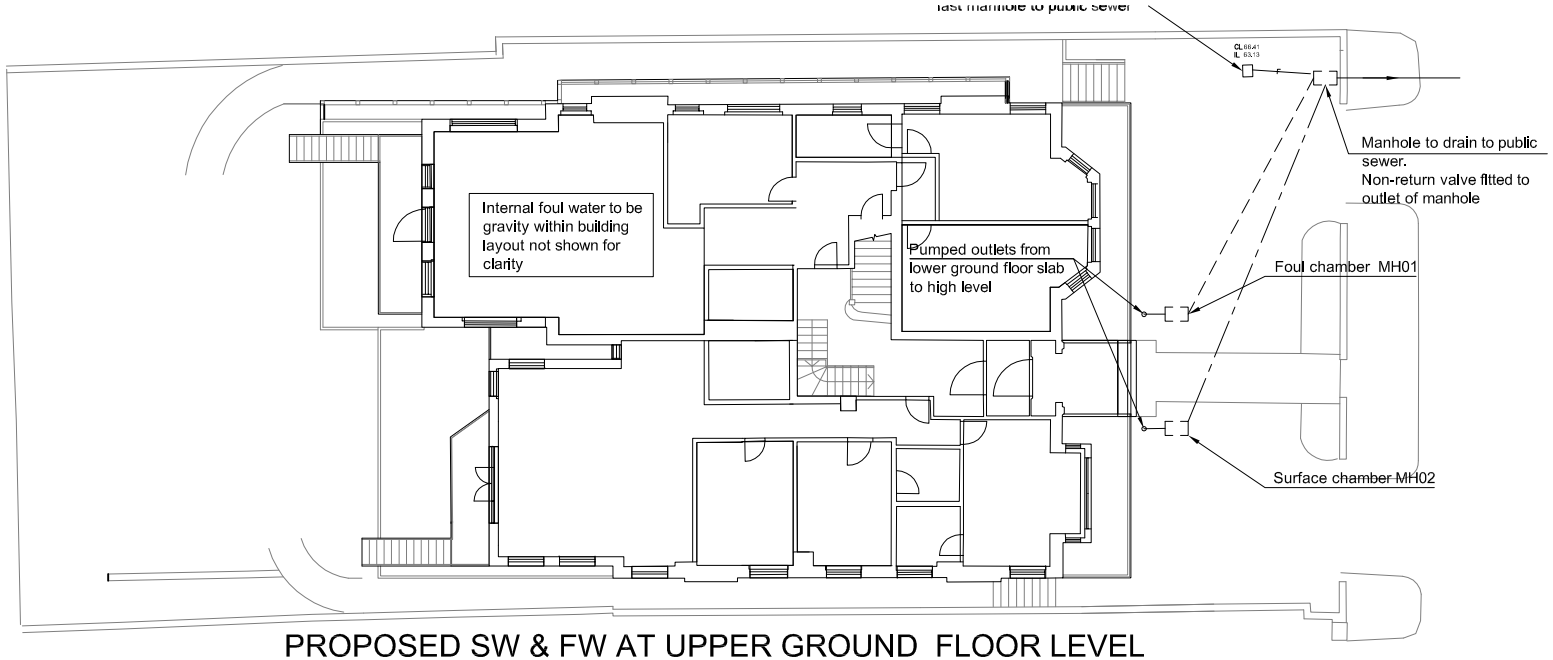
E-mail: tws@tws.uk.com Website: www.tws.uk.com

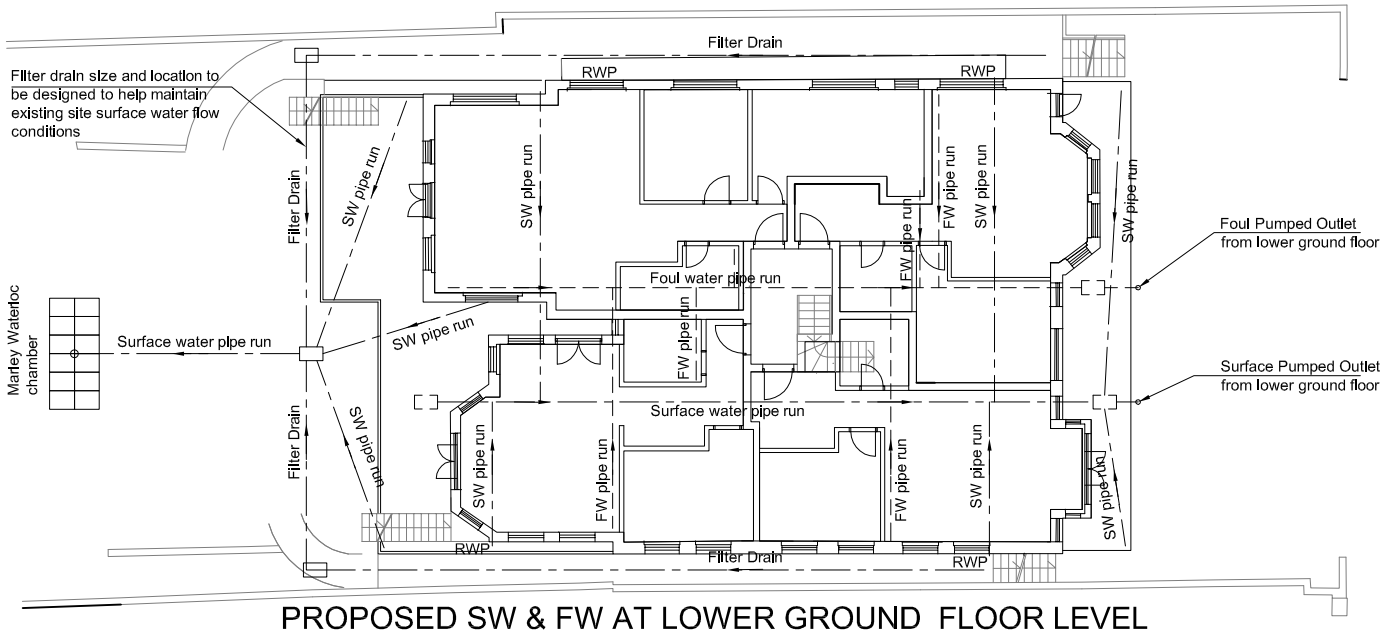
Contract	Title	Scale	Date	Drawn
9 MARESFIELD GARDENS, HAMPSTEAD, LONDON, NW3 5SJ,	COMPARISON OF EXISTING AND PROPOSED HARD AND SOFT LANDSCAPING AREAS WITH PROPOSED SUDS AREAS	1:175	16.06.16	GB
		Job No. 8972	Drawing No. BIA_07	Rev. -

APPENDIX J

TWS – 8972_ BIA_08 - PROPOSED SITE LAYOUT SURFACE & FOUL WATER ABOVE AND BELOW GROUND DRAINAGE



PROPOSED SW & FW AT UPPER GROUND FLOOR LEVEL



PROPOSED SW & FW AT LOWER GROUND FLOOR LEVEL

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Contract	Title	Scale	Date	Drawn
9 MARESFIELD GARDENS, HAMPSTEAD, LONDON, NW3 5SJ,	PROPOSED DRAINAGE LAYOUT FOR UPPER GROUND FLOOR AND LOWER GROUND FLOOR LEVELS	1:175	16.06.16	GB
		Job No. 8972	Drawing No. BIA_08	Rev. -

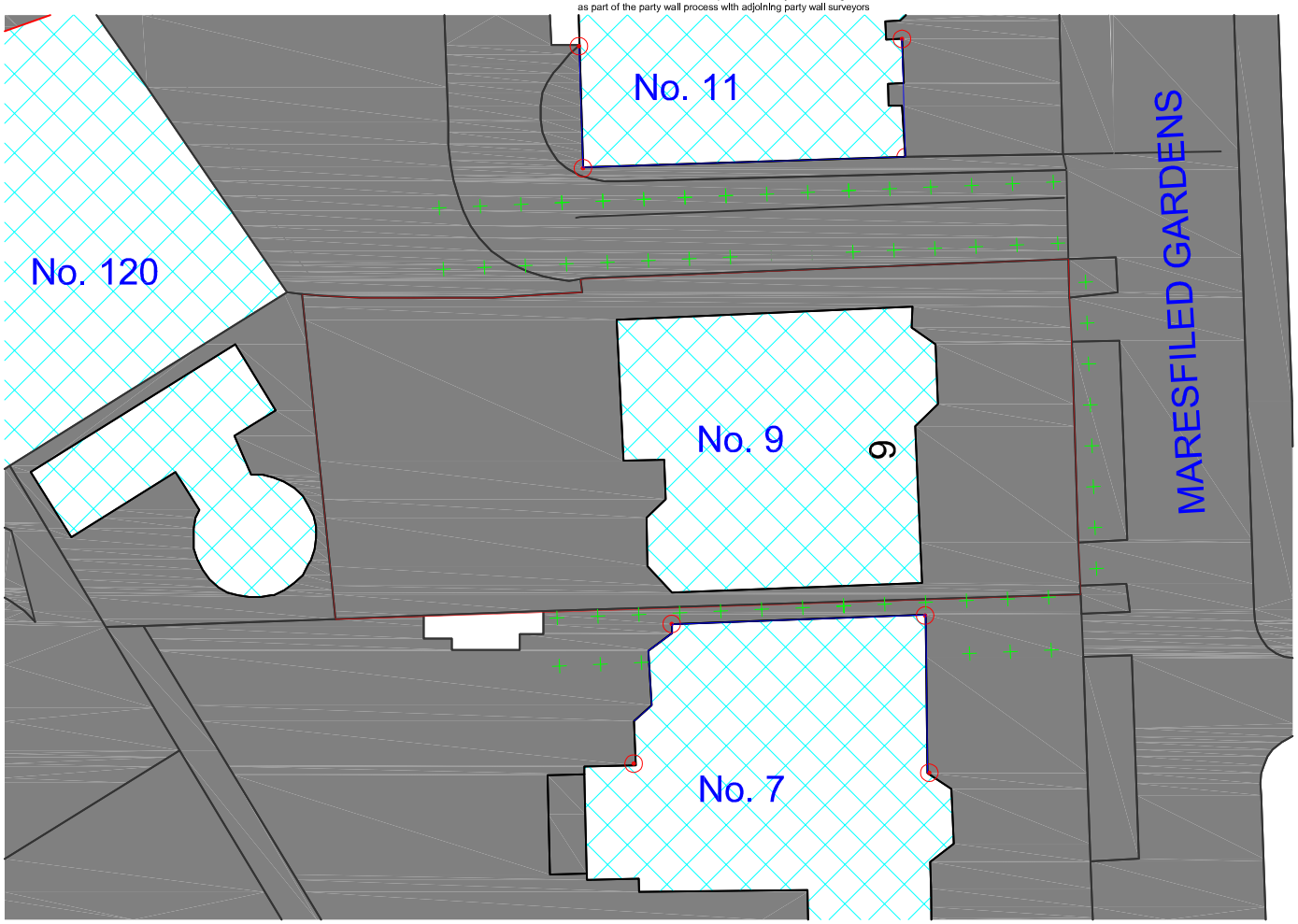
APPENDIX K

TWS – 8972_BIA_09 _ PROPOSED MONITORING OF MOVEMENT SETTLEMENT TO SITE AND SURROUNDING AREA

Movement Limits and Responses (No. 11 Maresfield Gradens)

Action Level	Response	Ground Surface Level	
		Vert., mm	*Horiz., mm*
Green	No Action	<2	<2
Green / Amber	Re-assess and agree course of action	3 to 5	3 to 5
Red	Stop works and secure adjoining the area	>6	>6

Stated movement limits and responses are subject to final agreement as part of the party wall process with adjoining party wall surveyors



Movement Limits and Responses (No. 7 Maresfield Gradens)

Action Level	Response	Ground Surface Level	
		Vert., mm	*Horiz., mm*
Green	No Action	<2	<2
Green / Amber	Re-assess and agree course of action	3 to 6	3 to 6
Red	Stop works and secure adjoining the area	>6	>6

Stated movement limits and responses are subject to final agreement as part of the party wall process with adjoining party wall surveyors

All readings are to be reported to the Supervising Officer and additional members of the team (TBC) within 48 hours of them being made.

The surveying company is to provide a movement survey report with all readings to be provided in a spreadsheet format with accompanying graphs indication the development of each observation with time and appropriate suitable profiles. The accompanying text is to be provided highlighting any trends that are or are likely to be encountered and also record against them the type of work undertaken prior to the readings. Each report is to be dated and referenced and have the site location plan included for easy of locating survey points

If any unusual observations or observations suggesting excessive deformation and/or possible instability are made these should be checked and if confirmed, reported to the Contractor and Engineer immediately.

The survey company is to review the positions show are suitable for surveying from agreed base positions and positions are subject to final site survey.

The survey company is to provide a method statement confirming how the works are to be undertaken giving details of all equipment to be used with data sheets confirming up to date equipment calibration.

Timing of readings (grd level, survey & monitoring)
An initial base reading is to be undertaken 1 month prior to and at start on site and then every 2 weeks from start of underpinning and piling works.
Readings are to be taken every 2 weeks during basement excavation works.
If casting of slabs or removal of propping falls within the 2 week period then take additional reading in between at 1 week.
Once the basement box is completed above ground level readings are to be taken every 2 weeks for 2 months and if a trend of reducing rate of movement is established then revert to readings every 4 weeks
If during any of the readings excessive movement is noted revert back to 1 week readings until 2 weeks after readings show excessive movement has stop. Then revert back to readings every 4 weeks.

KEY

- Surface levelling studs (~5m c/c)
- Wall(s); precise levelling at ground level (5m c/c by excavation)
- Structures(s); 3D Retro-targets top & bottom of wall (Final locations to be agreed)

The movement limits noted on this drawing are taken from basement impact assessment

The contractor is to review this and all other relevant documentation and it is the contractor's responsibility to review the monitoring results and to maintain all ground and building movement within the design parameters and where possible improve upon.

The limits given in the table are the maximum and not to be exceeded and if at any time it is deemed that the movement are likely to be exceeded, the contractor is to make all necessary arrangement to bring the movement back to within the acceptable limits for the relevant phase or works.

The contractor is to immediately notify the Supervising Officer and Design Team of any such situation and the proposed remedial works.

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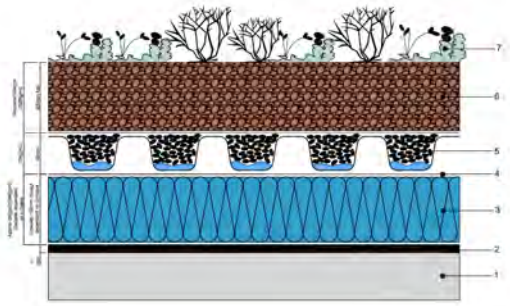
Contract	Title	Scale	Date	Drawn
9 MARESFIELD GARDENS, HAMPSTEAD, LONDON, NW3 5SJ,	PROPOSED MONITORING OF MOVEMENT AND SETTLEMENT TO SITE AND SURROUNDING AREA	1:150	16.06.16	GB
		Job No. 8972	Drawing No. BIA_09	Rev. -

APPENDIX L

PERMAQUIK 6100 DATA SHEETS
AND WATERLOC DATA SHEET

PERMAQUIK 6100 SYSTEM INVERTED INTENSIVE ROOF GARDEN (REAR GARDEN)

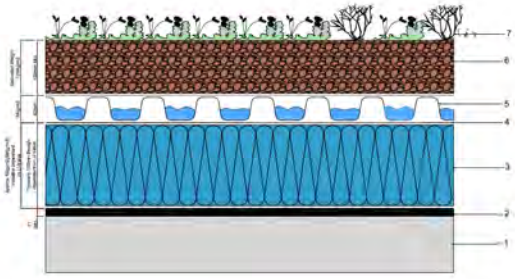
PERMAQUIK 6100 SYSTEM INVERTED INTENSIVE ROOF GARDEN



1. Concrete deck
2. Permaquik 6100 system
   - > Radmat Permaquik 6100 3mm hot melt membrane
   - > Radmat 2016 reinforcement fleece
   - > Radmat Permaquik 6100 3mm hot melt membrane
   - > Radmat 5mm root barrier membrane
3. Extruded polystyrene insulation board
4. Min-K thermal sheet
5. Radmat D60 water retention & drainage board G12 filter membrane
6. Radmat 100% recycled green roof growing media
7. Plant layer either plug & plant wild flowers/perennials or selected herbs

Note: Expected rainwater retention from 80 litres/m2

PERMAQUIK 6100 SYSTEM INVERTED SEMI INTENSIVE ROOF GARDEN (FRONT GARDEN)



1. Concrete deck
2. Permaquik 6100 system
   - > Radmat Permaquik 6100 3mm hot melt membrane
   - > Radmat 2016 reinforcement fleece
   - > Radmat Permaquik 6100 3mm hot melt membrane
   - > Radmat 5mm root barrier membrane
3. Extruded polystyrene insulation board
4. Min-K thermal sheet
5. Radmat D40 water retention & drainage board G12 filter membrane
6. Radmat 100% recycled green roof growing media
7. Plant Layer either plug & plant wild flowers/perennials or selected herbs

Note: Expected rainwater retention from 40 litres/m2

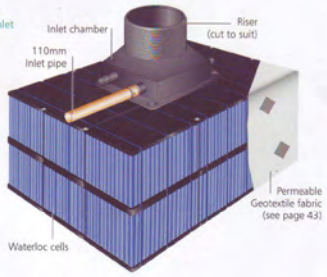
Waterloc for infiltration and attenuation systems

As with conventional soakaways, concerns have been expressed over the tendency for the plastic cell type structures to silt up over time with no means of cleaning or removal of debris other than total removal and replacement.

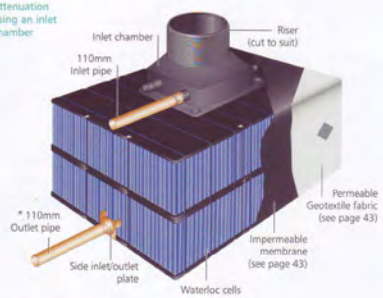
However, the use of the Marley Waterloc range of components for an infiltration or attenuation scheme provides a number of benefits over conventional installation methods:

- **Access to the soakaway for inspection and cleaning as recommended in BRE & CIRIA guidance notes.**
- **An inlet chamber for an optional filter and access to the incoming pipe connection for cleaning purposes.**
- **Improved inflow capacity via a single connection to the drainage system.**

Infiltration using an inlet chamber

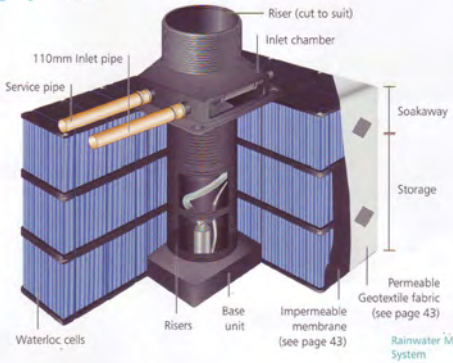


Attenuation using an inlet chamber



* Inlet pipes may also be connected to the vertical face of the cell (refer to page 35)

Waterloc for rainwater harvesting systems



Rainwater Management System

Significant steps have been taken in recent years to reduce water wastage through improvements to the supply network and the introduction of more efficient water appliances. However, domestic and commercial water consumption could be significantly reduced, simply through collecting, storing and re-using rainwater at source. Not only does this reduce the use of metered water, the collection of rainwater reduces the demand on the drainage system, in turn reducing flood risk.

A modular, low cost water recycling and management system can be constructed from separate components consisting of an inlet chamber, filter unit, submersible pump unit and base unit combined with Waterloc cells to form a central filtering and pumping riser.

The system uniquely combines infiltration with recycling, thereby alleviating the problems of either water shortage or flooding. The versatility of this system means that any size and combination of storage or infiltration unit can be constructed, as long as room is allowed for the central pumping riser.

In operation, rainwater is collected from the available roof area and passed through a silt trap, UG60, before it enters the main filter in the inlet chamber, where any fine sedimentary particles are removed. The filtered water is then fed to the base of the installation where it aerates with the stored water. When the collected rainwater has reached a minimum level, the control system can be activated, allowing the submersible pump to supply water on demand.

Control units are all supplied pre-wired, requiring only a final connection to be made to a 240V power supply via a RCD breaker. Once installed, the microprocessor based controls can be easily set up to control the pump discharge pressure and monitor the water level.

Two versions of the rainwater harvesting system are available:

- A remote connection facility suitable for an outside tap.
- A domestic backup system which can be connected via a storage tank to provide a supplementary water supply for non potable applications.

APPENDIX M

MASTERDRAIN HYDROLOGY
STORMWATER STORAGE CALCULATIONS

EXISTING SITE CONDITION

Data:-
Hydrology:-

Location	= Camden	Grid reference	= TQ2585
M5-60 (mm)	= 21.1	r	= 0.44
WRAP/Soil	= 4 / 0.45	SAAR (mm/yr)	= 650
Return period	= 30	Mean intensity	= 32.5mm/hr for a 1 hour storm

Percentage runoff = 42.0% calculated from:-

Percentage runoff = (0.829*PIMP)+(25*SOIL)+(0.078*UCWI)-20.7
where
PIMP = ImpervArea*100/(ImpervArea+PervArea) = 55.7
UCWI = Calculated value for Wetness Index = 68.0

Imperv. area	= 442 m²	Pervious area	= 352 m²
Total area	= 794 m²	Equiv area	= 333 m²
Total runoff	= 10.8 m³	Discharge rate	= 5.00 l/s

Storage (m³) = 4.0m³ (Sum of all balance quantities)

PROPOSED SITE CONDITION

Data:-
Hydrology:-

Location	= Camden	Grid reference	= TQ2585
M5-60 (mm)	= 21.1	r	= 0.44
WRAP/Soil	= 4 / 0.45	SAAR (mm/yr)	= 650
Return period	= 100	Mean intensity	= 42.8mm/hr for a 1 hour storm

Percentage runoff = 28.0% calculated from:-

Percentage runoff = (0.829*PIMP)+(25*SOIL)+(0.078*UCWI)-20.7
where
PIMP = ImpervArea*100/(ImpervArea+PervArea) = 71.7
UCWI = Calculated value for Wetness Index = 68.0

Imperv. area	= 569 m²	Pervious area	= 225 m²
Total area	= 794 m²	Equiv area	= 437 m²
Total runoff	= 18.7 m³	Discharge rate	= 3.00 l/s

Storage (m³) = 9.6 m³ (Sum of all balance quantities)