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London Irish Centre

Drainage Strategy and SuDS Statement

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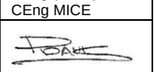
		Remarks:	**For planning**				
Revision:	P1	Prepared by:	M Tranchina MEng (Hons)	Checked by:	W Hudson MEng (Hons)	Approved by:	P Davis BEng (Hons) MSc CEng MICE
Date:	05/03/20	Signature:		Signature:		Signature:	
Revision:	P2	Prepared by:	M Tranchina MEng (Hons)	Checked by:	W Hudson MEng (Hons)	Approved by:	P Davis BEng (Hons) MSc CEng MICE
Date:	10/03/20	Signature:		Signature:		Signature:	

Contents

Appendices

One

Introduction

1.1

Elliott Wood Partnership (EWP) have been appointed by Acumen Portfolio Solutions on behalf of the London Irish Centre to provide a SuDS drainage strategy report to support a detailed planning application for the proposed redevelopment of the buildings comprising the centre, at Camden Square.

1.2

The purpose of this report is to explain the approach taken with regards to the below ground drainage strategy. It evaluates the selection of SuDS and highlights how the drainage disposal hierarchy has been followed.

1.3

This report has been prepared in accordance with the GOV.UK *Sustainable Drainage Systems: Non-statutory Technical Standards* and the London Borough of Camden (LBC) SuDS advice note and drainage proforma.

Two

Existing Site

2.1

The site is located on the corners of Camden Square, Murray Street and Murray Mews, within the London Borough of Camden and comprises a group of buildings that border the 19th century Villas along Camden Square and extend over the Network Rail tunnel to the west.

2.2

A topographic survey by Maltby Surveys, dated July 2019 has been provided. This can be found in **Appendix A**. This shows that levels fall away from the existing building towards the public highway.

The total site area is 1,830m^2. There is approximately 55m^2 of existing soft landscaping, with the remaining 1,775m^2 considered to be impermeable area.

2.3

A site investigation has been completed on the site by Soiltechnics Ltd in February 2020 and consisted of one 4m deep borehole. The investigation indicated that the underlying ground is London Clay overlain by a very thin layer of made ground. This is in line with geological information obtain from the BGS website.

Figure 1: Site ground conditions

Three

Existing Drainage

3.1

According to Thames Water public sewer records the following public sewers exist near the development site:

A 610 x 432mm public combined sewer running south-west in Camden Square to the north-west of the development.

A 1499 x 838mm public combined sewer running south east within Murray Street to the south west of the development.

A 457mm diameter public combined sewer running south west within Murray Mews to the south east of the development. Refer to **Appendix B** for asset records.

3.2

A CCTV drainage survey was undertaken by G.O. Drainage Services Ltd in October 2019 to determine the location, depth, size and condition of the private drainage network within the development site. The survey confirms that there are two existing combined outfalls which connect, via gravity, directly into the public sewer in Camden Square.

One is a 100mm diameter connection, approximately 4.44m deep. The other is a 150mm diameter connection and is approximately 1.56m deep. The difference in depth is due to the change in levels in the external area where the demarcation manholes are located.

3.3

Surface water runoff from the existing roof and external hardstanding areas drains to two demarcation manholes located within the external area on the western side of the site. It then outfalls to the local Thames Water surface water sewer network.

The surface water runoff rates for the existing site have been calculated using the equation below (based on CIRIA C697):

$$Q = 2.78C.i.A$$

Where Q = Existing peak runoff (l/s), C = non-dimensional runoff coefficient=1.0, i = Rainfall intensity and A = total catchment area being drained=0.178ha

Table 1: Existing Surface Water Run-off Rates

Return Period	Rainfall Intensity (mm/hr)	Existing run-off (l/s)
1yr	33.2	16.4
30yr	81.5	40.3
100yr	106.9	52.9

Note that the rainfall intensities used in the above calculations have been based on average rainfall intensities for a 15-minute storm using Micro Drainage software. Areas of existing soft landscaping have been assumed to have a non-dimensional runoff co-efficient of 0. Refer to **Appendix D** for rainfall profiles.

Four

Proposed Development

4.1

The proposed works include the refurbishment of Nos. 50, 51 and 52 Camden Square, as well as the McNamara Hall, and the demolition of the buildings along Murray Street and Murray Mews and construction of a new 4-storey building with basement in their place. The new building is to include a feature atrium opening to connect the levels.

Five

Proposed Drainage Strategy

5.1 Drainage Hierarchy

The surface water drainage system has been designed in accordance with the GOV.UK *Sustainable Drainage Systems: Non-statutory Technical Standards* and the Draft *New London Plan: Policy SI13*

The following drainage hierarchy has therefore been considered:

- rainwater harvesting (including a combination of green and blue roofs)
- infiltration techniques and green roofs
- rainwater attenuation in open water features for gradual release
- rainwater discharge direct to a watercourse (unless not appropriate)
- rainwater attenuation above ground (including blue roofs)
- rainwater attenuation below ground
- rainwater discharge to a surface water sewer or drain
- rainwater discharge to a combined sewer.

5.2 Rainwater Harvesting

A rainwater harvesting system has been proposed to reduce the developments potable water demand. Details of this system are to be confirmed by the M&E engineer.

5.3 Use of Infiltration

Drainage via infiltration is not possible as the site is situated on a bedrock of London Clay Formation. In addition, in order to comply with building regulations, soakaways should not be built within 5m of a building or road. As the building and its basement occupy the full extent of the developable site area it will not be possible to achieve this requirement. Therefore, infiltration methods have not been considered feasible for this development.

5.4 Use of Green Roofs

It is proposed that the top roof of the development will be a green roof area. This will reduce the total surface water discharge volume during smaller rainfall events, as well as providing benefits to biodiversity and water quality. The area of proposed green roof is approximately 227m^2.

As it is difficult to measure the reduction in surface water discharge rate, especially following multiple storm events in a short space of time, the positive impact of green roofs has been ignored in the calculation of surface water run-off and treated as impermeable roof areas. It is proposed that these areas will only be accessed for maintenance. Refer to **Appendix E** for Proposed Development Plans.

5.5 Use of Blue Roofs

A blue roof manages surface water attenuation within the construction build-up of a flat roof or podium. A blue roof is versatile as it can receive a diverse array of finishes and treatments. It is recognised by the LLFA that blue roofs are considered to be a sustainable surface water management solution, as they provide a level of treatment to the water, benefit from evaporation which can help to reduce the total volume of run-off and manage surface water at source.

There is an opportunity at the London Irish Centre to implement a blue roof system across a number of the proposed roofs. In order to maximise the attenuation provided, it is proposed that surface water from the upper roof catchment is routed via a vertical rainwater pipe and a drainage channel to the blue roofs located at the lower roof levels. Refer to **Appendix E** for Proposed Development Plans.

5.6 Use of Below Ground Attenuation

Based on the tree survey completed by ACD Environmental, there are a number of root protection areas for existing trees, both within the site and in the public highway, that extend beneath the external areas of the site. As a result, there is no external space available to locate an attenuation tank that could drain to the sewer under gravity.

Below ground attenuation would therefore need to be located below the proposed basement. However, this would impact on the existing foundations of the buildings that are remaining as existing and would require extensive structural works to accommodate.

Attenuation below the basement would also rely on a pumped discharge as it would be lower than the sewer. Such reliance on mechanical means of disposal, which is susceptible to mechanical and electrical failure, is a potential flood risk to the development. Below ground attenuation is therefore considered unsuitable and less sustainable, and as such the proposed strategy is to implement above-ground attenuation via blue roofs with gravity discharge.

5.7 Draining to Watercourses

There are no nearby accessible water courses, therefore surface water generated from the development will be attenuated via blue roofs before discharging to the existing Thames Water sewers via the existing combined outfalls within Camden Square (subject to agreement with Thames Water).

5.8 Draining to Sewers

Thames Water Asset records indicate that there is a combined sewer network surrounding the site, with one 610x432 sewer to the west of the development within Camden Square. It is proposed to utilise the two existing 150mm connections to this sewer, as identified by the CCTV survey.

The evaluation of SuDS is demonstrated in **Table 2** below.

Table 2: *Evaluation of SuDS techniques*

SuDS Technique	Y/N	Comment
Rainwater harvesting	**Y**	**Rainwater harvesting is proposed to reduce the developments potable water consumption.**
Green Roofs	**Y**	**A green roof and numerous areas of planting have been proposed across a number of levels, reducing both the total and peak surface water discharge, as well as providing benefits to biodiversity and water quality.**
Blue Roofs	**Y**	**Attenuation is to be provided via blue roof storage systems. Refer to Appendix E for Proposed Development Plans.**
Basins and ponds	N	The site is located within an urban area; as such there is no feasible location or space for a detention basin or pond.
Filter strips and swales	N	Filter strips and swales are not appropriate due to unsuitable ground conditions.
Infiltration devices	N	Infiltration is not deemed feasible for this site as the existing ground conditions are not conducive to infiltration techniques and due to restricted space on site.
Permeable surfaces	N	Due to the limited area available the use of permeable surfaces is not considered suitable.
Tanked systems	N	No external space for below ground attenuation to existing root protection areas. Attenuation below the basement is considered unsuitable due to impact on existing foundations and preference for above ground attenuation via blue roofs.

5.9 Proposed Peak Surface Water Discharge Rate

In line with the Draft New London plan Policy SI13, 'development proposals should aim to get as close to greenfield run-off rates as possible depending on site conditions.' The HR Wallingford "Greenfield runoff estimation for sites" available at uksuds.com has been used to determine the greenfield runoff rate for the total site area (see **Appendix F**).

The greenfield runoff rates for the site are outlined below:

Table 3: *Greenfield Runoff rate estimations (from HR Wallingford online tool)*

Return Period	Greenfield Runoff Rate (l/s)
QBar	**0.78**
1 in 1 year	**0.67**
1 in 30 years	**1.80**
1 in 100 years	**2.50**

In this case, Greenfield runoff rates are considered prohibitively low. The proposed strategy therefore looks to minimise surface water discharge as much as possible through a system of blue roofs, and to eliminate the need for below ground attenuation which would result in the need to pump surface water, increasing flood risk to the building.

The proposed blue roof system will capture rainfall across the majority of the proposed roof areas, with the exception of the proposed terrace area, and restrict discharge from these areas to 1.6 l/s. The external areas and roof areas which are to remain as existing will not be attenuated.

The blue roof proposals have been developed in collaboration with established blue roof manufacturers ABG in order to establish proposed build-up depths and achievable discharge rates. Refer to **Appendix G** for Blue roof Calculation Summary.

The proposed site area has been reviewed to determine the total area of the site being positively drained and therefore contributing to the site's attenuation requirements. **Table 4** provides a breakdown of the proposed site areas and their contributing areas.

Table 4: *Total Site areas and contributing areas*

Feature	Area (m^2)	Runoff Coefficient*	Contributing Area (m^2)
Roof Area – Blue Roof Catchment	866	1.0	866
Other Roof Areas	528	1.0	528
Hard Landscaping	381	1.0	381
Soft Landscaping	55	0	0
Total	**1840**	**-**	**1775 (0.178ha)**

*- Runoff coefficients taken from BS752

5.10

The proposed runoff rates for different storm events are summarised in the table below.

Table 5: Proposed Surface Water Run-off Rates

Storm Return Period (years)	Proposed discharge rate from blue roof catchment (l/s)	Proposed discharge rate from other impermeable areas (l/s)	Total Proposed discharge rate (l/s)
1	1.6	8.4	10.0
30	1.6	20.6	22.2
100	1.6	27.0	28.6
100 + 40% CC	1.6	> 27.0	> 28.6

5.11

The proposed peak surface water discharge rate is therefore 27.0l/s for the 1 in 100 year + 40% climate change allowance event. By restricting discharge from the blue roof catchment to 1.6 l/s provides over 46% betterment in the 1 in 100-year return period + 40 % climate change allowance for the total discharge rate from the site. **Table 6** below details the betterment provided for different storm return periods.

Table 6: *Betterment provided for different storm return periods*

Storm Return Period (years)	Existing Flow Rate (l/s)	Proposed Flow Rate (l/s)	% Reduction
1	16.4	10.0	39%
30	40.3	22.2	45%
100	52.9	28.6	46%
100 + 40% CC	N/A	> 28.6	> 46%

Six

Impact on Network Rail Tunnel

6.1

The site is partly situated above an existing rail tunnel. Network Rail have been contacted in line with statutory process to ensure that the proposed additional loads generated by the development are acceptable. One impact of the proposed blue roof drainage strategy is that the system applies some additional load on to the structure.

If Network Rail do not accept the proposed loads, there is a risk that the proposed blue roofs on top of McNamara Hall will need to be omitted. In this case the proposed strategy will be reviewed and amendments to the blue roof areas and surface water attenuation strategy may be required.

Seven

Maintenance Requirements

7.1

All SuDS will be maintained by the property owner for the lifetime of the development in accordance with the SuDS Manual as summarised below:

Table 7*: Modular System / Blue Roofs*

Maintenance Schedule	Required Action	Recommended Frequency
Regular	Inspect and identify any areas that are not operating correctly. If required, take remedial action.	Monthly for 3 months, then six monthly
	Debris removal from catchment surface (where may cause risks to performance)	Monthly
	Remove sediment from pre-treatment structures	Annually, or as required
Remedial actions	Repair/rehabilitation of inlets, outlets, overflows and vents	As required
Monitoring	Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed	Annually and after large storms

Table 8: Green Roofs

Maintenance Schedule	Required Action	Recommended Frequency
Regular	Inspect all components including soil substrate, vegetation, drains, irrigation systems (if applicable), 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	Annually and after severe storms
	Inspect drain inlets to ensure unrestricted runoff from the drainage layer to the conveyance or roof drain system	Annually and after severe storms
	Inspect underside of roof for evidence of leakage	Annually and after severe storms
Maintenance	Remove debris and litter to prevent clogging of inlet drains and interference with plant growth	Six monthly 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 as required (where > 5% of coverage)	Annually (in autumn)
	Remove fallen leaves and debris from deciduous plant foliage	Six monthly or as required
	Remove nuisance and invasive vegetation, including weeds	Six monthly or as required
	Mow grasses, prune shrubs and manage other planting (if appropriate) as required – clippings should be removed and not allowed to accumulate	Six monthly or as required
Remedial actions	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	As required
	If drain inlet has settled, cracked or moved, investigate and repair as appropriate	As required

Gullies / Linear channels
Inspection and removal of debris from silt trap once a year; preferably after leaf fall in the autumn.

Drainage pipes, manholes and silt traps
Inspect manholes & silt traps for build-up of silt and general debris once a year; preferably after leaf fall in the autumn. If silt/debris is building up, then clean with jetting lorry / gully sucker and inspect pipe – repeat cleaning if required. If the pipes to be jetted are plastic then a high flow, low pressure setting should be used so that the pipes are not damaged.

Pumping stations
Pumping stations are to be maintained in accordance with the pump supplier/maintenance company requirements and in accordance with British Standards (BS EN 12056-4) i.e. inspections every quarter.

Unusual / unresolved problems
If the drainage system is still holding water following cleaning with a jetter, or the jetting of the system removes excessive amounts of debris this may indicate greater issues within the system. A CCTV survey is likely to be required and further advice should be sought from a drainage engineer.

NOTE: Manhole covers can be heavy and suitable lifting equipment / procedures should be used. Where possible, personnel should not enter manholes to carry out maintenance.

Eight

Flood Risk and Overland Flows

8.1

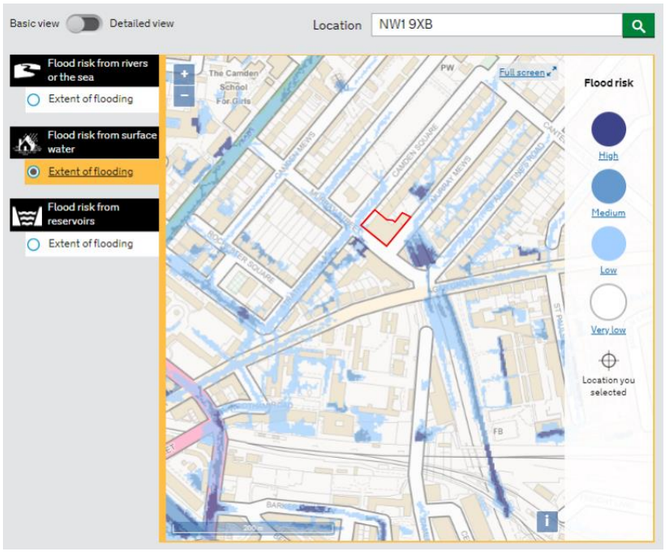
The existing site is located within Flood Zone 1 and is considered to be at low risk of flooding from fluvial and tidal sources. The development site area is less than 1 hectare in plan area, and not located in an area identified within as being at risk of surface water flooding. As a result, in accordance with the Camden Local Plan a site-specific flood risk assessment is not considered to be required.

8.2

The below ground surface water drainage network has been designed to accommodate the 1 in 100 year plus 40% climate change allowance, with no expected exceedance. External levels within the site boundary will be designed to fall away from the building to reduce the risk of flooding to the buildings, should exceedance occur.

8.3

According to the Environment Agency's (EA) indicative surface water flood map below, the site is at very low risk of flooding from surface water.



Gov.uk Surface Water Flooding Map

Nine

Proposed Foul Water Strategy

9.1

All foul water from ground floor and above will offset at high-level within the building and drop to a suspended high-level drainage network in the basement, as designed by M&E. It is proposed that this network will outfall via one of the two existing Thames Water connections within the external areas, adjacent to Camden Square.

9.2

To protect the building from flooding due to sewer surcharge all foul drainage below ground floor level will be positively pumped, discharging to the high-level suspended gravity network. Pumping stations are to include dual vortex pumps (duty and standby), non-return valves located in an accessible location to protect against public sewer surcharge, alarms and telemetry. Only foul and cavity drainage from the basement levels should be pumped. The proposed below ground drainage is presented on the Proposed Development Plans in **Appendix E.**

Ten

Conclusion

10.1

This SuDS strategy has been produced in order to support the planning application for the development of the London Irish Centre, Camden Square. The SuDS Hierarchy outlined within the Draft New London Plan has been followed in order to employ the most suitable and practicable SuDS design to improve surface water run-off from the site.

10.2

The development will restrict surface through the use of a blue roof attenuation system. This system will capture rainfall across the majority of the proposed roof areas, with the exception of the proposed terrace area, and restrict discharge from these areas to 1.6 l/s. The external areas and roof areas which are to remain as existing will not be attenuated and will discharge at an unrestricted rate.

10.3

Below ground attenuation has not been proposed within the external areas due to the presence of existing tree root protection zones. Any below ground attenuation would therefore need to be located below the proposed basement. However, this would impact on the existing foundations of the buildings that are remaining as existing and would require extensive structural works to accommodate and is therefore not considered feasible.

10.4

By following the process of SuDS design outlined, the surface water management of the proposed site will see a significant betterment from the existing case.

The sustainable drainage proposals set out in this report and its supporting documentation strike a balance between the sustainable requirements and constraints of the development.

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Appendices

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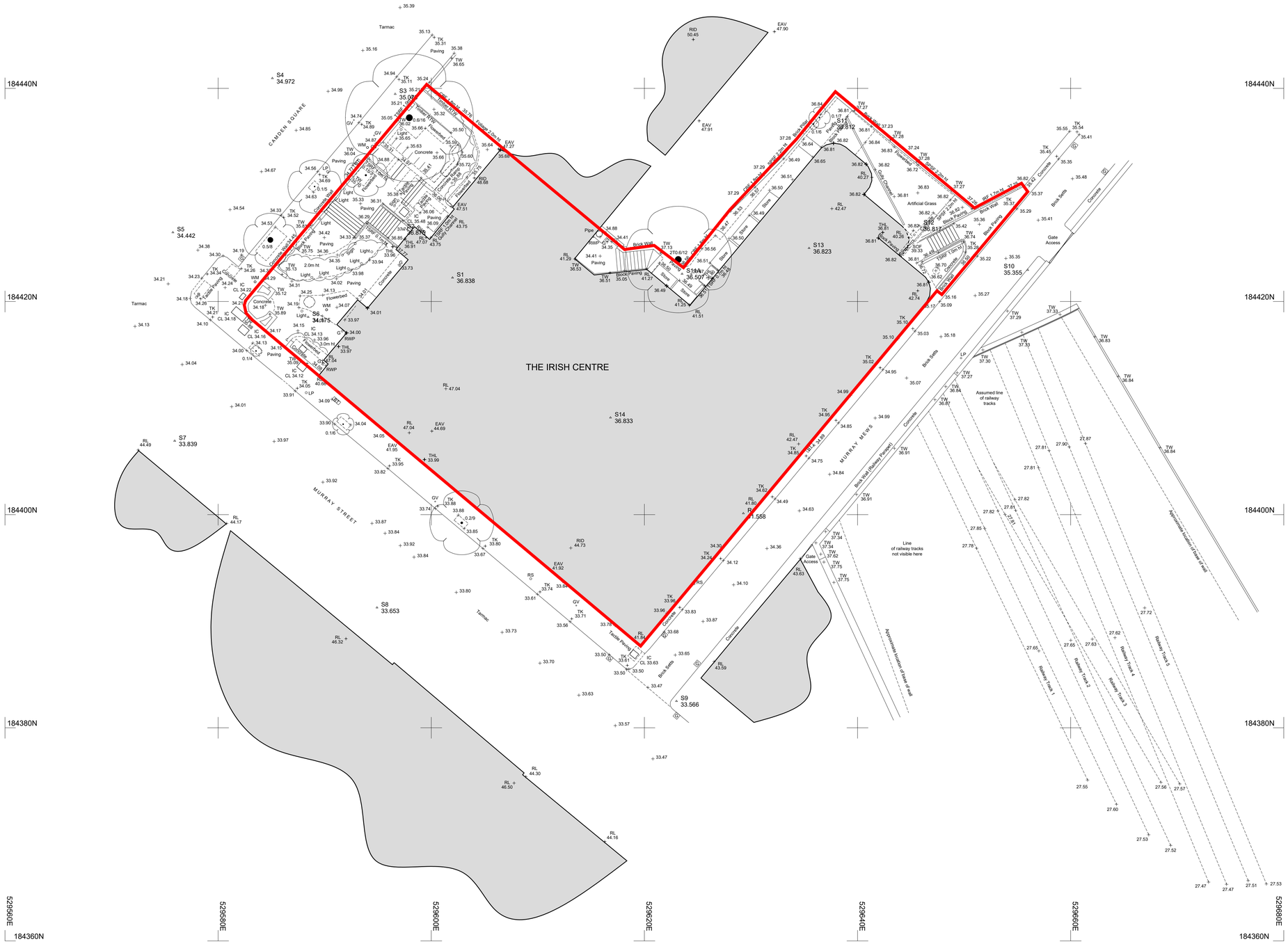
A Topographical Survey



Sheet Layout

Grid

N

W E

S

LEGEND

BANKING — Top / Bottom

BUSHES & HEDGES

TREES — MT / 3T / 0.2 / 6 (Multiple Trunks; No of Trunks; Dia of Base; Height of Tree)

NOTE:- SPREADS AND HEIGHTS ARE INDICATIVE ONLY

GATES — Single / Double

WALL — Width drawn to scale 0.23w

BUILDING

OPEN SIDED BUILDING

GLASS ROOFED

CONTOURS 25.50

ABBREVIATIONS (WHERE APPLICABLE)

ARCH HEAD HEIGHT	AHH	MARKER	MKR
ARCH HEAD LEVEL	AHL	MONITORING WELL	MW
ARCH SPRINGER HEIGHT	ASH	NOTICE BOARD	NB
ARCH SPRINGER LEVEL	ASL	NAME PLATE	NP
AIR VALVE	AV	OVERHEAD WIRES	OHW
BED LEVEL	BL	PARKING METER	PM
BELISHA BEACON	BB	RIDGE LEVEL	RID
BOLLARD	B	ROOF LEVEL	RL
BRITISH TELECOM BOX	BTB	ROAD SIGN	RS
BRITISH TELECOM MANHOLE	BTMH	RODDING EYE	RE
BRICKWORK	BKWK	RETAINING WALL	RTW
BUS STOP	BS	RAIN WATER PIPE	RWP
CABLE TV	CATV	SLUICE VALVE	SV
COVER LEVEL	CL	STOP COCK	SC
CABLE MARKER	CM	SOFFIT LEVEL	SOF
COLUMN	Col	STRUCTURAL SLAB LEVEL	SSL
CONCRETE POST	CP	TREE STUMP	ST
EAVES LEVEL	EAV	SOIL AND VENT PIPE	SVP
ELECTRICAL COVER	ELEC	THRESHOLD LEVEL	THL
ELECTRICITY CONTROL BOX	ECB	TELEGRAPH POLE	TP
ELECTRICITY POLE	EP	TELEPHONE CALL BOX	TCB
EARTH ROD	ER	TOP OF KERB	TK
FLOWER BED	FB	TURNSTILE	TS
FINISHED FLOOR LEVEL	FFL	TRAFFIC LIGHT	TL
FIRE HYDRANT	FH	TOP OF WALL	TW
FLOOR LEVEL	FL	UNABLE TO LIFT	UTL
FLAG STAFF	FS	UNABLE TO SURVEY	UTS
GAS PIPE	GP	VENT PIPE	VP
GAS VALVE	GV	WATER METER	WM
GULLY	G	WATER LEVEL	WL
GATE STOP	GS	WASH OUT	WO
INSPECTION COVER	IC	WASTE PIPE	WP
INVERT LEVEL	IL	WATER TANK	WT
LAMP POST	LP	WATER VALVE	WV

FENCES

BARBED WIRE FENCE	BWF	LARCH LAP FENCE	LLF
CORRUGATED IRON FENCE	CIF	METAL RAILING FENCE	MRF
CLOSE BOARD FENCE	CBF	POST AND CHAIN FENCE	PCF
CHAIN LINK FENCE	CLF	PICKET FENCE	PIF
CHESTNUT PALING FENCE	CPF	POST AND RAIL FENCE	PRF
FENCE POST	FPO	POST AND WIRE FENCE	PWF
INTERWOVEN FENCE	IWF	STEEL PALISADE SECURITY FENCE	SPSF
IRON RAILING FENCE	IRF	TUBULAR STEEL RAIL FENCE	TSRF

REV.	NOTES	DWN	DATE
A	Railway wall added to east side of Murray Mews	RP	06/09/19

QMS ISO 9001 REGISTERED

A MEMBER OF THE THE SURVEY ASSOCIATION

QMS ISO 14001 REGISTERED

Notes:

Grid and levels relate to OS GPS Active Network.

Sheet is North orientated unless stated.

Maltby Surveys Ltd

2 QUEENS ROAD
HAYWARDS HEATH
WEST SUSSEX
RH16 1EB
Tel: 01444 416246
Fax: 01444 417697
E-Mail: mls@maltbysurveys.com
WebSite: http://www.maltbysurveys.com

SURVEYED	RP	CLIENT
DRAWN	RP	Coffey Architects
CHECKED	SJM	SCALE
		1/200 (A1 Sheet)

RICS

London Irish Centre, 50-52 Camden Square, London, NW1 9XB

TOPOGRAPHICAL SURVEY

Job No	Rev	Drawing Number
19/161	A	19/161/100

Date : July 2019

B Thames Water Asset Records

Asset location search

Property Searches

Elliott Wood Partnership LLP
LONDON
W1W 7TY

Search address supplied London Irish Centre
52
Camden Square
London
NW1 9XB

Your reference 2180676

Our reference ALS/ALS Standard/2019_4088503

Search date 8 October 2019

Keeping you up-to-date

Notification of Price Changes

From 1 September 2018 Thames Water Property Searches will be increasing the price of its Asset Location Search in line with RPI at 3.23%.

For further details on the price increase please visit our website: www.thameswater-propertysearches.co.uk
Please note that any orders received with a higher payment prior to the 1 September 2018 will be non-refundable.

Thames Water Utilities Ltd
Property Searches, PO Box 3189, Slough SL1 4WW
DX 151280 Slough 13

searches@thameswater.co.uk
www.thameswater-propertysearches.co.uk

0845 070 9148

searchcode

Asset location search

Property Searches

Search address supplied: London Irish Centre, 52, Camden Square, London, NW1 9XB

Dear Sir / Madam

An Asset Location Search is recommended when undertaking a site development. It is essential to obtain information on the size and location of clean water and sewerage assets to safeguard against expensive damage and allow cost-effective service design.

The following records were searched in compiling this report: - the map of public sewers & the map of waterworks. Thames Water Utilities Ltd (TWUL) holds all of these.

This searchprovides maps showing the position, size of Thames Water assets close to the proposed development and also manhole cover and invert levels, where available.

Please note that none of the charges made for this report relate to the provision of Ordnance Survey mapping information. The replies contained in this letter are given following inspection of the public service records available to this company. No responsibility can be accepted for any error or omission in the replies.

You should be aware that the information contained on these plans is current only on the day that the plans are issued. The plans should only be used for the duration of the work that is being carried out at the present time. Under no circumstances should this data be copied or transmitted to parties other than those for whom the current work is being carried out.

Thames Water do update these service plans on a regular basis and failure to observe the above conditions could lead to damage arising to new or diverted services at a later date.

Contact Us

If you have any further queries regarding this enquiry please feel free to contact a member of the team on 0845 070 9148, or use the address below:

Thames Water Utilities Ltd
Property Searches
PO Box 3189
Slough
SL1 4WW

Email: searches@thameswater.co.uk
Web: www.thameswater-propertysearches.co.uk

Asset location search

Thames Water Property Searches

Waste Water Services

Please provide a copy extract from the public sewer map.

Enclosed is a map showing the approximate lines of our sewers. Our plans do not show sewer connections from individual properties or any sewers not owned by Thames Water unless specifically annotated otherwise. Records such as "private" pipework are in some cases available from the Building Control Department of the relevant Local Authority.

Where the Local Authority does not hold such plans it might be advisable to consult the property deeds for the site or contact neighbouring landowners.

This report relates only to sewerage apparatus of Thames Water Utilities Ltd, it does not disclose details of cables and or communications equipment that may be running through or around such apparatus.

The sewer level information contained in this response represents all of the level data available in our existing records. Should you require any further Information, please refer to the relevant section within the 'Further Contacts' page found later in this document.

For your guidance:

- The Company is not generally responsible for rivers, watercourses, ponds, culverts or highway drains. If any of these are shown on the copy extract they are shown for information only.
- Any private sewers or lateral drains which are indicated on the extract of the public sewer map as being subject to an agreement under Section 104 of the Water Industry Act 1991 are not an ‘as constructed’ record. It is recommended these details be checked with the developer.

Clean Water Services

Please provide a copy extract from the public water main map.

Enclosed is a map showing the approximate positions of our water mains and associated apparatus. Please note that records are not kept of the positions of individual domestic supplies.

For your information, there will be a pressure of at least 10m head at the outside stop valve. If you would like to know the static pressure, please contact our Customer Centre on 0800 316 9800. The Customer Centre can also arrange for a full flow and pressure test to be carried out for a fee.

For your guidance:

- Assets other than vested water mains may be shown on the plan, for information only.
- If an extract of the public water main record is enclosed, this will show known public water mains in the vicinity of the property. It should be possible to estimate the likely length and route of any private water supply pipe connecting the property to the public water network.

Payment for this Search

A charge will be added to your suppliers account.

Further contacts:

Waste Water queries

Should you require verification of the invert levels of public sewers, by site measurement, you will need to approach the relevant Thames Water Area Network Office for permission to lift the appropriate covers. This permission will usually involve you completing a TWOSA form. For further information please contact our Customer Centre on Tel: 0845 920 0800. Alternatively, a survey can be arranged, for a fee, through our Customer Centre on the above number.

If you have any questions regarding sewer connections, budget estimates, diversions, building over issues or any other questions regarding operational issues please direct them to our service desk. Which can be contacted by writing to:

Developer Services (Waste Water)
Thames Water
Clearwater Court
Vastern Road
Reading
RG1 8DB

Tel: 0800 009 3921
Email: developer.services@thameswater.co.uk

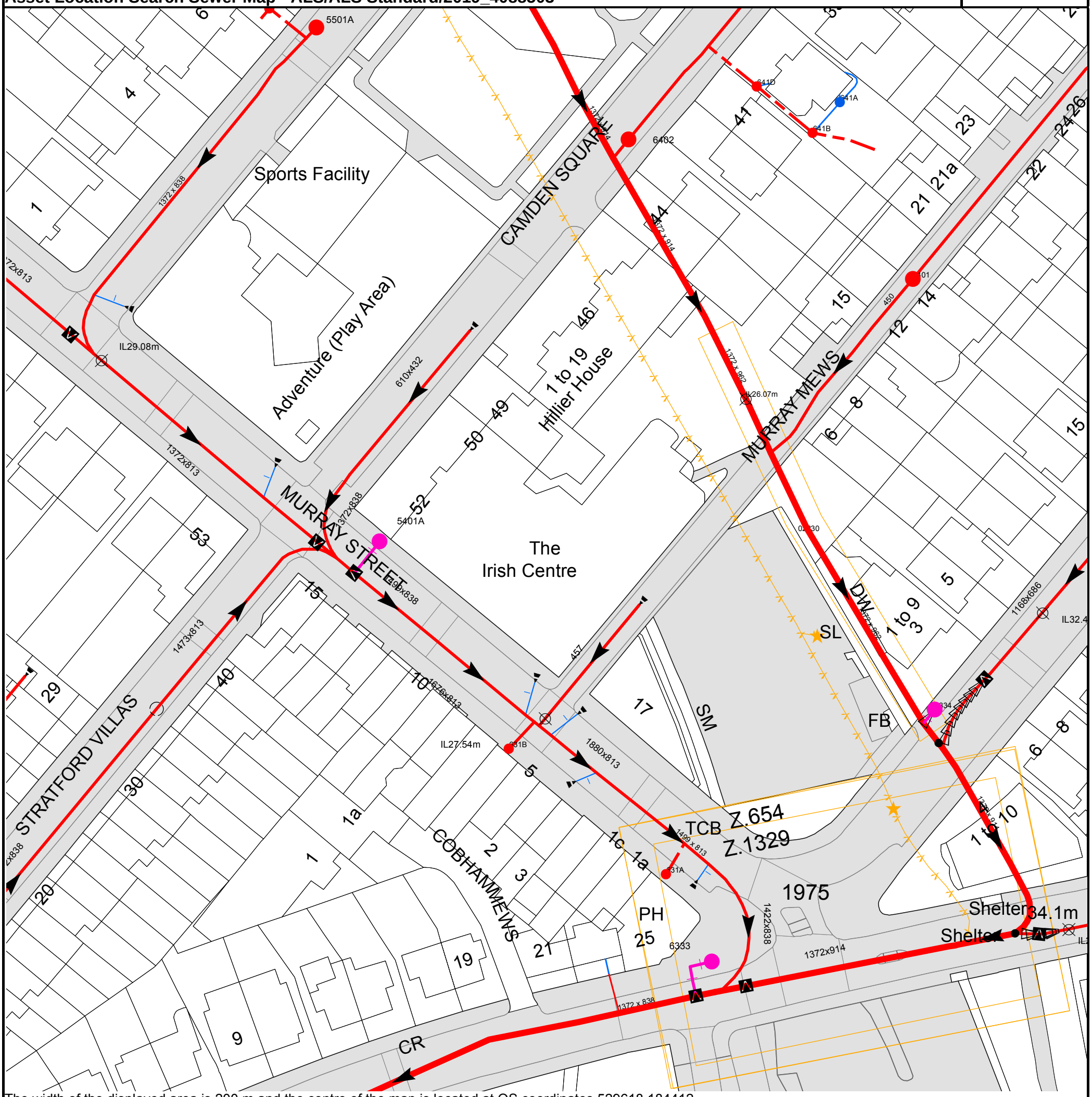
Clean Water queries

Should you require any advice concerning clean water operational issues or clean water connections, please contact:

Developer Services (Clean Water)
Thames Water
Clearwater Court
Vastern Road
Reading
RG1 8DB

Tel: 0800 009 3921
Email: developer.services@thameswater.co.uk

Asset Location Search Sewer Map - ALS/ALS Standard/2019_4088503



The width of the displayed area is 200 m and the centre of the map is located at OS coordinates 529618,184412

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
551D	n/a	n/a
5501A	36.42	32.86
5401A	n/a	n/a
6402	37.06	31.54
641D	n/a	n/a
641B	n/a	n/a
641A	n/a	n/a
6401	36.45	32.54
6334	34.7	25.63
6333	n/a	n/a
631A	n/a	n/a
631B	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.

ALS Sewer Map Key

Public Sewer Types (Operated & Maintained by Thames Water)

Foul: A sewer designed to convey waste water from domestic and industrial sources to a treatment works.

Surface Water: A sewer designed to convey surface water (e.g. rain water from roofs, yards and car parks) to rivers or watercourses.

Combined: A sewer designed to convey both waste water and surface water from domestic and industrial sources to a treatment works.

- Trunk Surface Water
- Trunk Foul
- Storm Relief
- Trunk Combined
- Vent Pipe
- Bio-solids (Sludge)
- Proposed Thames Surface Water Sewer
- Proposed Thames Water Foul Sewer
- Gallery
- Foul Rising Main
- Surface Water Rising Main
- Combined Rising Main
- Sludge Rising Main
- Proposed Thames Water Rising Main
- Vacuum

Sewer Fittings

A feature in a sewer that does not affect the flow in the pipe. Example: a vent is a fitting as the function of a vent is to release excess gas.

- Air Valve
- Dam Chase
- Fitting
- Meter
- Vent Column

Operational Controls

A feature in a sewer that changes or diverts the flow in the sewer. Example: A hydrobrake limits the flow passing downstream.

- Control Valve
- Drop Pipe
- Ancillary
- Weir

End Items

End symbols appear at the start or end of a sewer pipe. Examples: an Undefined End at the start of a sewer indicates that Thames Water has no knowledge of the position of the sewer upstream of that symbol, Outfall on a surface water sewer indicates that the pipe discharges into a stream or river.

- Outfall
- Undefined End
- Inlet

Other Symbols

Symbols used on maps which do not fall under other general categories

- Public/Private Pumping Station
- Change of characteristic indicator (C.O.C.I.)
- Invert Level
- Summit

Areas

Lines denoting areas of underground surveys, etc.

- Agreement
- Operational Site
- Chamber
- Tunnel
- Conduit Bridge

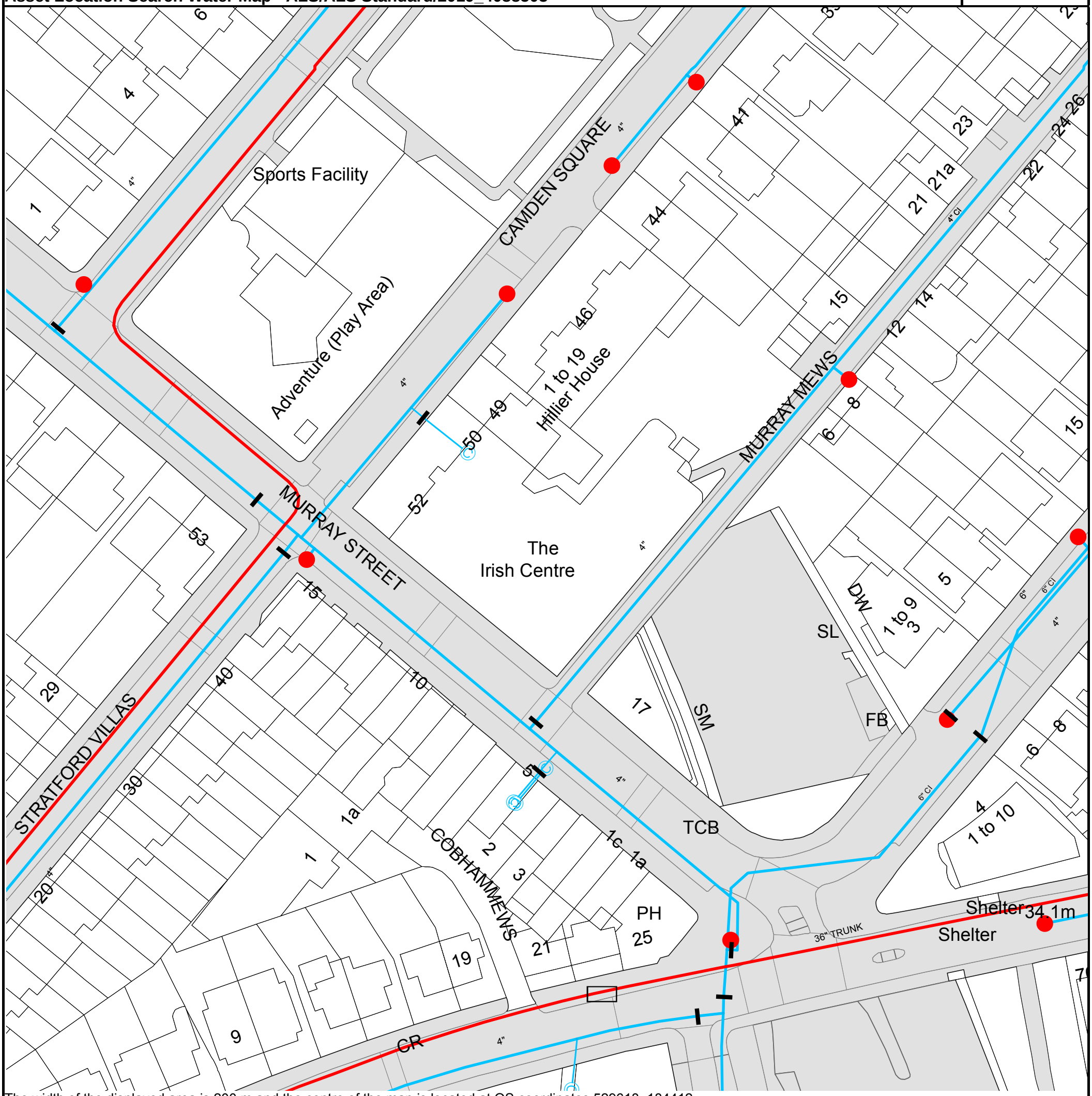
Other Sewer Types (Not Operated or Maintained by Thames Water)

- Foul Sewer
- Surface Water Sewer
- Combined Sewer
- Gulley
- Culverted Watercourse
- Proposed
- Abandoned Sewer

Notes:

1) All levels associated with the plans are to Ordnance Datum Newlyn.
2) All measurements on the plans are metric.
3) Arrows (on gravity fed sewers) or flecks (on rising mains) indicate direction of flow.
4) Most private pipes are not shown on our plans, as in the past, this information has not been recorded.
5) 'na' or '0' on a manhole level indicates that data is unavailable.
6) The text appearing alongside a sewer line indicates the internal diameter of the pipe in milimetres. Text next to a manhole indicates the manhole reference number and should not be taken as a measurement. If you are unsure about any text or symbology present on the plan, please contact a member of Property Insight on 0845 070 9148.

Asset Location Search Water Map - ALS/ALS Standard/2019_4088503



The width of the displayed area is 200 m and the centre of the map is located at OS coordinates 529618, 184412.

ALS Water Map Key

Water Pipes (Operated & Maintained by Thames Water)

4" — **Distribution Main:** The most common pipe shown on water maps. With few exceptions, domestic connections are only made to distribution mains.

16" — **Trunk Main:** A main carrying water from a source of supply to a treatment plant or reservoir, or from one treatment plant or reservoir to another. Also a main transferring water in bulk to smaller water mains used for supplying individual customers.

3" SUPPLY — **Supply Main:** A supply main indicates that the water main is used as a supply for a single property or group of properties.

3" FIRE — **Fire Main:** Where a pipe is used as a fire supply, the word FIRE will be displayed along the pipe.

3" METERED — **Metered Pipe:** A metered main indicates that the pipe in question supplies water for a single property or group of properties and that quantity of water passing through the pipe is metered even though there may be no meter symbol shown.

Transmission Tunnel: A very large diameter water pipe. Most tunnels are buried very deep underground. These pipes are not expected to affect the structural integrity of buildings shown on the map provided.

Proposed Main: A main that is still in the planning stages or in the process of being laid. More details of the proposed main and its reference number are generally included near the main.

Valves

- General Purpose Valve
- Air Valve
- Pressure Control Valve
- Customer Valve

Hydrants

- Single Hydrant

Meters

- Meter

End Items

Symbol indicating what happens at the end of a water main.

- Blank Flange
- Capped End
- Emptying Pit
- Undefined End
- Manifold
- Customer Supply
- Fire Supply

Operational Sites

- Booster Station
- Other
- Other (Proposed)
- Pumping Station
- Service Reservoir
- Shaft Inspection
- Treatment Works
- Unknown
- Water Tower

Other Symbols

- Data Logger

PIPE DIAMETER	DEPTH BELOW GROUND
Up to 300mm (12")	900mm (3')
300mm - 600mm (12" - 24")	1100mm (3' 8")
600mm and bigger (24" plus)	1200mm (4')

Other Water Pipes (Not Operated or Maintained by Thames Water)

Other Water Company Main: Occasionally other water company water pipes may overlap the border of our clean water coverage area. These mains are denoted in purple and in most cases have the owner of the pipe displayed along them.

Private Main: Indiates that the water main in question is not owned by Thames Water. These mains normally have text associated with them indicating the diameter and owner of the pipe.

Terms and Conditions

All sales are made in accordance with Thames Water Utilities Limited (TWUL) standard terms and conditions unless previously agreed in writing.

1. All goods remain in the property of Thames Water Utilities Ltd until full payment is received.
2. Provision of service will be in accordance with all legal requirements and published TWUL policies.
3. All invoices are strictly due for payment 14 days from due date of the invoice. Any other terms must be accepted/agreed in writing prior to provision of goods or service, or will be held to be invalid.
4. Thames Water does not accept post-dated cheques-any cheques received will be processed for payment on date of receipt.
5. In case of dispute TWUL`s terms and conditions shall apply.
6. Penalty interest may be invoked by TWUL in the event of unjustifiable payment delay. Interest charges will be in line with UK Statute Law 'The Late Payment of Commercial Debts (Interest) Act 1998'.
7. Interest will be charged in line with current Court Interest Charges, if legal action is taken.
8. A charge may be made at the discretion of the company for increased administration costs.

A copy of Thames Water's standard terms and conditions are available from the Commercial Billing Team (cashoperations@thameswater.co.uk).

We publish several Codes of Practice including a guaranteed standards scheme. You can obtain copies of these leaflets by calling us on 0800 316 9800

If you are unhappy with our service you can speak to your original goods or customer service provider. If you are not satisfied with the response, your complaint will be reviewed by the Customer Services Director. You can write to her at: Thames Water Utilities Ltd. PO Box 492, Swindon, SN38 8TU.

If the Goods or Services covered by this invoice falls under the regulation of the 1991 Water Industry Act, and you remain dissatisfied you can refer your complaint to Consumer Council for Water on 0121 345 1000 or write to them at Consumer Council for Water, 1st Floor, Victoria Square House, Victoria Square, Birmingham, B2 4AJ.

Ways to pay your bill

Credit Card	**BACS Payment**	**Telephone Banking**	**Cheque**
Call **0845 070 9148** quoting your invoice number starting CBA or ADS / OSS	Account number **90478703** Sort code **60-00-01** A remittance advice must be sent to: **Thames Water Utilities Ltd., PO Box 3189, Slough SL1 4WW.** or email **ps.billing@thameswater.co.uk**	By calling your bank and quoting: Account number **90478703** Sort code **60-00-01** and your invoice number	Made payable to '**Thames Water Utilities Ltd**' Write your Thames Water account number on the back. Send to: **Thames Water Utilities Ltd., PO Box 3189, Slough SL1 4WW** or by DX to **151280 Slough 13**

Thames Water Utilities Ltd Registered in England & Wales No. 2366661 Registered Office Clearwater Court, Vastern Rd, Reading, Berks, RG1 8DB.

Search Code

IMPORTANT CONSUMER PROTECTION INFORMATION

This search has been produced by Thames Water Property Searches, Clearwater Court, Vastern Road, Reading RG1 8DB, which is registered with the Property Codes Compliance Board (PCCB) as a subscriber to the Search Code. The PCCB independently monitors how registered search firms maintain compliance with the Code.

The Search Code:

- provides protection for homebuyers, sellers, estate agents, conveyancers and mortgage lenders who rely on the information included in property search reports undertaken by subscribers on residential and commercial property within the United Kingdom
- sets out minimum standards which firms compiling and selling search reports have to meet
- promotes the best practise and quality standards within the industry for the benefit of consumers and property professionals
- enables consumers and property professionals to have confidence in firms which subscribe to the code, their products and services.

By giving you this information, the search firm is confirming that they keep to the principles of the Code. This provides important protection for you.

The Code's core principles

Firms which subscribe to the Search Code will:

- display the Search Code logo prominently on their search reports
- act with integrity and carry out work with due skill, care and diligence
- at all times maintain adequate and appropriate insurance to protect consumers
- conduct business in an honest, fair and professional manner
- handle complaints speedily and fairly
- ensure that products and services comply with industry registration rules and standards and relevant laws
- monitor their compliance with the Code

Complaints

If you have a query or complaint about your search, you should raise it directly with the search firm, and if appropriate ask for any complaint to be considered under their formal internal complaints procedure. If you remain dissatisfied with the firm's final response, after your complaint has been formally considered, or if the firm has exceeded the response timescales, you may refer your complaint for consideration under The Property Ombudsman scheme (TPOs). The Ombudsman can award compensation of up to £5,000 to you if the Ombudsman finds that you have suffered actual loss and/or aggravation, distress or inconvenience as a result of your search provider failing to keep to the code.

Please note that all queries or complaints regarding your search should be directed to your search provider in the first instance, not to TPOs or to the PCCB.

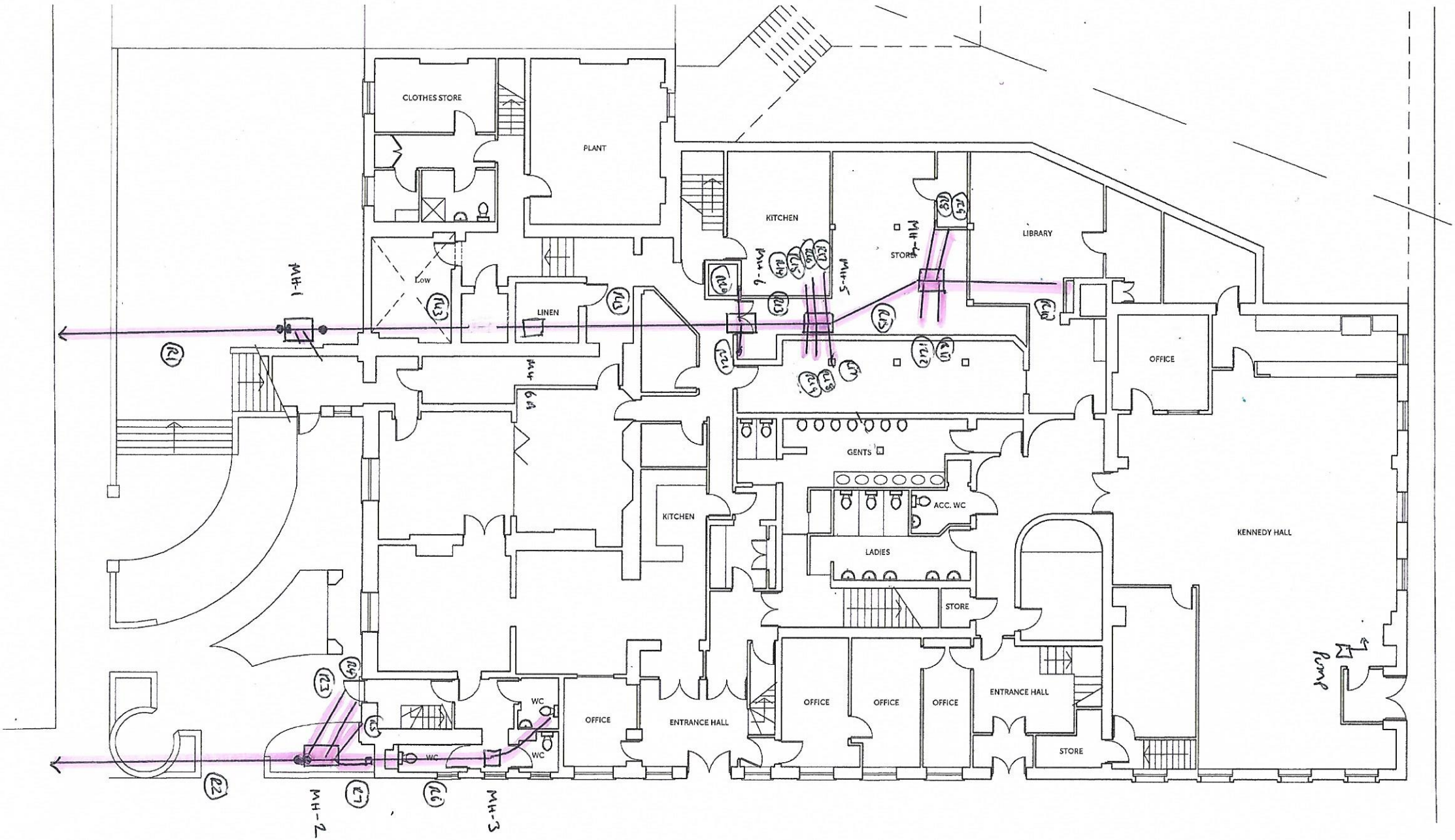
TPOs Contact Details

The Property Ombudsman scheme
Milford House
43-55 Milford Street
Salisbury
Wiltshire SP1 2BP
Tel: 01722 333306
Fax: 01722 332296
Web site: www.tpos.co.uk
Email: admin@tpos.co.uk

You can get more information about the PCCB from www.propertycodes.org.uk

PLEASE ASK YOUR SEARCH PROVIDER IF YOU WOULD LIKE A COPY OF THE SEARCH CODE

C CCTV Drainage Survey Plan

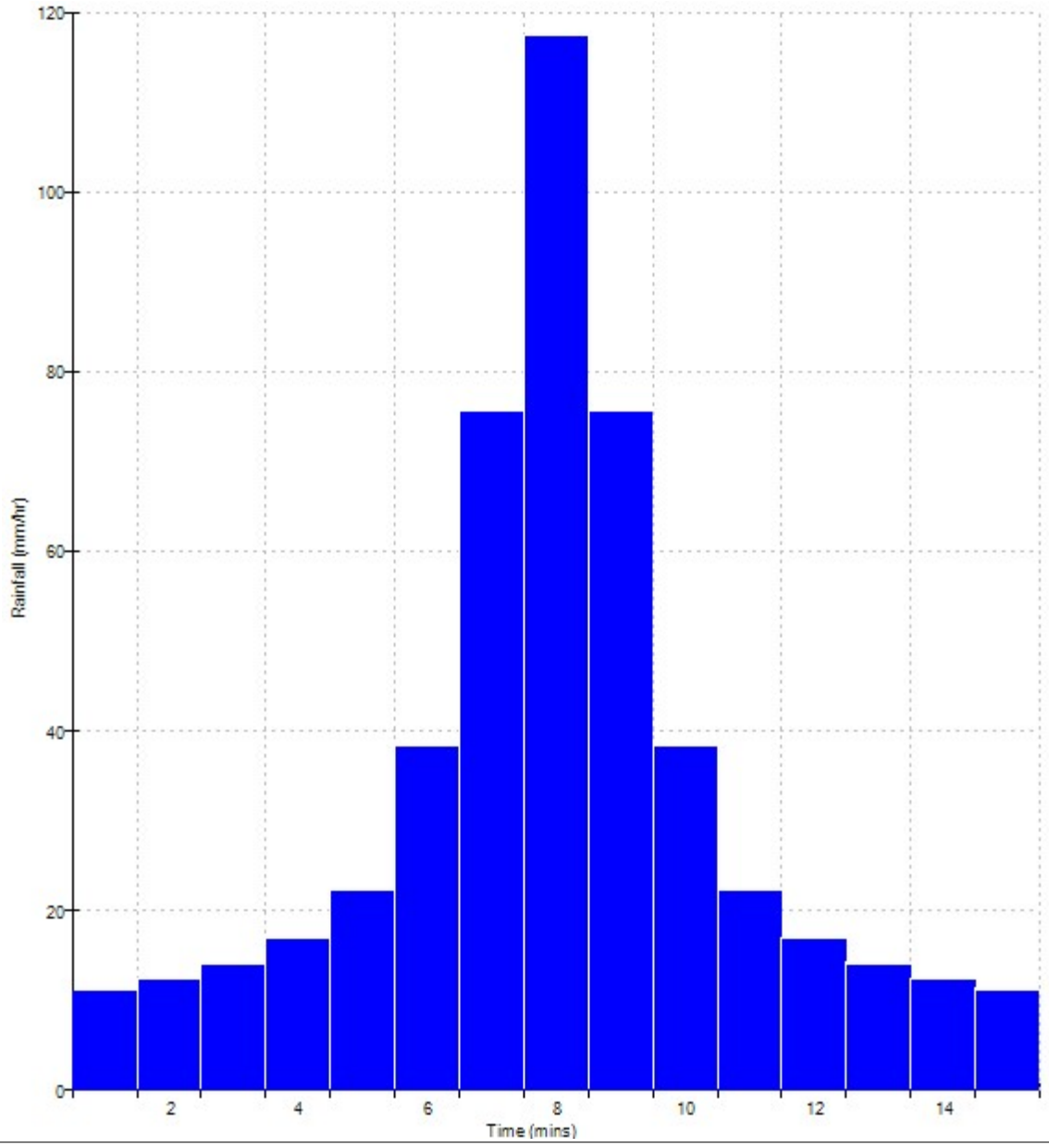

CLOTHES STORE
PLANT
KITCHEN
STORE
LIBRARY
OFFICE
Low
LINEN
GENTS
ACC. WC
LADIES
KITCHEN
KENNEDY HALL
STORE
ENTRANCE HALL
OFFICE
OFFICE
OFFICE
ENTRANCE HALL
STORE
OFFICE
WC
WC
WC
MH-1
MH-2
MH-3
MH-4
MH-5
MH-6
MH-7
Pump

D Site Rainfall Profiles

Rainfall profile

Storm duration (mins) 15

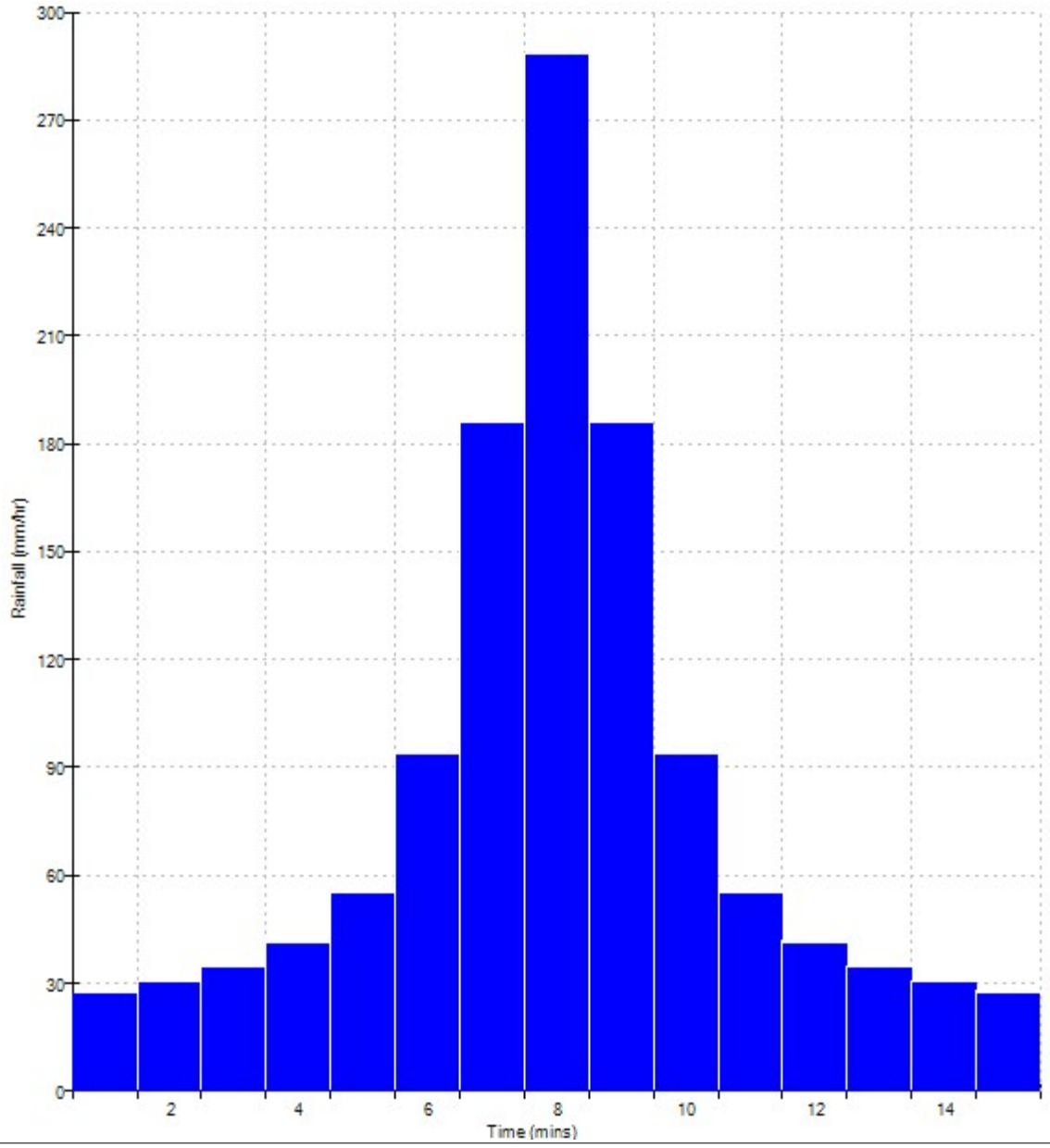
FSR Data	
Region	England and Wales
M5-60 (mm)	20.700
Ratio R	0.441
Peak Intensity (mm/hr)	117.262
Ave. Intensity (mm/hr)	33.181
Return Period (years)	1.0



Rainfall profile

Storm duration (mins) 15

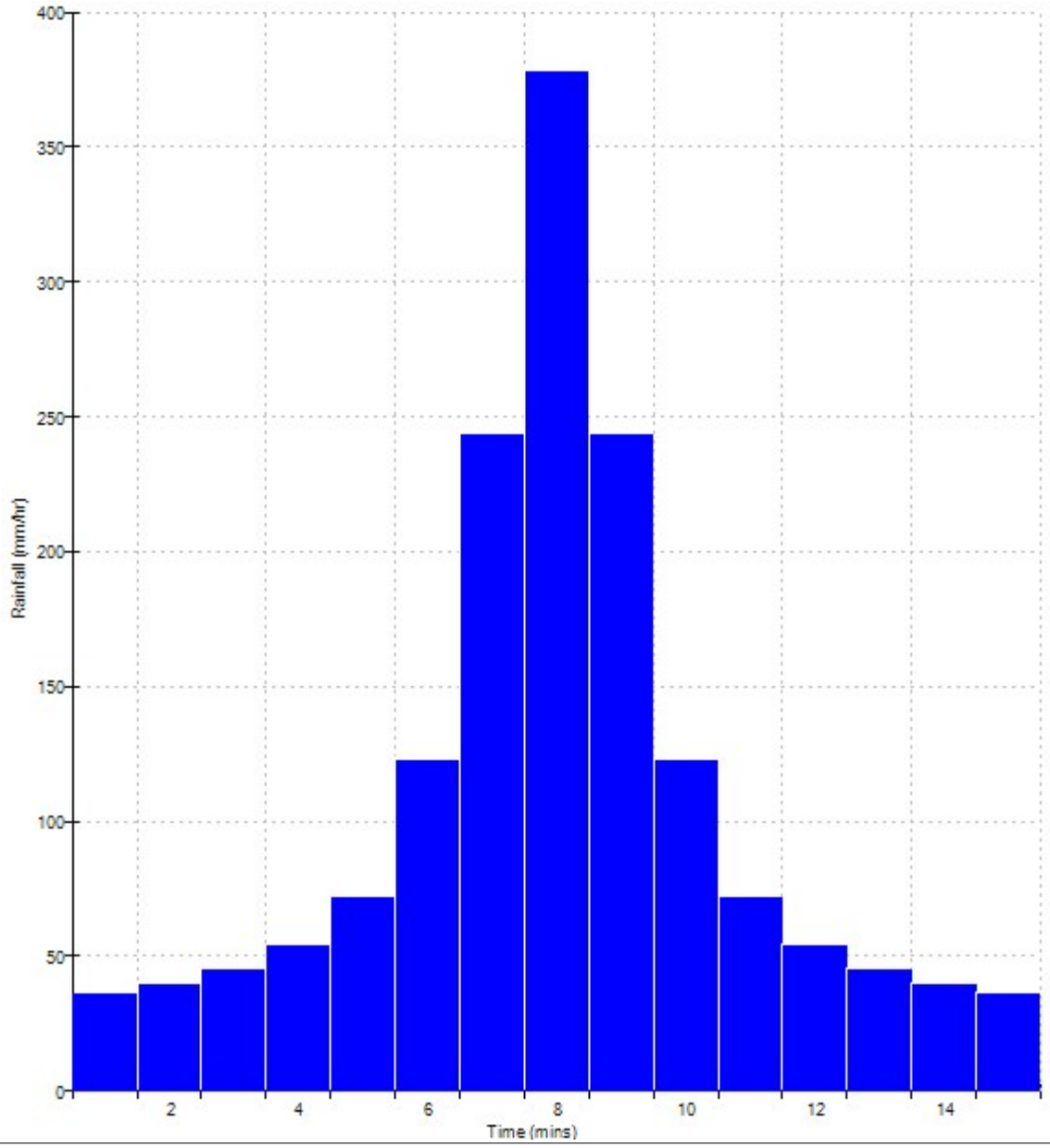
FSR Data	
Region	England and Wales
M5-60 (mm)	20.700
Ratio R	0.441
Peak Intensity (mm/hr)	287.990
Ave. Intensity (mm/hr)	81.491
Return Period (years)	30.0



Rainfall profile

Storm duration (mins) 15

FSR Data	
Region	England and Wales
M5-60 (mm)	20.900
Ratio R	0.438
Peak Intensity (mm/hr)	377.718
Ave. Intensity (mm/hr)	106.881
Return Period (years)	100.0



E Proposed Development Plans

This drawing is to be read in conjunction with all relevant architects, engineers and specialists drawings and specifications.

Do not scale from this drawing.

Key

- Proposed surface water drainage network
- Proposed foul water drainage network
- Existing combined water network
- Proposed area of blue roof attenuation
- Proposed blue roof catchment

Notes

1. This drawing is based on Coffey Architects Proposed Roof Plan drawing 1120_A105_05.

x2 Proposed surface water connections to demarcation manhole

1. Proposed blue roof drainage (Peak discharge rate - 1.6 l/s)

2. Proposed remaining impermeable area - Unrestricted (Peak discharge rate - 27.0 l/s)

Existing combined demarcation manhole

Existing 150mm dia. connection to TW sewer within Camden Square to be re-used

Proposed foul water connection to demarcation manhole

Peak discharge rate - TBC l/s

Existing combined demarcation manhole

Existing 150mm dia. connection to TW sewer within Camden Square not required.

5. Stair Roof
- 63m2
- 0.4 l/s

1. McNamara Hall Roof (PV Panels / Plant)
- 400m2
- 0.6 l/s

4. New Kitchen Roof
101m2
- 0.6 l/s

2. Top Roof (Green Roof)
- 252m2

3. External Terrace
- 165m2

Terrace Feature

ROOF +46.88

ROOF +47.180

Proposed drainage channel

In order to route surface water from the top roof to the McNamara Hall blue roof, a drainage channel would be required.

02 A202 · BB A250 · 04 A202 · 01 A202 · DD A251 · AA A250 · 01 A201 · EE A251 · CC A251 · 02 A200 · 01 A200

0m 01 02 03 04 05 06 07 08 09 10m

N

rev	date	by	chk	description
P2	02.03.20	MTr	PDa	For Planning
P1	20.02.20	MTr	PDa	Stage 2+

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Elliott Wood Partnership Ltd
Central London • Wimbledon • Nottingham
Consulting Structural and Civil Engineers
(020) 7499 5888 • elliottwood.co.uk

Project

London Irish Centre

Drawing title

Proposed Drainage - Site Layout

Scale (s)	Date	Drawn
NTS	February 2020	MTr

Drawing status: Preliminary — Status S2 — Revision P2

Project no.	Originator	Zone	Level	Type	Role	drg no.
2180676	EWP	ZZ	XX	SK	C	0004

F Greenfield Run-off Estimation Tool

Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by: Marco Tranchina

Site name: London Irish Centre

Site location: London Irish Centre

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013) , the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Site Details

Latitude: 51.54380° N

Longitude: 0.13243° W

Reference: 2167683631

Date: Oct 15 2019 11:45

Runoff estimation approach

IH124

Site characteristics

Total site area (ha): 0.184

Methodology

Q_{BAR} estimation method: Calculate from SPR and SAAR

SPR estimation method: Calculate from SOIL type

Soil characteristics

	Default	Edited
SOIL type:	4	4
HOST class:	N/A	N/A
SPR/SPRHOST:	0.47	0.47

Hydrological characteristics

	Default	Edited
SAAR (mm):	629	629
Hydrological region:	6	6
Growth curve factor 1 year:	0.85	0.85
Growth curve factor 30 years:	2.3	2.3
Growth curve factor 100 years:	3.19	3.19
Growth curve factor 200 years:	3.74	3.74

Notes

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

When Q_{BAR} is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

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

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

(3) Is SPR/SPRHOST ≤ 0.3?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

Greenfield runoff rates

	Default	Edited
Q_{BAR} (l/s):	0.78	0.78
1 in 1 year (l/s):	0.67	0.67
1 in 30 years (l/s):	1.8	1.8
1 in 100 year (l/s):	2.5	2.5
1 in 200 years (l/s):	2.93	2.93

G Blue Roof Calculation Summary

BLUE ROOF STORAGE AND OUTFLOW SUMMARY

PRIVATE & CONFIDENTIAL - NOT FOR DISTRIBUTION

Project Name:	London Irish Centre, London - Kitchen Roof - Option 1		
Prepared for:	Elliott Wood, London		
Date:	14/02/2020		
ABG Project ID:	19365	Calculator version:	1.24
Prepared by:	Andrew Keer, andrew@abgltd.com, 07525-808700		
Notes/description:	Ballasted, and pavers on pedestals, surface finishes, with potential for freestanding and ballasted, PV panels. Maintenance access only. Warm/inverted roof construction, with zero falls - TBC. 1/3 of the catchment from 'Top Roof'. 'Option 1' = additional catchment areas.		

Blue Roof Estimate

Input Parameters - Rainfall Information (Flood Studies Report 1975)		
Return period:	100 years	*As supplied by Client*
Allowance for Climate Change:	40 %	*As supplied by Client*
Location selected for FSR data:	London (Central)	

Input Parameters - Roof Information		
Total catchment area:	185 m^2	*As supplied by Client*
Attenuation area:	101 m^2	*As supplied by Client*
Maximum allowable runoff:	0.5 l/s	*As supplied by Client*

Output - Rainfall Calculation

Duration	Time to Empty	Restricted Outflow (l/s)
15 mins	8 hours and 0 minutes	0.4
30 mins	9 hours and 20 minutes	0.4
1 hour	10 hours and 20 minutes	0.4
2 hours	10 hours and 50 minutes	0.4
4 hours	10 hours and 40 minutes	0.4
6 hours	10 hours and 10 minutes	0.4
10 hours	9 hours and 0 minutes	0.4
24 hours	3 hours and 40 minutes	0.2
48 hours	0 hours and 0 minutes	0.0

Total attenuation required: 11.2 m^3
Half empty time: 4 hours and 0 minutes.

Output - Recommended Blue Roof System		
System Name:	ABG blueroof VF HD 130mm	
Description:	No. of control positions TBC by design team, and also with the structural engineer's deflection analysis.	
Total attenuation capacity:	11.4 m^3	
Number of Blue Roof outlets:	2	

Notes:

1. This document contains an estimate which has been prepared by ABG Ltd and is illustrative only and not a detailed design.
2. Further details on the theories used in this estimate are available upon request from ABG. The values given are indicative and correspond to nominal results obtained in our laboratories and testing institutes. In line with our policy of continuous improvement the right is reserved to make changes without notice at any time.
3. This estimate is specific to the characteristics of ABG products and is not applicable to other products.
4. The copyright in this document belongs to ABG Ltd.
5. The estimate given in this report is based on the stated parameters as per the brief. If these parameters are not correct or have changed, ABG should be contacted to provide a revised estimate.
6. No guarantee or liability can be drawn from the information in this report.
7. Final determination of the suitability of any information is the sole responsibility of the user. ABG will be pleased to discuss the use of this or any other product but responsibility for selection of a material and its application in any specific project remains with the user.

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UK t 01484 852096 e geo@abgltd.com **Export** t +44(0)1484 852250 e export@abgltd.com
www.abgltd.com

1. DEFINITIONS

'Consultant' means ABG Geosynthetics Ltd and its legal successors. 'Client' means the person, firm, company or organisation for whom the Consultant is performing the Services. 'Agreement' means the contract referred to in Clause 2. 'Services' means the services to be performed by the Consultant in accordance with the proposal from the Consultant. 'Project' means the project or works for which the Client has commissioned the Services.

2. GENERAL

Unless and until a formal agreement is entered into, the Client's acceptance of the proposal for Services from the Consultant or a request for some or all the Services to be performed by the Consultant, shall constitute a binding
contract between the Client and the Consultant which contract will be subject to any terms and conditions contained or referred to in the aforementioned proposal and these terms and conditions. In the event of any conflict, the terms and conditions in the proposal shall prevail over these terms and conditions. The Agreement so formed shall supersede all previous understandings, commitments or agreements whether written or oral between the Client and the Consultant relating to the subject matter hereof. No person or entity shall have any rights in relation to this Agreement, whether as third parties or otherwise, save the parties to this Agreement. Should any term or condition of this Agreement be held to be unenforceable or invalid by the courts of any jurisdiction to which it is subject then such term or condition shall be disregarded and the remaining terms and conditions shall remain in full force and effect.

3. PERFORMANCE OF SERVICES AND SCOPE

The Consultant shall perform the Services using the degree of skill care and diligence to be expected from a consultant experienced in the provision of services of similar scope size and complexity. The Consultant shall use reasonable endeavours to complete the Services within the time or programme agreed but shall not be responsible for any delay beyond the reasonable control of the Consultant.

The fee contained in the proposal is for the scope of services as defined therein. If not already contained in the proposal the Consultant and the Client shall agree as an initial activity an integrated project services programme to
include the activities of all the parties to the Project relevant to the Services to be supplied by the Consultant. The
aforesaid programme shall show the key dates for final information and the delivery of such to the Consultant so as to enable the Consultant to carry out the services in an efficient once through manner to achieve the programme delivery dates for the Services.

The Consultant provides various services including Design and Product use advice which is distinct from a Design Service. The Design Service may or may not attract a fee.

Where the Consultant's services are of an advisory nature and dependent upon the degree of information and release thereof by the Client then the Client agrees that any reliance placed on the services by the Client shall take due account of such constraints.

4. CONFIDENTIALITY AND INTELLECTUAL PROPERTY RIGHTS

i. The Consultant and the Client shall keep confidential all information pertaining to the Services.

ii. Copyright for all reports, documents and the like produced by the Consultant in the performance of the Services
shall remain vested with the Consultant but the Consultant shall grant an irrevocable royalty free license to the Client to use such reports, documents and the like for any purpose in connection with the Project.

5. LIABILITY

i. The Consultant shall be liable to pay compensation to the Client arising out of or in connection with this
Agreement only if a breach of the duty of care in Clause 3 is established against the Consultant.

ii. Notwithstanding any other term to the contrary in this Agreement or any related document and whether the cause of action for any claim arises under or in connection with the Agreement in contract or in tort, in negligence or for breach of statutory duty or otherwise the Consultant shall have no liability to the Client in respect of any claim for loss or damage arising from acts of war or terrorism or arising from flooding, burst water mains or failed drainage or arising from any incidence of toxic mould or asbestos but otherwise in relation to any cause of action as aforesaid the total liability of the Consultant in the aggregate for all claims shall be limited to a sum equivalent to ten (10) times the fee payable under this Agreement or £50,000, whichever is the lesser, or such other sum as may be expressly stated in the Consultant's proposal, and further but without prejudice to the aforesaid limit of liability any such liability of the Consultant shall be limited to such sum or sums as it would be just and equitable for the Consultant to pay having regard to the Consultant's responsibility for the same and on the basis that all other parties appointed or to be appointed by the Client to perform related services in connection with the Project shall be deemed to have provided undertakings on terms no less onerous than this Agreement and shall be deemed to have paid to the Client such contribution as it would be just and equitable for them to pay having regard to their responsibility for any loss or damage and providing that it shall be deemed that such other parties have not limited or excluded their liability to the Client for such loss or damage in any way which may be prejudicial to the Consultant's liability under this clause. Nothing in this clause shall operate to exclude or limit the Consultant's liability for death or personal injury.

iii. The Client shall indemnify and keep indemnified the Consultant from and against all claims, demands,
proceedings, damages, costs and expenses arising out of or in connection with this Agreement or the Project
arising from acts of terrorism or arising otherwise in excess of the liability of the Consultant under this
Agreement or which may be made in respect of events occurring after the expiry of the period of liability stated
in this Agreement.

iv. No action or proceedings under or in connection with this Agreement shall be commenced against the Consultant after the expiry of one year from completion of the Services.

v. ABG Geosynthetics Ltd is not responsible for consequential, indirect or incidental losses.

6. INSURANCE

The Consultant shall arrange Professional Indemnity Insurance cover for the amount stated in Clause 5(ii). The Consultant will use all reasonable endeavours to maintain Professional Indemnity Insurance cover for the period stated in 5(iv) above, providing such insurance remains available to the Consultant at commercially reasonable rates.

7. CLIENT'S OBLIGATIONS

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BLUE ROOF STORAGE AND OUTFLOW SUMMARY

PRIVATE & CONFIDENTIAL - NOT FOR DISTRIBUTION

Project Name:	London Irish Centre, London - McNamara Hall Roof - Option 1
Prepared for:	Elliott Wood, London
Date:	14/02/2020
ABG Project ID:	19365 Calculator version: 1.24
Prepared by:	Andrew Keer, andrew@abgltd.com, 07525-808700
Notes/description:	Ballasted, and pavers on pedestals, surface finishes, with freestanding and ballasted, PV panels; and smaller plant area (approx. 74m2). Maintenance access only. Warm/inverted roof construction, with zero falls - TBC. Plant support method TBC - with ABG and structural engineer. 2/3 of catchment from 'Top Roof. 'Option 1' = with additional catchment.

Blue Roof Estimate

Input Parameters - Rainfall Information (Flood Studies Report 1975)		
Return period:	100 years	*As supplied by Client*
Allowance for Climate Change:	40 %	*As supplied by Client*
Location selected for FSR data:	London (Central)	

Input Parameters - Roof Information		
Total catchment area:	568 m^2	*As supplied by Client*
Attenuation area:	400 m^2	*As supplied by Client*
Maximum allowable runoff:	0.6 l/s	*As supplied by Client*

Output - Rainfall Calculation

Duration	Time to Empty	Restricted Outflow (l/s)
15 mins	21 hours and 10 minutes	0.4
30 mins	25 hours and 0 minutes	0.5
1 hour	28 hours and 0 minutes	0.5
2 hours	30 hours and 20 minutes	0.5
4 hours	32 hours and 10 minutes	0.6
6 hours	32 hours and 30 minutes	0.6
10 hours	32 hours and 50 minutes	0.6
24 hours	29 hours and 0 minutes	0.5
48 hours	20 hours and 0 minutes	0.4

Total attenuation required: 43.9 m^3
Half empty time: 12 hours and 10 minutes.

Output - Recommended Blue Roof System	
System Name:	ABG blueroof VF HD 130mm/VF HD+ 130mm
Description:	No. of control positions TBC by design team, and also with the structural engineer's deflection analysis.
Total attenuation capacity:	45.2 m^3
Number of Blue Roof outlets:	2

Notes:

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BLUE ROOF STORAGE AND OUTFLOW SUMMARY

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Project Name:	London Irish Centre, London - Stair Roof		
Prepared for:	Elliott Wood, London		
Date:	29/01/2020		
ABG Project ID:	19365	Calculator version:	1.24
Prepared by:	Andrew Keer, andrew@abgltd.com, 07525-808700		
Notes/description:	Ballasted, and pavers on pedestals, surface finishes, with potential for freestanding and ballasted, PV panels. Maintenance access only. Warm/inverted roof construction, with zero falls - TBC.		

Blue Roof Estimate

Input Parameters - Rainfall Information (Flood Studies Report 1975)		
Return period:	100 years	*As supplied by Client*
Allowance for Climate Change:	40 %	*As supplied by Client*
Location selected for FSR data:	London (Central)	

Input Parameters - Roof Information		
Total catchment area:	63 m^2	*As supplied by Client*
Attenuation area:	63 m^2	*As supplied by Client*
Maximum allowable runoff:	0.5 l/s	*As supplied by Client*

Output - Rainfall Calculation

Duration	Time to Empty	Restricted Outflow (l/s)
15 mins	2 hours and 30 minutes	0.3
30 mins	3 hours and 0 minutes	0.4
1 hour	3 hours and 10 minutes	0.4
2 hours	3 hours and 0 minutes	0.4
4 hours	2 hours and 20 minutes	0.3
6 hours	1 hour and 30 minutes	0.2
10 hours	0 hours and 30 minutes	0.1
24 hours	0 hours and 0 minutes	0.0
48 hours	0 hours and 0 minutes	0.0

Total attenuation required: 3.2 m^3
Half empty time: 1 hours and 0 minutes.

Output - Recommended Blue Roof System	
System Name:	ABG blueroof VF HD 80mm
Description:	No. of control positions TBC by design team, and also with the structural engineer's deflection analysis.
Total attenuation capacity:	4.1 m^3
Number of Blue Roof outlets:	2

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H London Borough of Camden SuDS Proforma

Camden

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1. Project & Site Details		
	Project / Site Name (including sub-catchment / stage / phase where appropriate)	London Irish Centre
	Address & post code	London Irish Centre, 52 Camden Square, London, NW1 9XB
	OS Grid ref. (Easting, Northing)	E 529617
		N 181415
	LPA reference (if applicable)	
	Brief description of proposed work	Refurbishment of 50, 51 & 52 Camden Square, and McNamara Hall. Demolition of buildings along Murray Street and Murray Mews and construction ofa new 4-storey building with basement.
	Total site Area	1830 m^2
	Total existing impervious area	1775 m^2
	Total proposed impervious area	1775 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	x2 existing 150mm combined water outfalls to TW sewer within Camden
	Designer Name	Marco Tranchina
	Designer Position	Civil Engineer
	Designer Company	Elliott Wood Partnership

2. Proposed Discharge Arrangements			
	2a. Infiltration Feasibility		
	Superficial geology classification		
	Bedrock geology classification	London Clay	
	Site infiltration rate	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	Y	Y
	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	mm combined water outfalls to TW sewer v	
	Has the owner/regulator of the discharge location been consulted?	Yes	

Camden

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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	0.78			
1 in 1	0.67	16.4		10
1 in 30	1.8	40.3		22.2
1 in 100	2.5	52.9		28.6
1 in 100 + CC				28.6
Climate change allowance used		40%		
3b. Principal Method of Flow Control		Orifice flow control at blue roof outlets		

3c. Proposed SuDS Measures

	Catchment area (m^2)	*Plan area (m^2)*	*Storage vol. (m^3)*
Rainwater harvesting	866		0
Infiltration systems	0		0
Green roofs	252	227	0
Blue roofs	866	564	62
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	**1984**	**791**	**62**

4. Supporting Information

4a. Discharge & Drainage Strategy	*Page/section of drainage report*
Infiltration feasibility (2a) – geotechnical factual and interpretive reports, including infiltration results	Section 5.3 (p3)
Drainage hierarchy (2b)	Section 5 (p3)
Proposed discharge details (2c) – utility plans, correspondence / approval from owner/regulator of discharge location	Section 5.8 (p3)
Discharge rates & storage (3a) – detailed hydrologic and hydraulic calculations	Section 5.9 (p4)
Proposed SuDS measures & specifications (3b)	Section 5 (p3)
4b. Other Supporting Details	*Page/section of drainage report*
Detailed Development Layout	Appendix E
Detailed drainage design drawings, including exceedance flow routes	Appendix E
Detailed landscaping plans	Appendix E
Maintenance strategy	Section 6 (p5)
Demonstration of how the proposed SuDS measures improve:	
a) water quality of the runoff?	Section 5 (p3)
b) biodiversity?	Section 5 (p3)
c) amenity?	Section 5 (p3)

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