SuDS water management plan

Drainage, storage and run-off strategies plan

Site Address		5a Harrow view, Uxbridge UB10 0QG
Primary Contact		Gaurav Sheel (Owner, Self builder) +44 74120 41240
Date		13-01-2025
Planning app number		20342/APP/2024/166

4. NONSC Sustainable water management

In November 2024, FULL planning permission (ref :20342/APP/2024/166) was granted for: "*To support planning application for the erection of new two storey 3 bed dwelling with basement; new garage; cycle and bin storage and associated amenity space following demolition of existing dwelling at 5a Harrow View, Uxbridge, UB10 0QG*"

The permission was granted subject to conditions and this plan has been prepared to meet the requirements of Condition 4:

Prior to commencement of the hereby approved development, (excluding demolition and site clearance) a scheme for the provision of sustainable water management shall be submitted to, and approved in writing by the Local Planning Authority. The scheme shall clearly demonstrate how the approved development will incorporate sustainable urban drainage (SuDs) in accordance with the hierarchy set out in Policy 5.13 of the London Plan and will:

i. provide information on all SuDs features including the method employed to delay and control the surface water discharged from the site and:

ii. provide a management and maintenance plan for the lifetime of the development of arrangements to secure the operation of the scheme throughout its lifetime. Including appropriate details of Inspection regimes, appropriate performance specification.
The scheme shall also demonstrate the use of methods to minimise the use of potable water through water collection, reuse and recycling and will:

iii. provide details of water collection facilities to capture excess rainwater; and how water usage will be reduced in the development.
Thereafter the development shall be implemented and retained/maintained in accordance with these details for as long as the development remains in existence.

REASON
To ensure that surface water run off is controlled to ensure the development does not increase the risk of flooding and is to be handled as close to its source as possible and Conserve water supplies in compliance with: Hillingdon Local Plan: Part 1- Strategic Policies Policy EM6 Flood Risk Management in (2012), Hillingdon Local Plan Part 2 Development Management Policies Policy DMEI 10 Water Management, Efficiency and Quality (2020), as well as relevant SuDs guidance contained within the London Plan (2021) and NPPF (2021).

i. provide information on all SuDs features including the method employed to delay and control the surface water discharged from the site and:

iii. provide details of water collection facilities to capture excess rainwater; and how water usage will be reduced in the development.

The geotechnical assessment / investigation conducted (reports attached) on the site during Feb/Mar 2024 concluded that :

5.4 Infiltration Drainage

Infiltration testing in accordance with BS EN ISO 22282-2 was undertaken in all boreholes.

The testing indicates:

- insufficient unsaturated testing area (saturated Made Ground with perched water at <0.50m bgl).
- very low permeability natural soils encountered, with infiltration rates of < 1 x $10m^{-7}m/s$.

The adoption of infiltration drainage is not considered to be appropriate, due to the presence of very low permeability natural soils and shallow, perched groundwater.

Proposed drainage for the new development should consider adopting attenuation SuDS.

Using the recommendation of the report, the following four SuDs methods are planned and committed to be delivered -

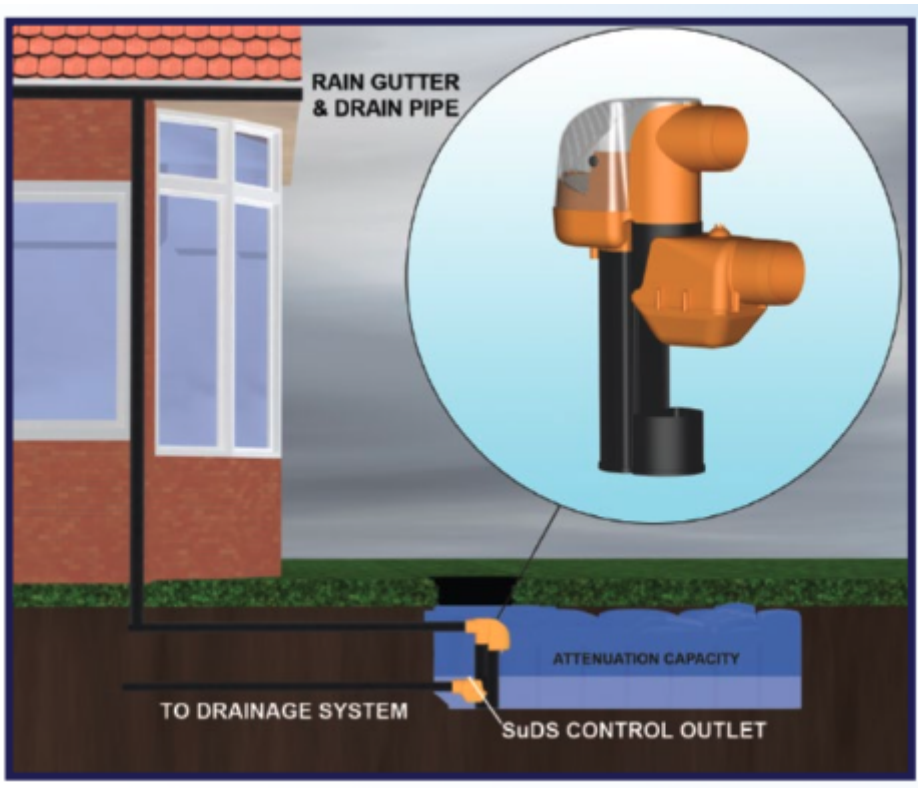
1. **Method 1:** Roof border will be fitted with gutters that will connect to the rain water harvesting tank and use it for non potable water requirements at site like toilet flushes and watering the plants/ lawn. Calculations show (see the screenshot below) demonstrate that a 5000 litre tank will be sufficient to collect rain water and there won't require any runoff to the sewer mains service.
2. **Method 2** : For rain water collected through roof, falling on ground or collected around the basement - perimeter gutters/drain will be installed and a connection to the Rain water harvesting + Attenuation tank will be added(details of product : https://www.rainwaterharvesting.co.uk/product/rain-activ-dual-direct-feed-system/). The tank is 2m3 size to cater for long term storage for gardening. In the unlikely event of overflow, a micro discharge rate of no more than 1.95l/sec would be released to the sewers main.
3. **Method 3**: Permeable paving is proposed (as it was in the previous scheme) so the impact on existing water infiltration/runoff surface remains unchanged. Details of paving materials and dimensions are covered in landscape plan (attached) and the site plan (attached)
4. **Method 4**: Laid to lawn is proposed throughout the garden as existing in the previous scheme.

ii. provide a management and maintenance plan for the lifetime of the development of arrangements to secure the operation of the scheme throughout its lifetime. Including appropriate details of Inspection regimes, appropriate performance specification.

The scheme shall also demonstrate the use of methods to minimise the use of potable water through water collection, reuse and recycling and will:

The existing site was not using any recycling or water collection methodology. The new proposed scheme uses the Rain Activ Dual Direct Feed System that has the rainwater harvesting system whilst at the same time acting as on site SuDS solution.

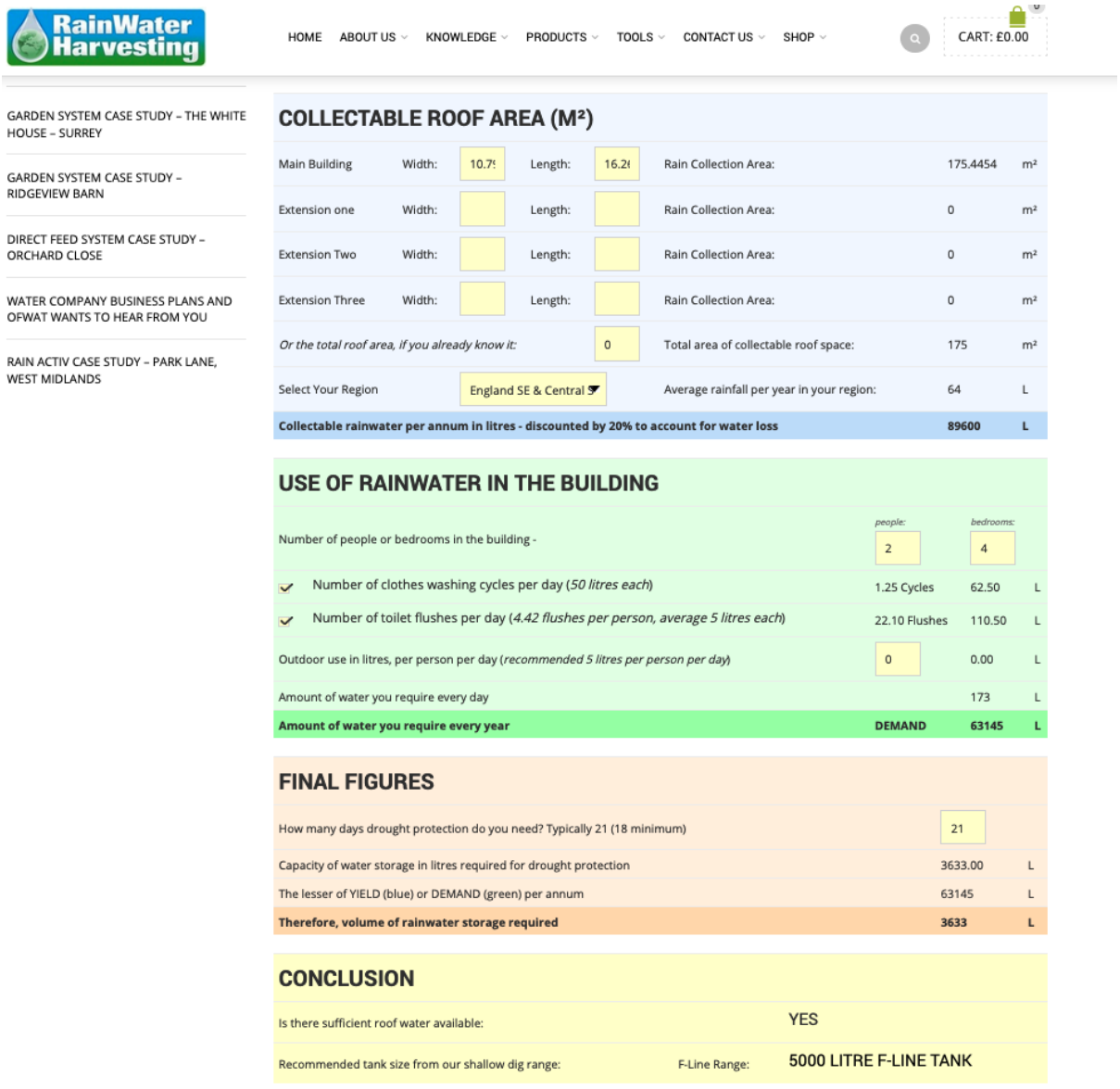
The SudS calculations recommend the underground tank to be of sizes from 5000 litres. The bottom portion of the tank is used to store the required rainwater for use within the garden. The top portion of the tank is the attenuation capacity as specified by the Micro Drainage™ calculations(<2l/s).



More information can be obtained here : https://www.rainwaterharvesting.co.uk/product/rain-activ-dual-direct-feed-system/

The system comes with no moving or consumable parts, fully self-cleaning. The solution requires no service maintenance however, visual inspection of the drains for debris etc will be performed every quarter or when an overflow is observed on ground.

The following calculations demonstrate the tank size.



RainWater Harvesting

HOME ABOUT US KNOWLEDGE PRODUCTS TOOLS CONTACT US SHOP CART: £0.00

GARDEN SYSTEM CASE STUDY – THE WHITE HOUSE – SURREY

GARDEN SYSTEM CASE STUDY – RIDGEVIEW BARN

DIRECT FEED SYSTEM CASE STUDY – ORCHARD CLOSE

WATER COMPANY BUSINESS PLANS AND OFWAT WANTS TO HEAR FROM YOU

RAIN ACTIV CASE STUDY – PARK LANE, WEST MIDLANDS

COLLECTABLE ROOF AREA (M²)

Main Building	Width: 10.7	Length: 16.2	Rain Collection Area:	175.4454	m²
Extension one	Width:	Length:	Rain Collection Area:	0	m²
Extension Two	Width:	Length:	Rain Collection Area:	0	m²
Extension Three	Width:	Length:	Rain Collection Area:	0	m²
Or the total roof area, if you already know it:		0	Total area of collectable roof space:	175	m²
Select Your Region	England SE & Central		Average rainfall per year in your region:	64	L
Collectable rainwater per annum in litres - discounted by 20% to account for water loss				**89600**	**L**

USE OF RAINWATER IN THE BUILDING

	people:	bedrooms:	
Number of people or bedrooms in the building -	2	4	
✓ Number of clothes washing cycles per day (*50 litres each*)	1.25 Cycles	62.50	L
✓ Number of toilet flushes per day (*4.42 flushes per person, average 5 litres each*)	22.10 Flushes	110.50	L
Outdoor use in litres, per person per day (*recommended 5 litres per person per day*)	0	0.00	L
Amount of water you require every day		173	L
Amount of water you require every year	**DEMAND**	**63145**	**L**

FINAL FIGURES

How many days drought protection do you need? Typically 21 (18 minimum)	21	
Capacity of water storage in litres required for drought protection	3633.00	L
The lesser of YIELD (blue) or DEMAND (green) per annum	63145	L
Therefore, volume of rainwater storage required	**3633**	**L**

CONCLUSION

Is there sufficient roof water available:		YES
Recommended tank size from our shallow dig range:	F-Line Range:	5000 LITRE F-LINE TANK

HILLINGDON LONDON

GREATER LONDON AUTHORITY

LoDEG

1. Project & Site Details

Project / Site Name (including sub-catchment / stage / phase where appropriate)	5a Harroview, UB10 0QG
Address & post code	5a Harroview, UB10 0QG
OS Grid ref. (Easting, Northing)	E 508155
	N 182680
LPA reference (if applicable)	20342/APP/2024/166
Brief description of proposed work	demolition of existing bungalow and build a new 4 bedroom house with detached garage
Total site Area	610 m^2
Total existing impervious area	80 m^2
Total proposed impervious area	175 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 perimeter drain around house is connected to surface tank sewer on harrowview road
Designer Name	
Designer Position	
Designer Company	

2. Proposed Discharge Arrangements

2a. Infiltration Feasibility

Superficial geology classification	Made Ground .4m Soft to firm gravelly clay .4 to 1.5m Black Park Gravel Member
Bedrock geology classification	Firm to stiff London Clay - Unproductive Strata
Site infiltration rate	1 m/s
Depth to groundwater level	04 m below ground level
Is infiltration feasible?	No. very low infiltration < 1 x 10m-7m/s.

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	Y	Y
7 discharge rainwater to the combined sewer.	N	N

2c. Proposed Discharge Details

Proposed discharge location	Connect insitu drain to the propsed attenuation tank and only discharge excess water using the existing connection to the suface tank sewer mains
Has the owner/regulator of the discharge location been consulted?	There is no new discharge location proposed. The existing discharge location will be used

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				
1 in 1				
1 in 30				
1 in 100				
1 in 100 + CC				
Climate change allowance used		40%		
3b. Principal Method of Flow Control		Rain water harvesting and attenuation tank.		

3c. Proposed SuDS Measures

	Catchment area (m^2)	*Plan area (m^3)*	*Storage vol. (m^3)*
Rainwater harvesting	175		2
Infiltration systems	0		0
Green roofs	0	0	0
Blue roofs	0	0	0
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	175		2
Total	**350**	**0**	**4**

4. Supporting Information

4a. Discharge & Drainage Strategy	*Page/section of drainage report*
Infiltration feasibility (2a) – geotechnical factual and interpretive reports, including infiltration results	This is not a feasible strategy due to the ground conditions. Please refer to geotechnical report
Drainage hierarchy (2b)	5000 litre RWH tank will be sufficient to collect yearly rain water for in site use
Proposed discharge details (2c) – utility plans, correspondence / approval from owner/regulator of discharge location	HR walling ford calculations demonstrate a 2m3 tank will meet the need to store control discharge rates of max 2l/s
Discharge rates & storage (3a) – detailed hydrologic and hydraulic calculations	Please find the HR walling ford tool calculated report attached
Proposed SuDS measures & specifications (3b)	
4b. Other Supporting Details	*Page/section of drainage report*
Detailed Development Layout	plans attached for. Perusal
Detailed drainage design drawings, including exceedance flow routes	ee elevation plans for gutters and drain
Detailed landscaping plans	See landscape plans with this app
Maintenance strategy	
Demonstration of how the proposed SuDS measures improve:	
a) water quality of the runoff?	Reduced runoff than existing
b) biodiversity?	Reuse rain water for gardening
c) amenity?	uces water dependence on Water com

Surface water storage requirements for sites

www.uksuds.com | Storage estimation tool

Calculated by:	Gaurav Sheel
Site name:	5A Harrowview
Site location:	UB10 0QG

This is an estimation of the storage volume requirements that are needed 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). It is not to be used for detailed design of drainage systems. It is recommended that hydraulic modelling software is used to calculate volume requirements and design details before finalising the design of the drainage scheme.

Site Details

Latitude:	51.53298° N
Longitude:	0.44184° W
Reference:	2190795532
Date:	May 10 2024 19:04

Site characteristics

Total site area (ha):	.061
Significant public open space (ha):	.044
Area positively drained (ha):	0.017
Impermeable area (ha):	.016
Percentage of drained area that is impermeable (%):	94
Impervious area drained via infiltration (ha):	0
Return period for infiltration system design (year):	100
Impervious area drained to rainwater harvesting (ha):	0
Return period for rainwater harvesting system (year):	100
Compliance factor for rainwater harvesting system (%):	66
Net site area for storage volume design (ha):	0.02
Net impermable area for storage volume design (ha):	0.02
Pervious area contribution to runoff (%):	30

* where rainwater harvesting or infiltration has been used for managing surface water runoff such that the effective impermeable area is less than 50% of the 'area positively drained', the 'net site area' and the estimates of Q_{BAR} and other

Methodology

esti	IH124
Q_{BAR} estimation method:	Calculate from SPR and SAAR
SPR estimation method:	Calculate from SOIL type

Soil characteristics

	Default	Edited
SOIL type:	4	4
SPR:	0.47	0.47

Hydrological characteristics

	Default	Edited
Rainfall 100 yrs 6 hrs:	--	63
Rainfall 100 yrs 12 hrs:	--	92.4
FEH / FSR conversion factor:	1.2	1.2
SAAR (mm):	623	623
M5-60 Rainfall Depth (mm):	20	20
'r' Ratio M5-60/M5-2 day:	0.4	0.4
Hydological region:	6	6
Growth curve factor 1 year:	0.85	0.85

flow rates will have been reduced accordingly.

Design criteria

Climate change allowance factor:	1.4
Urban creep allowance factor:	1.1
Volume control approach	Use long term storage
Interception rainfall depth (mm):	5
Minimum flow rate (l/s):	2

Growth curve factor 10 year:	1.62	1.62
Growth curve factor 30 year:	2.3	2.3
Growth curve factor 100 years:	3.19	3.19
Q_{BAR} for total site area (l/s):	0.26	0.26
Q_{BAR} for net site area (l/s):	0.08	0.08

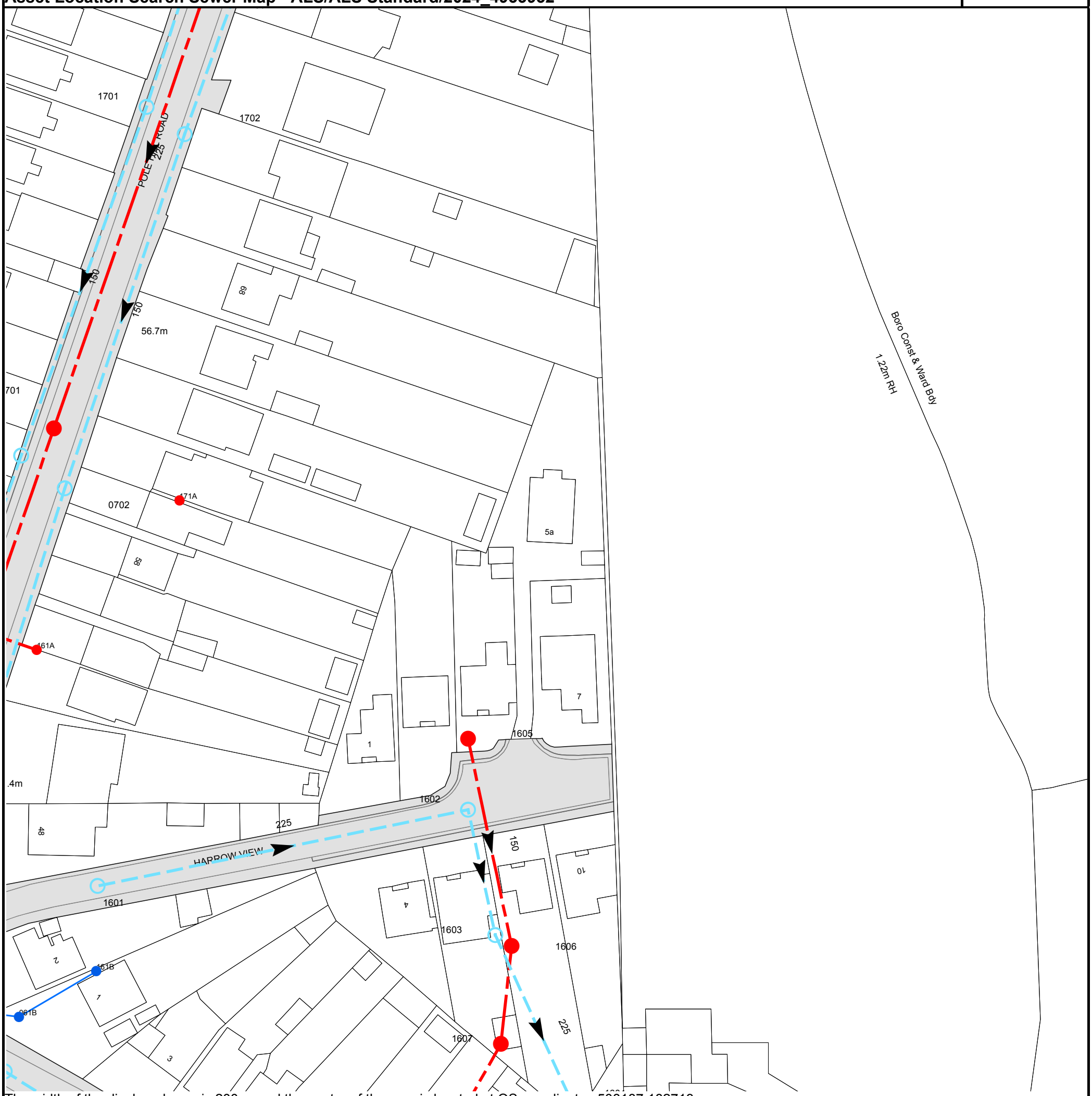
Site discharge rates

	Default	Edited
1 in 1 year (l/s):	2	2
1 in 30 years (l/s):	2	2
1 in 100 year (l/s):	2	2

Estimated storage volumes

	Default	Edited
Attenuation storage 1/100 years (m^3):	2	2
Long term storage 1/100 years (m^3):	0	0
Total storage 1/100 years (m^3):	2	2

Asset Location Search Sewer Map - ALS/ALS Standard/2024_4933932



The width of the displayed area is 200 m and the centre of the map is located at OS coordinates 508187,182713

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 (2020) with the Sanction of the controller of H.M. Stationery Office, License no. 100019345 Crown Copyright Reserved.

Asset Location Search - Sewer Key

Public Sewer Types (Operated and maintained by Thames Water)

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

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

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

- Storm Sewer
- Sludge Sewer
- Foul Trunk Sewer
- Surface Trunk Sewer
- Combined Trunk Sewer
- Foul Rising Main
- Surface Water Rising Main
- Combined Rising Main
- Vacuum
- Thames Water Proposed
- Vent Pipe
- Gallery

Other Sewer Types (Not operated and maintained by Thames Water)

- Sewer
- Culverted Watercourse
- Proposed
- Decommissioned Sewer
- Content of this drainage network is currently unknown
- Ownership of this drainage network is currently unknown

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
- Meter
- Dam Chase
- Vent
- Fitting

Operational Controls

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

- Ancillary
- Drop Pipe
- Control Valve
- 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.

- Inlet
- Outfall
- Undefined End

Other Symbols

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

- Change of Characteristic Indicator
- Public / Private Pumping Station
- Invert Level
- Summit

Areas

Lines denoting areas of underground surveys, etc.

- Agreement
- Chamber
- Operational Site

Ducts or Crossings

- Casement

Ducts may contain high voltage cables. Please check with Thames Water.

- Conduit Bridge
- Subway
- Tunnel

Notes:

1) All levels associated with the plans are to Ordnance Datum Newlyn.
2) All measurements on the plan are metric.
3) Arrows (on gravity fed sewers) or flecks (on rising mains) indicate the 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 indicates that data is unavailable.
6) The text appearing alongside a sewer line indicates the internal diameter of the pipe in millimeters. 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, please contact Property Searches on 0800 009 4540.