

surface water management

Chalcot House

CCE-ZC251-PL-RP-01

28.05.21

Structures Lab

Document Review Sheet

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Reference	Date	Author	Checked
CCE-ZC251-PL-RP-01	<i>28.05.2021</i>	<i>RW</i>	<i>JM</i>

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1.0 Introduction

Cannon Consulting Engineers have been commissioned for the design of the below ground foul and surface water drainage systems for the development at 59 Netherhall Gardens, London, NW3 5RE.

1.1 The Site

The site is considered to be brownfield consisting of approximately 0.1ha and bound by residential buildings on all sides. Access to the site is provided via an access road to Netherhall Gardens to the south. The approximate centre of the site is located at an Easting and Northing of 526478 and 185305 respectively.

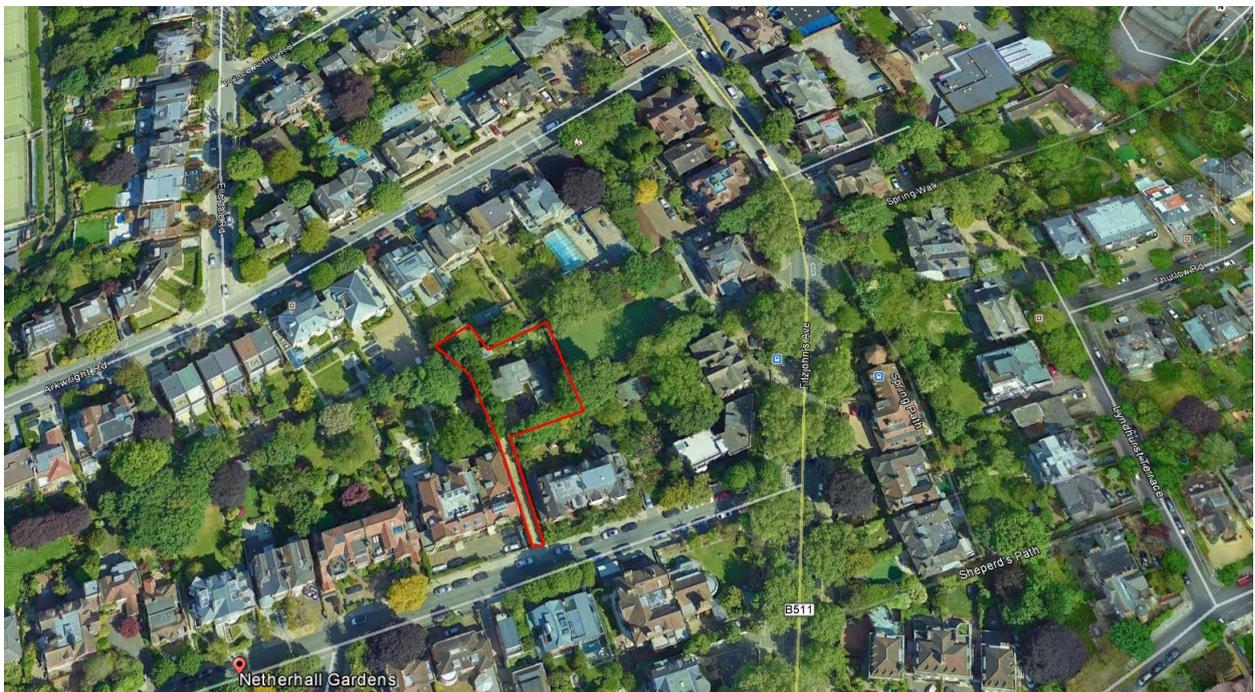


Figure 1.0 – Site Location

1.2 Proposed Development

It is proposed to demolish the existing building, and redevelop the site maintaining its use as residential. At the time of writing this report, it is not envisaged that there will be any increase to areas of hardstanding ground.

2.0 Design Principles

2.1 Sources of Information

A review of the relevant information from a range of sources has been undertaken and includes the following:

- EA Flood Map For Planning. [Accessed 28/05/2021]
- Non Statutory Technical Standards for Sustainable Drainage Systems, 2015 [Accessed 28.05.21]
- National Planning Policy Framework [Accessed 28.05.21]
- CIRIA, The SuDS Manual Version 6, 2015 [Accessed 28/05/21]

2.2 Design Guidance

The following design guidance will need to be adhered to for the proposed foul and surface water drainage systems:

- Building Regulations Part H;
- National Planning Policy Framework (NPPF);
- Sewage Sector guidance Appendix C, 2020;
- CIRIA, The SuDS Manual Version 6, 2015;
- BS EN 752:2008, Drainage & Sewer Systems Outside Buildings;
- BS EN 12056:200, Gravity Drainage Inside Buildings;

2.3 Flood Risk

The site is situated in Flood Zone 1, with a very low risk of flooding from all sources, including rainfall and artificial sources.

Any proposed development on the site will be subject to the planning requirements of Borough of Camden, the Lead Local Flood Authority (LLFA) and the NPPF. Flood risk vulnerability classification for all flood zones has been reproduced in Figure 2.0 below. This has been extracted from Table 3 of the NPPF PPG. Building types are classified depending on their use and are placed in a higher vulnerability class depending on flood risk sensitivity. Whilst the development is residential and therefore classed as highly vulnerable, the site is situation in Flood Zone 1 and therefore deemed acceptable.

Flood Zones	Flood Risk Vulnerability Classification				
	Essential Infrastructure	Highly Vulnerable	More Vulnerable	Less Vulnerable	Water Compatible
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	Exception Test Required	✓	✓	✓
Zone 3a	Exception Test Required	✗	Exception Test Required	✓	✓
Zone 3b	Exception Test Required	✗	✗	✗	✓

Figure 2.0 – Flood Vulnerability Classification

3.0 Drainage Strategy

3.1 Greenfield Runoff and Discharge Rates

Figure 3.0 shows the greenfield runoff rates for the whole development (0.1ha) and factored to provide a runoff rate per hectare.

Return Period	Greenfield Runoff Rates	
	Whole site (0.1 ha) [l/s]	Per hectare [l/s/ha]
QBAR	0.44	4.4
Q1-year	0.38	3.8
Q30-year	1.02	10.2
Q100-year	1.41	14.1

Figure 3.0 – Greenfield Runoff Rates

In accordance with the latest design and planning guidance stated in section 2.0, the proposed development must follow the SuDS and drainage hierarchy. The Non Statutory Technical Standards for Sustainable Drainage Systems Policy S3 States:

For developments which were previously developed, the peak runoff rate from the development to any drain, sewer or surface water body for the 1 in 1 year rainfall event and the 1 in 100 year rainfall event must be as close as reasonably practicable to the greenfield runoff rate from the development for the same rainfall event, but should never exceed the rate of discharge from the development prior to redevelopment for that event.

Due to the small nature of the site, it would be impractical to restrict to discharge rates to greenfield runoff values as stated in figure 3.0. As such, discharge rates will be restricted to 5l/s for all storm events up to and include the 1:100year event plus 40% climate change. This ensures the proposed development does not exceed the rate of discharge prior to redevelopment.

3.2 Surface Water and SuDS

The London Plan Policy 5.13 sets out the drainage hierarchy that should be considered for any new development. The following sets out these requirements which elements can be achieved:

- Store rainwater for later use;
 - Rainwater harvesting will be reviewed during detailed design with the potential for domestic water butts to be installed.
- Use infiltration techniques such as porous surfaces in non-clay areas;
 - Infiltration is not possible due to the presence of clay on site. In addition, the distance required for installation of soakaways (5m for a building structure) cannot be achieved due to the compact nature of the site.
- Attenuate rainwater in ponds or open water features for gradual release;
 - It would not be possible to achieve the required volumes within an open water feature given the compact nature and small scale of the site.
- Attenuate rainwater by storing in tanks or sealed water features for gradual release;
 - This is proposed using a buried geo-cellular crate system.
- Discharge rainwater direct to a watercourse;
 - The nearest watercourse is the Regents Canal which is over 2km to the south-east. As such this has not been considered further.
- Discharge rainwater to a surface water sewer/drain;
 - The proposed surface water system is kept separate from foul water until discharging into an existing combined system.
- Discharge rainwater to the combined sewer;
 - This forms part of the current proposal as the existing public sewer network is combined.

In addition to the above, areas of soft landscaping within the public realm and terraced areas are proposed. This will provide a betterment to the area's biodiversity, amenity and recreation over the existing situation.

A total of 23m³ of attenuation will be provided on site through the use of geo-cellular buried attenuation crates (10m³) and permeable paving (13m³). Subject to confirmation of the connection invert into the Thames Water Public Sewers within Netherhall Gardens, a gravity system is currently proposed with no pumping required. The Thames Water Asset Search is shown within **Appendix A** and Outline Surface Water Strategy within **Appendix B**.

A flow control (hydro-brake or similar) will be used to restrict flows to 5 l/s for all storm events up to and including the 1 in 100year event plus 40% allowance for climate change. All existing drainage infrastructure is to be abandoned and removed.

3.3 Foul Water

The site will be drained through a traditional gravity piped sewer system and foul flows will combine with surface water flows at the last chamber before connecting to the existing sewer network. At the time of writing this report, the design proposals show that there will be no increase in foul flows.

3.4 Approvals

At the time of writing this report, a pre-development enquiry has not been submitted. This is required to confirm capacity in the existing public sewers. As an overall betterment is expected to the total site flows, no concerns are envisaged. Discharge rates are also subject to the approval of the Lead Local Flood Authority (LLFA). A S106 consent will be required from Thames Water post planning, but before construction, to obtain consent to connect to the public sewers.

4.0 Conclusion

This drainage strategy sets out a viable solution for the below ground drainage system. The strategy aims to restrict runoff rates to as close to greenfield runoff rates as possible, without increasing on that of the previous development. The discharge rate is set to 5 l/s for all storm events up to and including the 1 in 100 year plus 40% climate change event.

Subject to the confirmation of the relevant authorities, it can therefore be concluded that the proposed development is suitable, providing that the strategy outlined in this report is followed.

Appendix A

Asset location search



Property Searches

Cannon Consulting Engineers

LONDON
EC4N 6NP

Search address supplied NETHERALL GARDENS
LONDON

Your reference ZC251

Our reference ALS/ALS Standard/2021_4384681

Search date 19 March 2021

Knowledge of features below the surface is essential for every development

The benefits of this knowledge not only include ensuring due diligence and avoiding risk, but also being able to ascertain the feasibility of any development.

Did you know that Thames Water Property Searches can also provide a variety of utility searches including a more comprehensive view of utility providers' assets (across up to 35-45 different providers), as well as more focused searches relating to specific major utility companies such as National Grid (gas and electric).

Contact us to find out more.



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

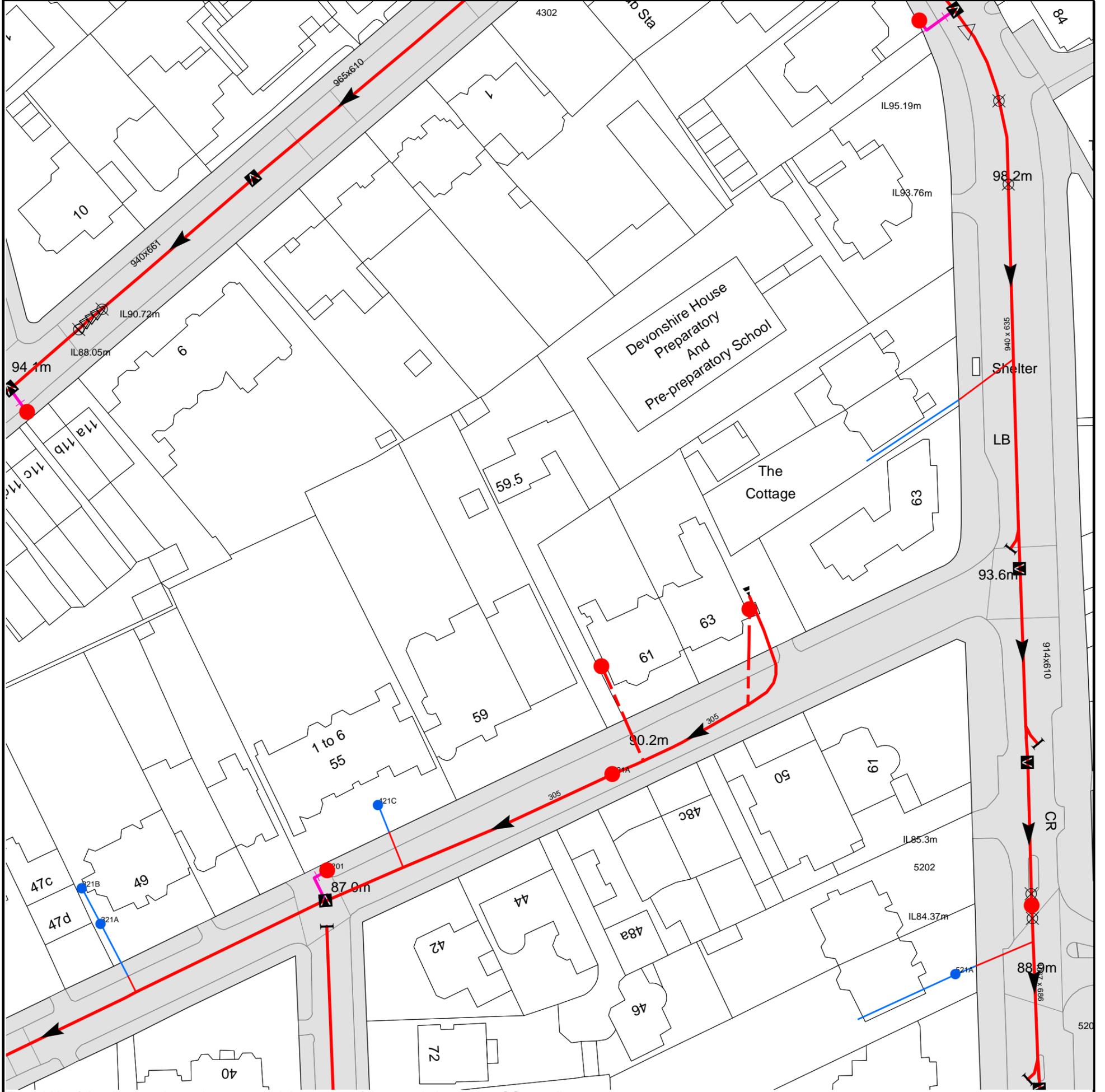


searches@thameswater.co.uk
www.thameswater-propertysearches.co.uk



0800 009 4540

Asset Location Search Sewer Map - ALS/ALS Standard/2021_4384681



The width of the displayed area is 200 m and the centre of the map is located at OS coordinates 526478,185294

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

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

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

Manhole Reference	Manhole Cover Level	Manhole Invert Level
5301	n/a	n/a
3301	n/a	n/a
321B	n/a	n/a
321A	n/a	n/a
4201	n/a	n/a
421C	n/a	n/a
4206	n/a	n/a
421A	n/a	n/a
5211	n/a	n/a
521A	n/a	n/a
5202	89.33	n/a

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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

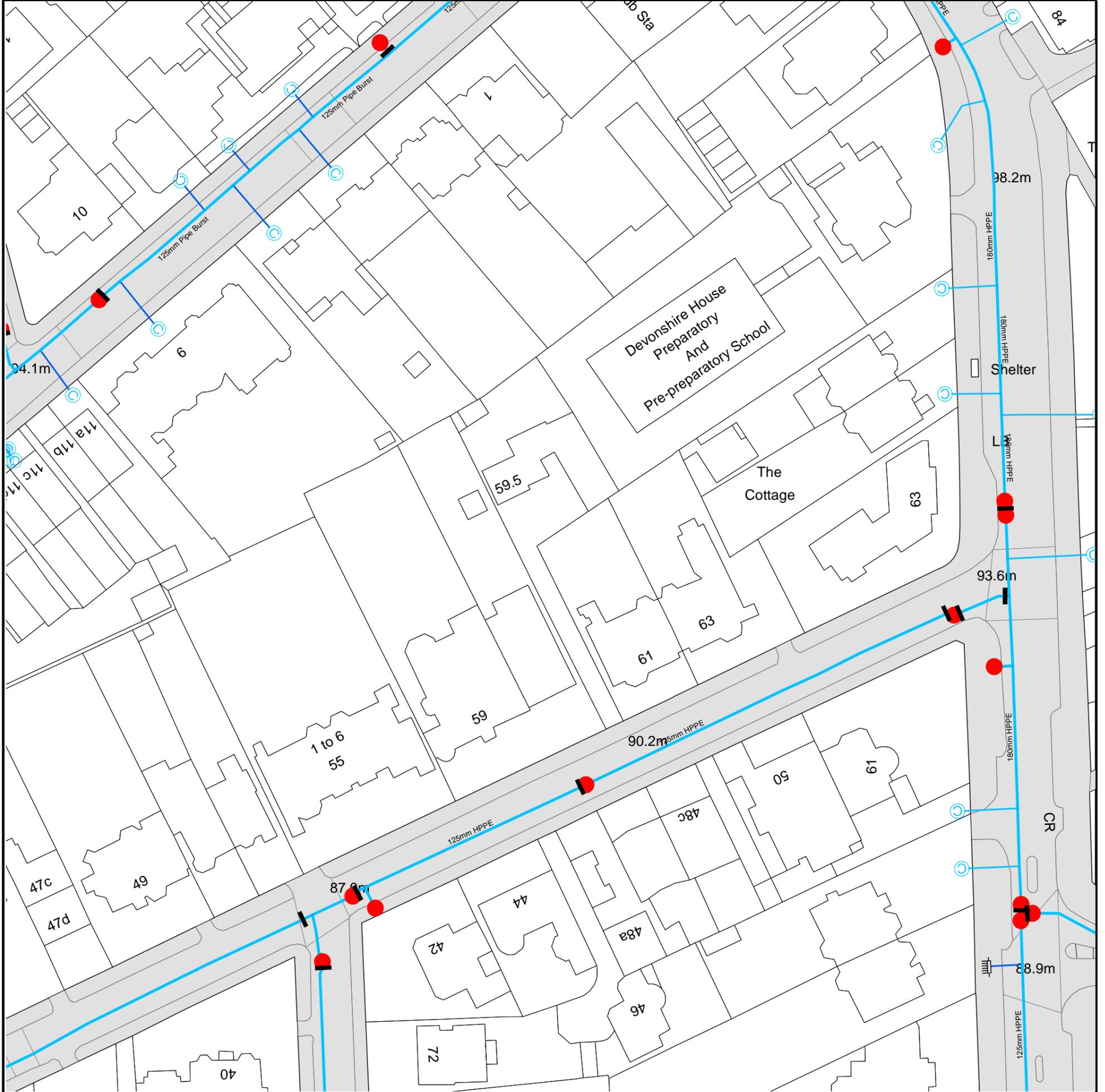
Other Sewer Types (Not Operated or Maintained by Thames Water)

-  Foul Sewer
-  Surface Water Sewer
-  Combined Sewer
-  Gully
-  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 'D' 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 millimetres. 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 Searches on 0800 009 4540.



The width of the displayed area is 200 m and the centre of the map is located at OS coordinates 526478, 185294.
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.

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ALS Water Map Key

Water Pipes (Operated & Maintained by Thames Water)

- 
Distribution Main: The most common pipe shown on water maps. With few exceptions, domestic connections are only made to distribution mains.
- 
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.
- 
Supply Main: A supply main indicates that the water main is used as a supply for a single property or group of properties.
- 
Fire Main: Where a pipe is used as a fire supply, the word FIRE will be displayed along the pipe.
- 
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.

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')

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

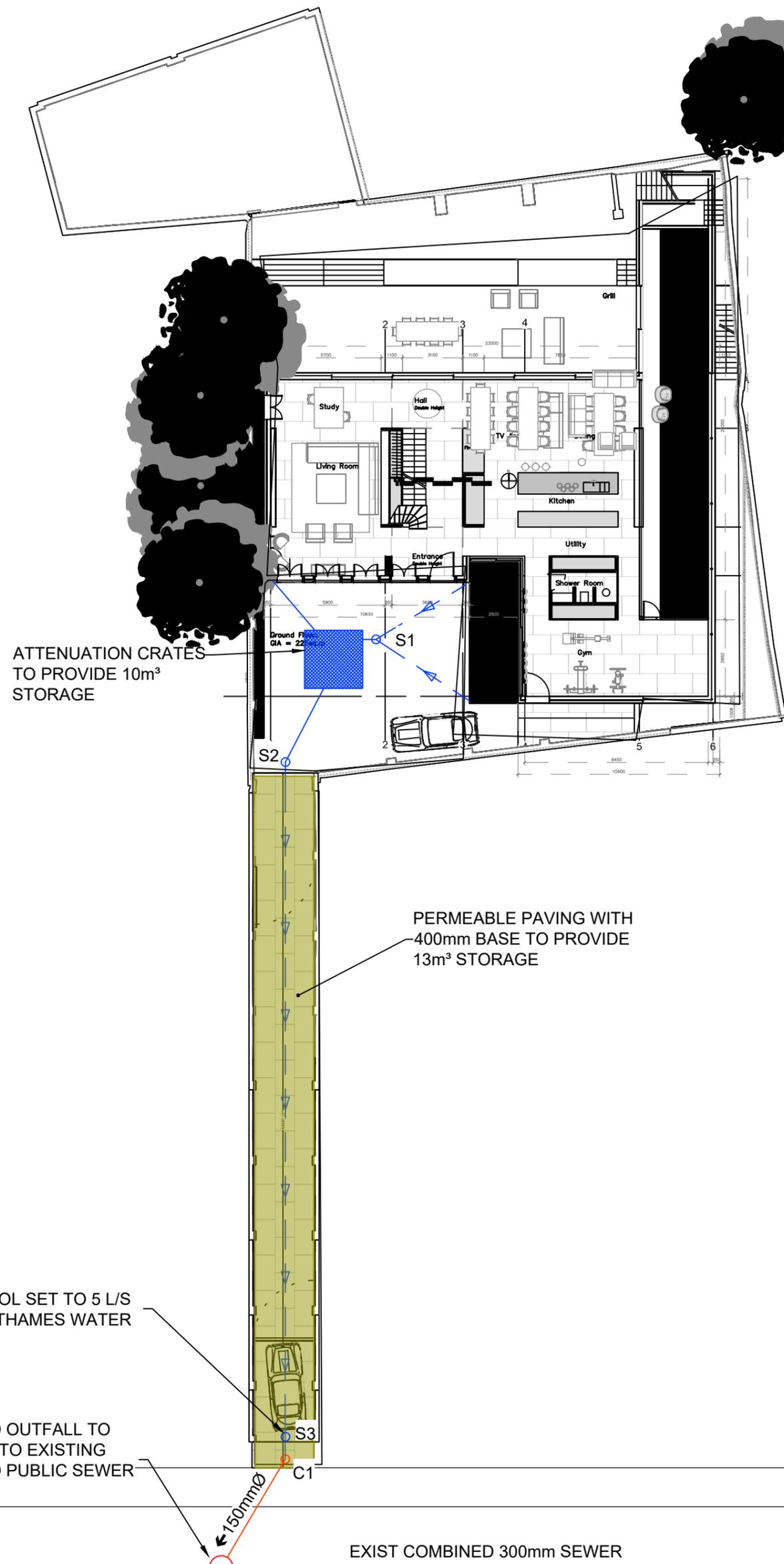
Other Symbols

-  Data Logger

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:** Indicates 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.

Appendix B



FLOW CONTROL SET TO 5 L/S
SUBJECT TO THAMES WATER
APPROVAL

COMBINED OUTFALL TO
CONNECT TO EXISTING
COMBINED PUBLIC SEWER
MH 521A

EXIST COMBINED 300mm SEWER

NETHERHALL GARDENS

REV	DESCRIPTION	DE	DR	CH	DATE

PROJECT TITLE CHALCOT HOUSE, LONDON	
DRAWING TITLE OUTLINE SURFACE WATER STRATEGY	
CLIENT STRUCTURES LAB	REV. P1

CANNON
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L:\ZC251 Chalcot House, London\3 PLANS\DRAWINGS\CURRENT DRGS\ZC251-DR-PL-200 Surface Water Layout