Arthur Stanley House
Drainage Strategy Report

Westbrook Partners / 1921 Mortimer Investments Limited

December 2017

Contents

Appendices

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Prepared by: Charlie Rudd
Approved by: Andrew Middlebrook

HEYNE TILLETT STEEL

1 Introduction

HTS have been appointed to develop a drainage strategy to support the planning application for the development of Arthur Stanley House.

This report will explore the methods of surface water discharge and incorporate SuDS techniques where feasible in line with Policy 5.13 'Sustainable Drainage' of the London Plan and Policy CC3 'Water and Flooding' of the Camden Local Plan.

The report will also assess the impact of the development in relation to the peak foul water discharge, and outline the methods for foul water disposal.

A flood risk assessment will be required for the development. This is to meet the EA requirements which requires a site specific Flood Risk Assessment in areas highlighted as having critical drainage problems. Also as stated in the London Borough of Camden's Local Plan a site specific FRA will be required for all basement developments on streets identified as being at flood risk.

2 Existing site description

The site is located within the London Borough of Camden and is bordered by Tottenham Street to the south and Tottenham Mews to the east. The neighbouring property along Tottenham Mews is the Tottenham Mews Day Hospital and the property which borders to the western boundary of the site is 30 Cleveland Street. See figure 1 below for site location plan

The site is currently occupied by Arthur Stanley House, a building which has seven upper storeys plus ground, lower ground 1 and lower ground 2. The existing building was previously classified as D1 healthcare. The north side of the basement was formerly a two storey boiler house covered by a suspended slab at Ground Floor and no structure above. Refer to Appendix A for a copy of the site dimensional survey carried out by Laser Surveys in January 2015.

Figure 1 – Site location plan

3 Site Geology

As per the CGL Study Report and Stage 1 Screening, according to BGS records, the site is underlain by the Lynch Hill Gravel Formation, which is in turn underlain by the London Clay Formation, the Lambeth Group Formation, the Thanet Sand Formation and Chalk at depth. Results from a historic ground investigation of the site confirm this stratigraphy.

The Lynch Hill Gravel member is classified as a Secondary A Aquifer by the Environment Agency. Results from a historic ground investigation of the site indicate that groundwater present within the Lynch Hill Gravel Member at a level of approximately 21.21mOD to 21.40mOD – 0.2-0.4m above the current Basement 2 structural slab level.

Intrusive investigations will be undertaken during the next design stage to confirm the findings of the historic ground investigation.

4 Existing Drainage

Public Drainage

Thames Water are the local sewerage undertaker for the area of the development. An Asset Location Search was obtained from TW to confirm the extent of the public sewers in the roads bordering the development. Refer to figure 2 below for site location in relation to TW sewers.

As illustrated in the TW mapping the development and the surrounding area is served by a network of combined water sewers located in Tottenham Street and Tottenham Mews.

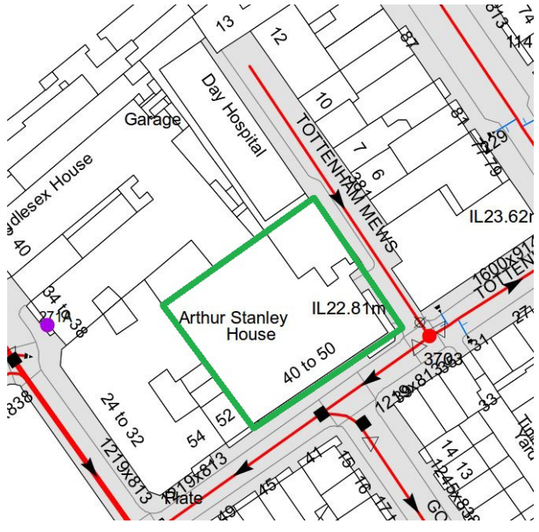

Figure 2 – Thames Water Asset Map

The combined water sewer in Tottenham Mews is identified as being 381mm in diameter and flows towards manhole 3703 in Tottenham Street. The invert level of the sewer juts before its connection to the Tottenham Street sewer is 22.81m AOD. This makes it approximately 4.2m deep at this location.

The combined water sewer in Tottenham Street is 1219 x 813mm and flows both towards Charlotte Street and Cleveland Street from manhole 3703. The invert level at manhole 3703 is not identified within the asset records. No public sewers have been identified within the site boundary.

Refer to Appendix B for full copy of Thames Water Asset Location search

Private Drainage

A CCTV survey was undertaken by JPD Technical Services in December 2015 to understand the extent of the private drainage network on site. Refer to Appendix C for full CCTV survey report and drawing.

The survey splits the existing site drainage into two categories, the underground drainage (Groundwater) system and the above ground drainage system.

The underground drainage system is described as being for groundwater only. Two small in-situ sumps were identified (PC1 and PC2) which have pumps installed in them to pump out the groundwater.

A series of temporary pumps can be seen located inside core drilled holes in the basement slab. These pumps connect via rising main to the existing pump rising mains. These pumps have been installed to help deal with the large amount of groundwater ingress.

All of the groundwater pumps are described as being discharging at full bore at all times.

The survey did not highlight any manholes or chambers at the lower basement level or at ground floor level to the rear of the building.

The above ground drainage system is combined and collects the foul and surface water discharge from the basement, ground, upper floors and roof levels of the building. This is then discharged via a 225mmdia cast iron outfall located at 'mid-level' lower basement floor. An anti-flood flap valve was found at the connection point to the TW sewer and is seized open therefore will not provide any protection against sewer surcharge. Excluding this the outfall is in good condition. The IL of the outfall is measured as being 700mm below ceiling level.

5 Proposed site description

The proposed development includes the refurbishment of the existing building, the extension of the floor plates to the rear of the building and the construction a residential block on the Mews. The development will include private residential units, B1 office space and a new GP surgery.

Refer to Appendix D for copy of current proposed architectural plans.

6 Surface Water Runoff Analysis

The existing site's surface water runoff rates have been calculated using the catchment areas described below. The site is entirely impermeable, a combination of roof areas and external paved areas make up the existing catchment area. Therefore the existing site's impermeable area is equal to the total site area. From AHMM drawing 15068_(00)_100 the site is a total of 1,152m² (0.115 ha).

In accordance with the Modified Rational Method, the peak existing runoff from the site is calculated from the formula:

Q = 3.61 x Cv x A x i

Where Cv is the volumetric runoff coefficient, A is the catchment area in hectares and (i) is the peak rainfall intensity (mm/hr).

The site will be assessed for a range of return periods, the rainfall intensity (i) for each of the storm scenarios is calculated using the FSR method.

Storm return period	Runoff rate (l/s)
1 in 1 year	9.72
1 in 30 year	23.85
1 in 100 year	30.84
1 in 100 year + 40% climate change	40.18

Table 1 – Pre-development Runoff Analysis

In line with the EA guidance on climate change allowances, a 40% increase in rainfall intensity has been assessed for the 100 year storm scenario.

Refer to Appendix E for copy of surface water runoff calculations

7 SuDS Analysis

In accordance with the London Plan Policy 5.13, Development should utilise SuDS unless there are practical reasons for not doing so, and should aim to achieve greenfield run-off rates and ensure that surface water run-off is managed as close to its source as possible using SuDS devices in line with the following drainage hierarchy:

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

The table below will explore the feasibility of each of the SuDS options within the London Plan drainage hierarchy.

Through the SuDS hierarchy we consider the only feasible SuDS measure is to attenuate water in a sealed water feature for gradual release.

Rank	Preference	Usage	Reason
1	Store rainwater for later use	X	The use of rainwater for re-use is deemed not practical for this proposed development due to various onsite constraints.
2	Use infiltration techniques, such as porous surfaces in non-clay areas	X	There is insufficient space on site for a soakaway as the development is entirely occupied by basement structure.
3	Attenuate rainwater in ponds or open water features for gradual release	X	There is inadequate space for ponds or open water features to be used on this site.
4	Attenuate rainwater by storing in tanks or sealed water features for gradual release.	✓	An attenuation tank can be provided at lower basement level in the form of an above ground storage tank.
5	Discharge rainwater direct to a watercourse	X	There are no watercourses in the vicinity of the site.
6	Discharge rainwater to a surface water sewer/drain	X	Thames Water records do not confirm the existence of a surface water sewer within the vicinity of the site.
7	Discharge rainwater to the combined sewer.	✓	Thames Water asset records show that the site benefits from a combined water sewer located in Tottenham Street.

Table 2 – SuDS hierarchy

8 Attenuation Design

The attenuation on site will be designed assuming that all of the site's impermeable surfaces (1152m²) are able to be drained into basement level 2 where the attenuation tank will be located.

The tank is to be located above slab in the basement level 2 plant room. Refer to M&E sketch in Appendix F. The construction of the tank is to be confirmed by the M&E engineer.

In line with London Borough of Camden Policy CC 3 – Water and flooding the development is required to utilise SuDS in line with the drainage hierarchy, unless inappropriate, to achieve a greenfield run-off rate where feasible. The greenfield rate for the development is too low to be attenuate feasibly at basement level therefore a restricted surface water discharge rate of 5 l/s will be applied to the development to meet these requirements. This rate will provide a significant betterment when compared to the pre-development peak runoff rates.

The discharge rate from the tank will be restricted via a pump device to 5.0 l/s. By restricting to this rate the total volume of attenuation required to prevent flooding for the 1 in 100 year event + 40% climate change is up to 47.5m³ Refer to Appendix G for copy of attenuation design calculations.

A pump will discharge attenuated flow via a rising main to the proposed high level drainage where it will flow towards the proposed high level outfall which discharges into the sewers in Tottenham Street.

9 Foul Water Discharge Analysis

Existing Site

The number of existing foul water appliances on site is currently not known. Therefore the existing site's foul water discharge will be assessed using 750 l / 100m² / day.

From the dimensional survey undertaken by Laser Surveys, the existing site's net internal floor area is equal to 4,300m². Therefore the foul water discharge rate can be calculated as:

750 x (4300/100) = 32250 l / day

32250 l / day = 0.373 l/s

To calculate the peak rate 6 DWF has been considered, therefore the peak foul water rate is equal to 6 x 0.373 = 2.24 l/s

Proposed Site

The proposed site's flow rates have been calculated using the guidance provided in BS EN 12056-2:2000 – "Gravity Drainage Systems Inside Buildings – Part 2: Sanitary Pipework, layout and calculation", the proposed foul rate is calculated from the formula:

$$Q = k \times \sqrt{DU}$$

For 'intermittent use' (representing dwellings, offices, etc.) K has a value of 0.5 giving:

The number of foul water appliances were based on the information provided in the AHHM proposed general arrangement plans, refer to Appendix D.

To understand if the local public sewer network has capacity for the increase in foul water flows generated by the development a pre-development enquiry application is required to be submitted to Thames Water. At the time of writing this report an application has not been submitted.
However it is considered that TW will accept the proposals as the increase in foul water discharge is offset by the decrease in surface water discharge.

Foul water flows from the proposed toilets, plant room and refuse store at basement level 2 and the toilets and showers located at basement level 1 will be drained via a below ground drainage system to a foul water pump chamber. This chamber will discharge via a rising main to the high level drainage at basement level 2 where it will enter the Thames Water combined sewer in Tottenham Street.

The foul water drainage generated by the residential unit will discharge to the sewer located in Tottenham Mews via a new high level outfall located at basement level 2.

Appliance	No.	Discharge units per appliance	Total number of discharge units
Wash hand basin	81	0.5	40.5
Shower	15	0.6	9.0
Bath	5	0.8	4.0
Kitchen Sink	19	0.8	15.2
Dishwasher	11	0.8	8.8
Washing Machine	11	0.8	8.8
WC	81	2.0	162
		Total discharge units =	248.3
		Therefore, total flow from site =	7.9 l/s

Table 3 – Foul Water Discharge Assessment

10 Flood Risk

In line with EA/DEFRA guidance as the site is located within a Critical Drainage Area (CDA) a flood risk assessment is required. Also as the development includes works to basement level and is located along a road highlighted as being at flood risk a site specific FRA will be required.

The flood risk assessment will explore all sources of flood risk including surface and ground water. The risks will be assessed using available information from the EA, Strategic Flood Risk Assessments and Flood Risk Management Strategy.

Mitigation measures will be presented where required.

Fluvial

The risk from fluvial flooding can be assessed by defining what flood zone the site is located within. Using the Flood map for planning made available by the EA it can be seen that the site is located within flood zone 1. See figure 4 below.

Flood zone 1 is an area which has been shown to have a less than 0.1% chance of flooding in any year, this is sometimes known as having a 1:1000 year chance. Therefore the risk of flooding from fluvial sources is considered to be low for the development.

Pluvial (Surface Water)

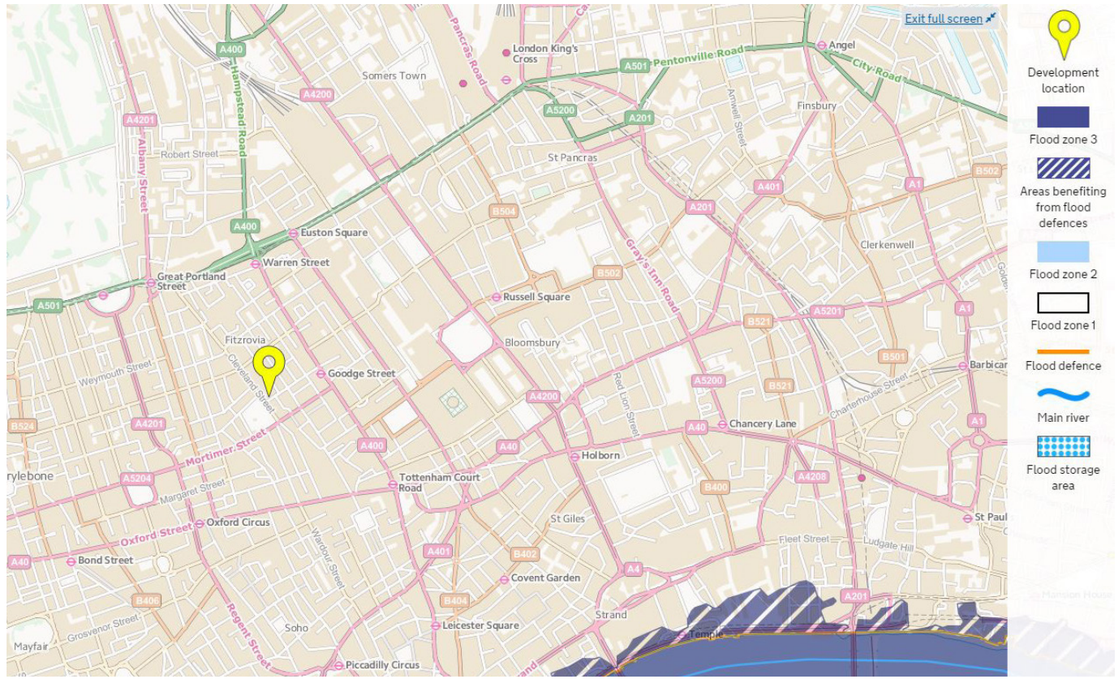

Figure 4 – Flood Zone Map

The risk of surface water flooding can be assessed using the 'Updated Flood Maps for Surface Water Flooding' and the Flood risk from surface water viewer made available on the GOV.UK website

Figure 5 adjacent detail extracts from these surface water flood maps.

As illustrated in the mapping below the there is a risk of surface water flooding along Tottenham Mews. The SFRA mapping shows the extent of the 1 in 30, 1 in 100 year and 1 in 1000 year flood risk. When viewing this information with the EA online mapping it can be seen that for the medium scenario (1 in 100 year) a section of road has a flood depth of 'below 300mm'.

The area covered by the 300mm maximum flood depth extends close to the proposed entrance to the residential unit. No flooding is shown to occur within the site boundary itself.

To mitigate the risk of surface water ingress into the site via the residential building entrance along Tottenham Mews a channel drain will be provided at the building threshold. The water collected via the channel will be directed towards the storm water attenuation tank.

The other location surface water runoff has the potential to enter the site is via the proposed light wells along Tottenham Mews.

Figure 5 – Surface water flood risk mapping

Figure 6 below is an extract from AHMM drawing 15068 (00)_P301 P01 DRAFT.

As illustrated the brick work will be laid to a 'hit and miss' design. This will act as a ventilation to the plant rooms located at basement level 2.

The level of flooding along Tottenham Mews is identified as being a maximum of 300mm in the 100 year storm event. This depth of flooding is shown to occur in the middle of the road at the location opposite the proposed light wells.

As the light wells are located 2.2m back from the edge of the road it is anticipated that most of the flood water will be contained within the highway and not make it to the maximum depth of 300mm by the edge of the footway adjacent to the light wells.

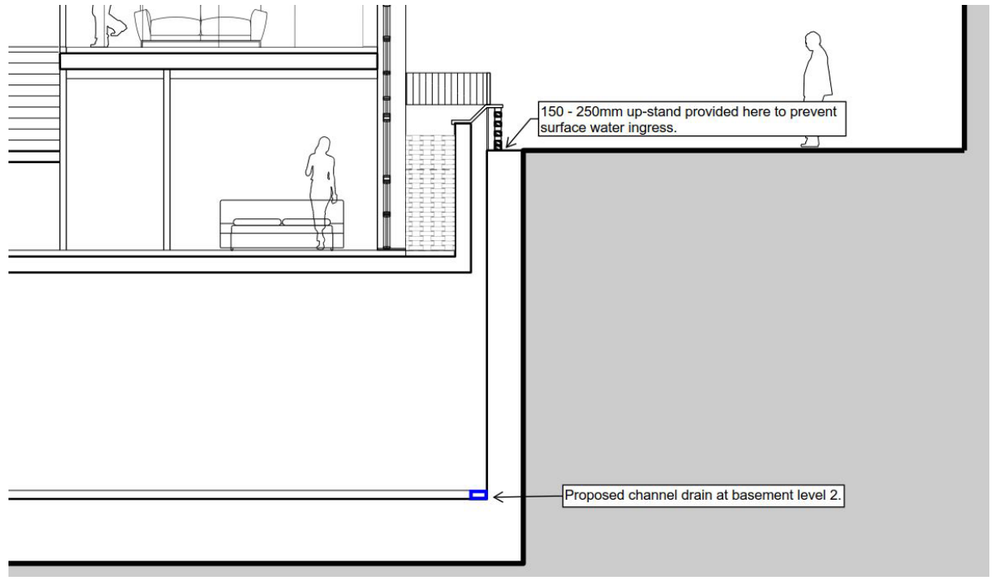

Figure 6 – Proposed light well section

To mitigate against the residual risk of surface water flooding the brickwork will be laid without a hit and miss pattern to a height of 150mm for the south light well and 250mm for the north light well.

Taking into account the above evidence and mitigation proposals it is considered that the risk from surface water flooding is low.

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Groundwater

The risk of flooding from groundwater flooding can be assessed using the information provided in the SFRA. The 'Increased Susceptibility to Elevated Groundwater' map provided in the SFRA illustrates that the site is not in an area which is at an increased risk to elevated groundwater. This mapping also shows EA groundwater flood incidents. The site shows no historic record of groundwater flooding based on this map.

The proposed scheme plans to maintain the double storey basement and as identified in the CCTV survey ground water infiltration into the basement level is high and currently requires two permanent pumps and several temporary pumps operating at full bore to remove the groundwater.

The high level of water infiltration into the basement is caused by the core samples taken as part of the ground investigations on site. Before the core samples were drilled through the slab it is understood that an existing cavity drain system was sufficient in protecting the basement from groundwater.

The proposed development's waterproofing strategy and indicative construction methodology is described below:

Foundations to the new concrete buildings will consist of CFA piles under RC pile caps. The existing Basement 2 slab will be broken back locally to allow the installation of new pile caps.

Vertical movement joints will be installed at the interfaces between existing and proposed foundations to allow differential vertical movements.

Foundations adjacent to the existing basement perimeter (both externally and adjacent to Arthur Stanley House) are to be offset from the site boundary to minimise the excavation of existing strip foundations. Excavation within the basement to form new pile caps and lift pits will require control measures to prevent water ingress. It may be feasible to adopt local or site wide shoring through the use of interlocking sheet or Giken piles embedded into the impervious clay layer, although the feasibility of this through dense gravels will need to be considered.

Taking into account the above proposed waterproofing strategy it is considered that for the proposed development the risk of flooding from groundwater is low.

Sewer

The Camden SFRA provides maps which illustrate the properties which are at risk of both internal and external sewer flooding. The mapping is based on information provided in the Thames Water DG5 Flood Register and illustrates historic sewer flooding incidents over the past 10 years.

Extracts from the DG5 sewer maps show that all of the historic incidents have occurred in the South Hampstead, Kilburn and Primrose Hill areas. No historic incidents have been recorded in the south of the borough where the development is located.

These records are supported by Thames Water Sewer Flooding History Enquiry, where they state that *'The flooding records held by Thames Water indicate that there have been no incidents of flooding in the requested area as a result of surcharging public sewers'*. Refer to Appendix H for full copy of Sewer Flooding History Enquiry.

Although the historic incidents do not indicate a risk of flooding from sewers it does not necessarily indicate that future incidents of sewer flooding will not occur.

To help reduce the risk of future incidents the development should look to decrease the peak surface water runoff rate from the development. As stated in the SFRA sewer systems are typically designed and constructed to accommodate the 1 in 30 year rainfall event, by reducing the sites peak runoff rate to less than the existing 1 in 30 year rate the risk of sewer flooding is reduced. This is due to the development putting less pressure on the public sewer network during the critical storms.

Based on the above historic record information the flood risk of flooding from sewers is considered to be low.

Reservoirs and Artificial Sources

Flooding from Reservoirs, canals and artificial sources; the latest Gov.uk detailed flood maps do not show any flooding on site or in the vicinity of the site from artificial sources or reservoirs.

11 Conclusion

After reviewing the SuDS hierarchy it is considered that the only feasible SuDS technique is to store surface water runoff in an attenuation structure for gradual release. The surface water flows will be directed to basement level to a tank structure where it will be restricted via a pump device at 5l/s. The attenuation has been sized to allow for no flooding up to and including the 1 in 100 year event plus 40% climate change.

All foul water flows generated at basement level will be drained to a foul water pump device. This will discharge via a rising main to the high level gravity system.

The risk of flooding to the development has been assessed for fluvial, pluvial, groundwater, sewers and reservoirs & artificial sources. It is considered that the site is at low risk from flooding for all of these sources.

Although the surface water maps show flooding along the road it is understood that the majority of the water will be contained within the highway. Any water which makes it to the building threshold will be of low volume and velocity and therefore can be easily drained into the attenuation structure via a channel drain.

Appendix A

Existing dimensional survey

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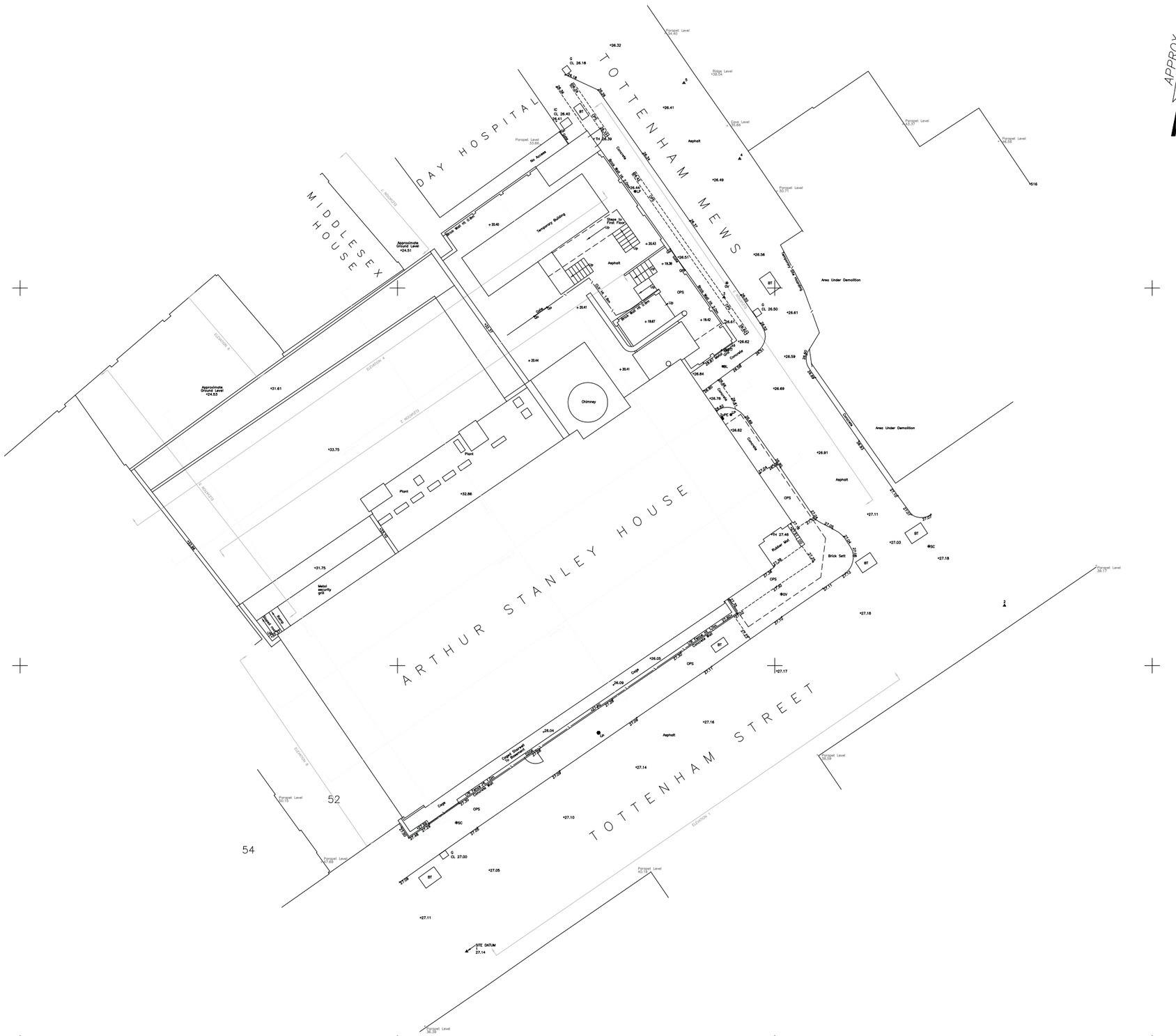

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142-144 HILLVIEW AVENUE, HORNCHURCH, ESSEX. RM11 2DL
TEL. 01708 438408 FAX 01708 438405. email: london@laserssurveys.com

DATUM NOTES

GRID IS BASED ON ORDNANCE SURVEY COORDINATES AND THE DRAWING IS ORIENTATED BY BEST GRAPHICAL FIT.

LEVELS ARE RELATED TO :- OPS DATUM.
DATUM USED IS LOCATED AT :-

SURVEY CONTROL STATION 1
(AS SHOWN ON DRAWING L6302/1)

VALUE GIVEN AS 27.14m (OPS DATUM)

E 529329.588 181731.072 N

SURVEY CONTROL STATIONS SHOWN ⚠

ABBREVIATIONS (where applicable)

AV	Air Valve	MH	Manhole Cover
BK	Brick	MK	Marker
BL	Bollard	MS	Milestone
BS	Bus Stop	MT	Meter
BT	British Telecom	MY	Mercury
CB	Control Box	OH	Overhead
C/B	Close Boarded	PAV	Paving
CL	Cover Level	PB	Post Box
CLK	Chainlink	PC	Pipe
CO	Column	PM	Parking Meter
Conc	Concrete	P/R	Post and Rail
CP	Catch Pit	PT	Post
CPS	Concrete Paving Slabs	P/W	Post and Wire
CATV	Cable Television	RE	Rodding Eye
DC	Drainage Channel	RET	Retaining
DP	Drain Pipe	RS	Road Sign
EC	Electricity Cover	RSJ	Rolled Steel Joist
ED	Earthing Rod	SC	Stop Cock
FB	Flower Bed	SH	Soakaway
FE	Fence	SI	Signboard
FH	Fire Hydrant	ST	Stanchion
FL	Floor Level	SV	Stop Valve
FP	Flag Pole	SVC	Security Video Camera
GP	Gate Post	TCB	Telephone Call Box
GV	Gas Valve	TL	Traffic Light
GY/G	Gully	TK	Tank
HT	Height	TP	Telegraph Pole
IC	Inspection Cover	UG	Underground
IL	Invert Level	UTF	Unable To Trace Further
IN	Interceptor	UTL	Unable To Lift
I/R	Iron Railings	VP	Vent Pipe
KO	Kerb Outlet	WL	Water Level
LB	Litter Bin	WM	Water Meter
LP	Lamp Post	WO	Wash Out

NOTES

- Drainage pipe sizes (where shown) have been gauged from the surface for safety reasons and should be regarded as approximate only.
- Tree species (where shown) should be treated with caution and expert identification is advised.
- Although this is a digital survey the accuracy and amount of detail shown is only commensurate with the graphical scale of mapping as specified. Care should be exercised when working to larger scales.
- Visible features in the vicinity of the boundaries as shown above, may not represent the extent of legally conveyed ownership.
- Whilst every effort has been made to achieve accuracy on this plan, CRUCIAL clearance dimensions, levels and invert levels should be checked prior to design and construction.
- Kerb levels have been taken in the bottom of the channel.
- Areas of dense undergrowth cannot be surveyed in detail, these areas will be shown in outline only and marked as "dense undergrowth" on the plan.

SHEET LAYOUT
NOT TO SCALE

ARTHUR STANLEY HOUSE
LONDON
W1T 4RN

TOPOGRAPHICAL & LOWER ROOF PLAN SURVEY

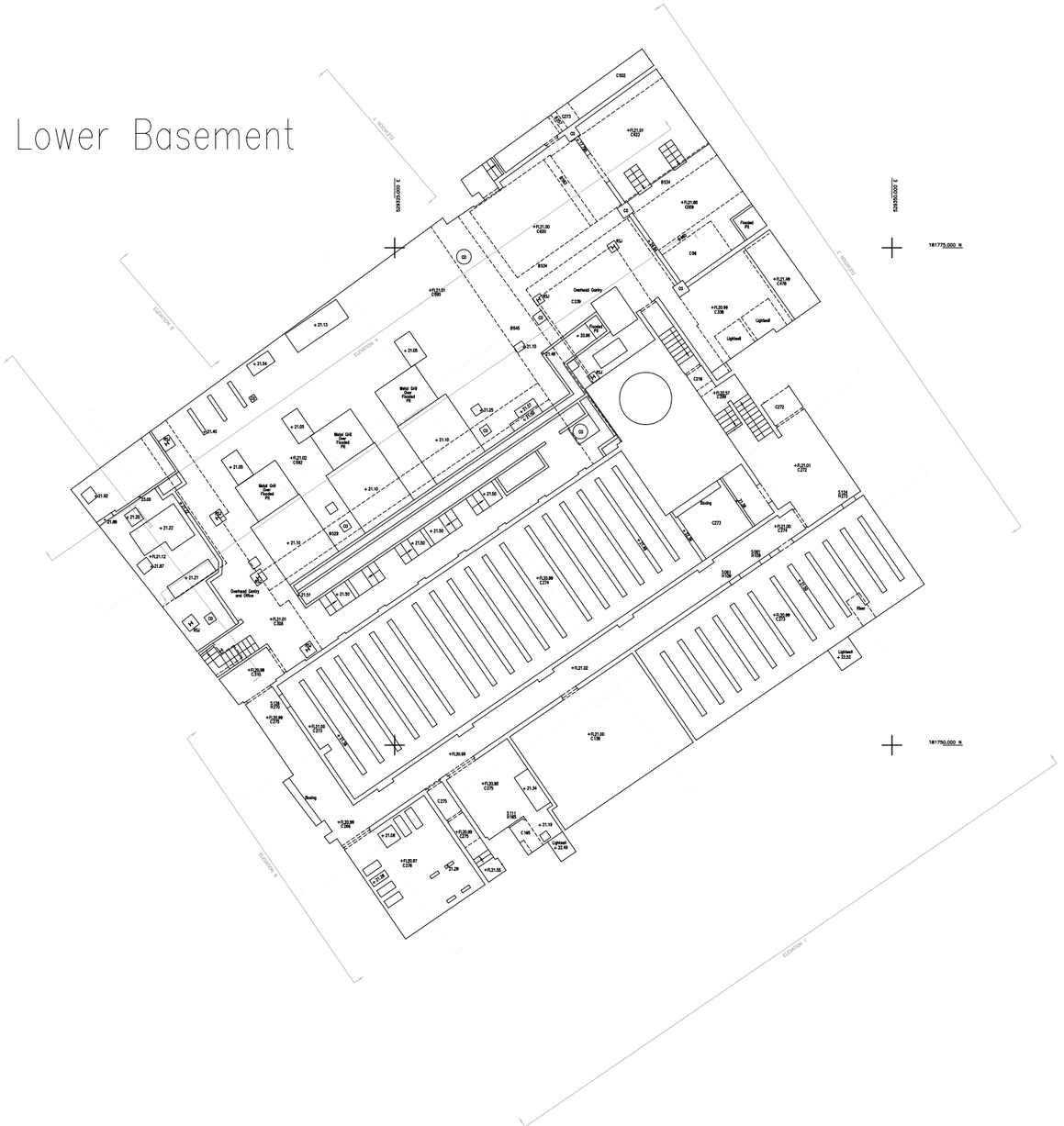
SURVEYED FOR University College London Hospitals Charity
Care of Llewelyn Davies
44-46 Whitfield Street
London
W1T 2RJ

SURVEYOR A.E./A.J.M/D.C
DATE JANUARY 2015

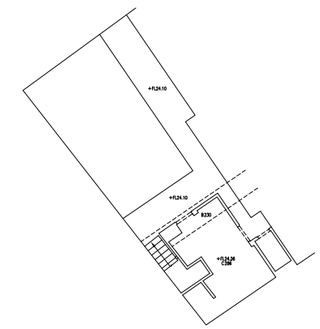
NO	DATE	REVISION
1	JUNE 2014	ADDITIONAL FLOORS SURVEYED
2	JULY 2014	AMENDMENT TO TOPOGRAPHIC SURVEY
3	JAN 2015	SURVEY RELATED TO OS DATUM.

DRAWING NO	L L6302/T/LRP	REV 3
SCALE	1 : 100	
SEE ALSO DWG NOS		
SHEET	1 of 4	
REF NO	L 6302	

Lower Basement



Lower Basement



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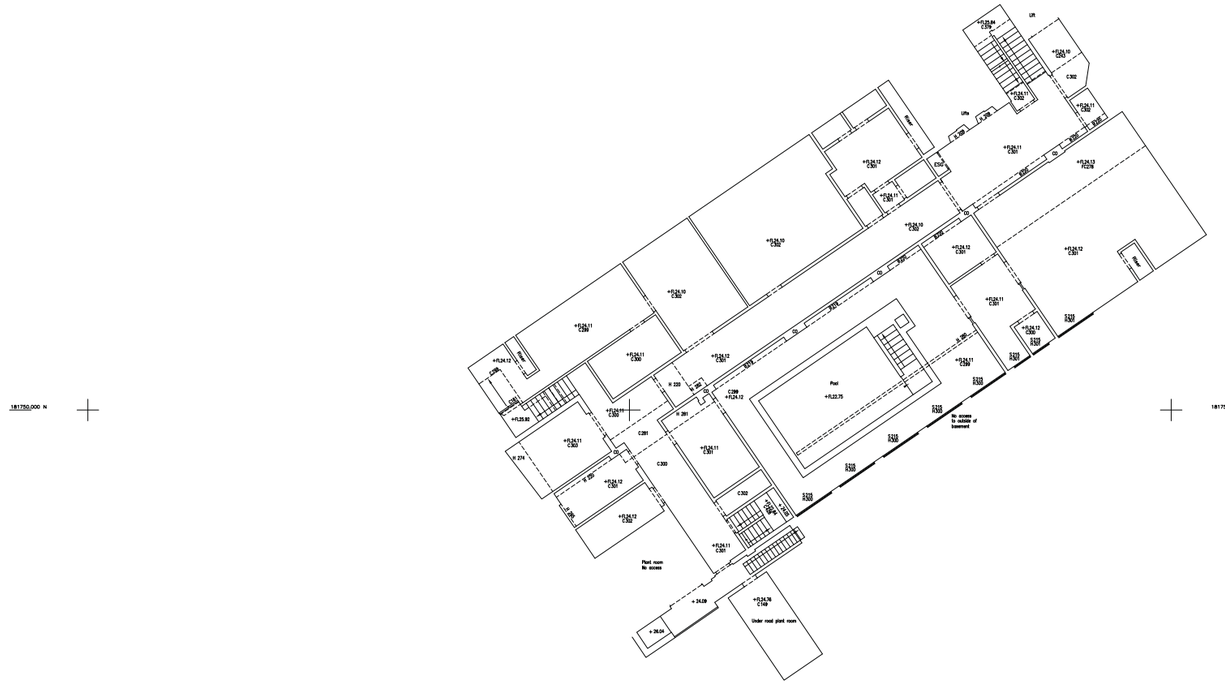
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Plant room
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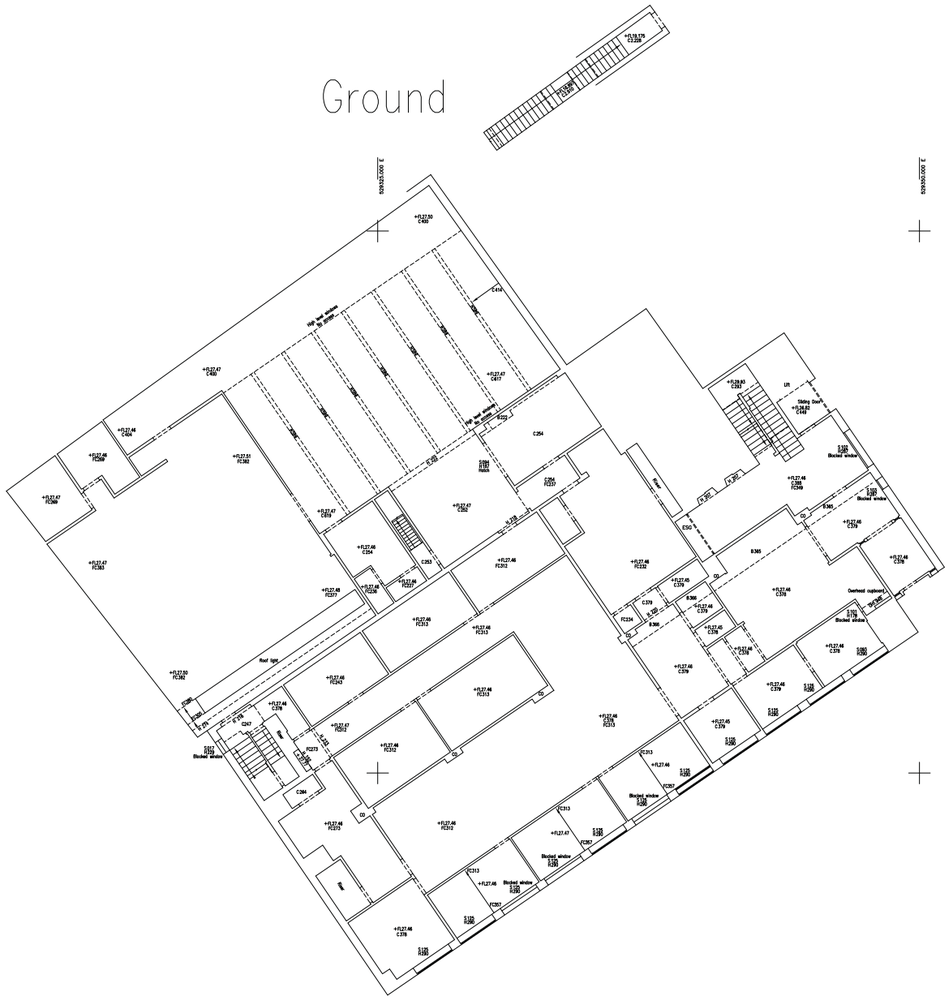
Under road plant room
No access to outside of basement

Ground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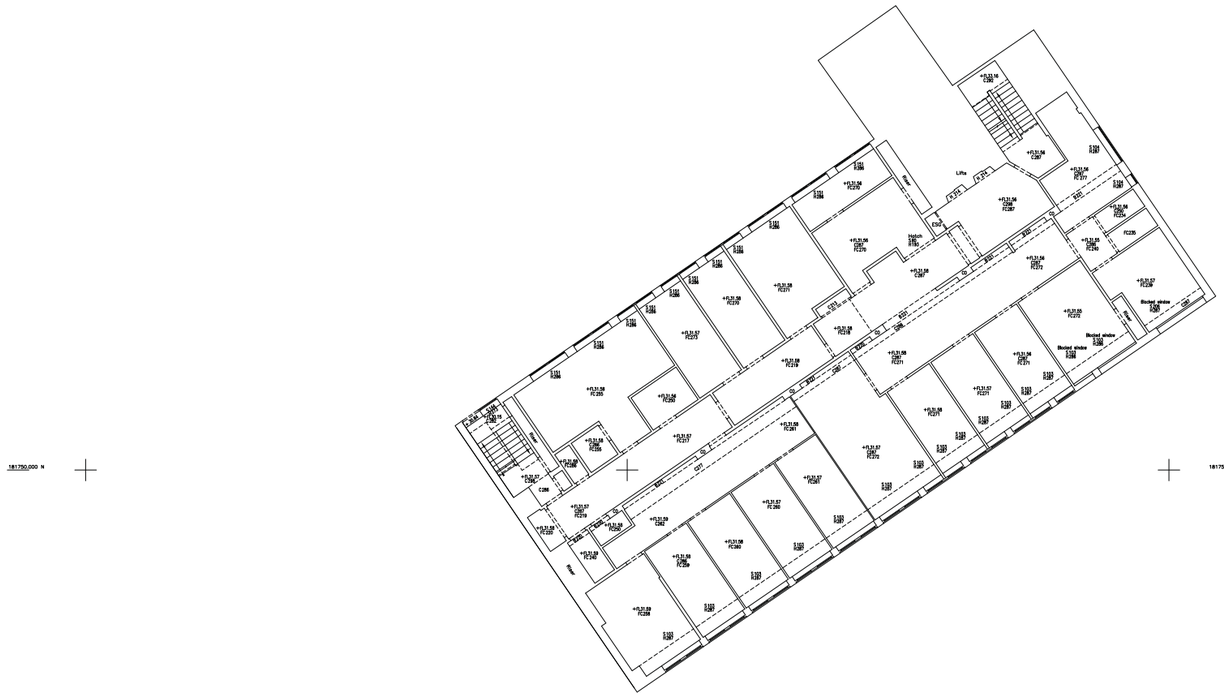
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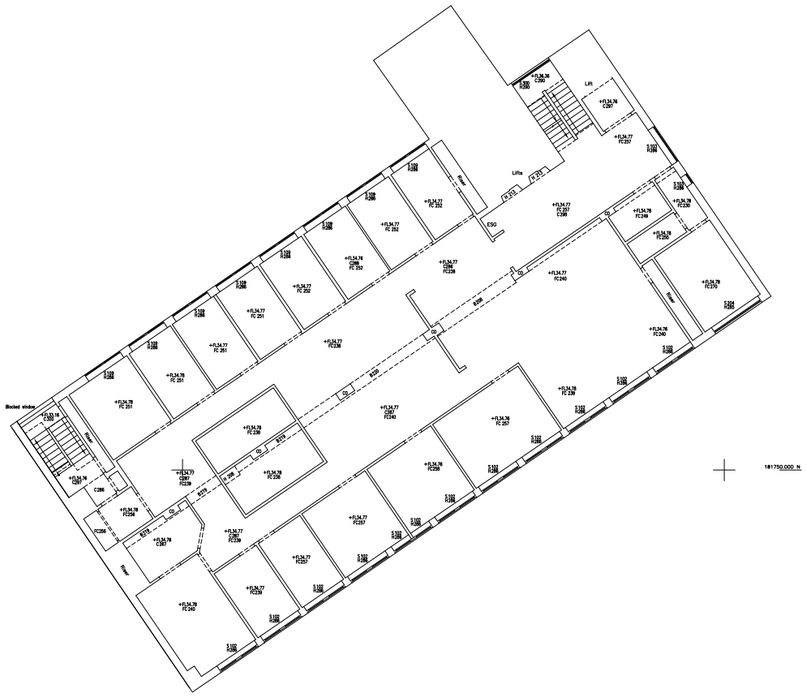
2nd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C290
S300
H290
+FL34.76
C297
+FL34.77
FC257
S103
H286
Lifts
H 213
Riser
ESG
+FL34.77
FC 257
C298
CO
+FL34.78
FC249
+FL34.78
FC230
+FL34.78
FC255
+FL34.78
FC270
S204
H285
+FL34.77
C286
FC238
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FC240
B208
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FC240
S102
H286
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FC 239
S109
H286
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C288
FC 252
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FC 251
+FL34.78
FC 251
+FL34.77
FC238
B220
Blocked window
+FL33.16
C300
+FL34.78
FC 238
B219
H 208
+FL34.77
C287
FC240
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FC 257
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FC258
+FL34.77
FC257
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C287
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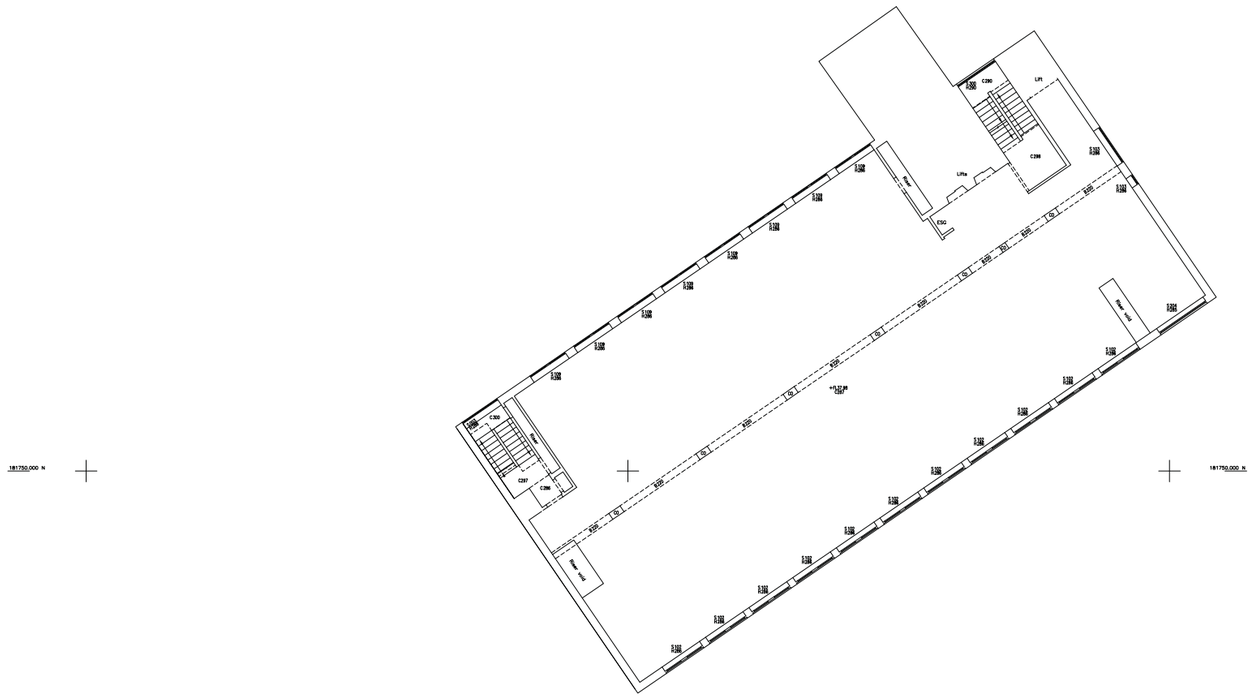
FC 240

3rd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LIFT
C298
LIFT
ESC
Water well
C293
C297
C296
Water well
Water well
11.57 M
C287

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181775.000 N
3,000,250 E
181775.000 N
3,000,500 E
181775.000 N
181750.000 N
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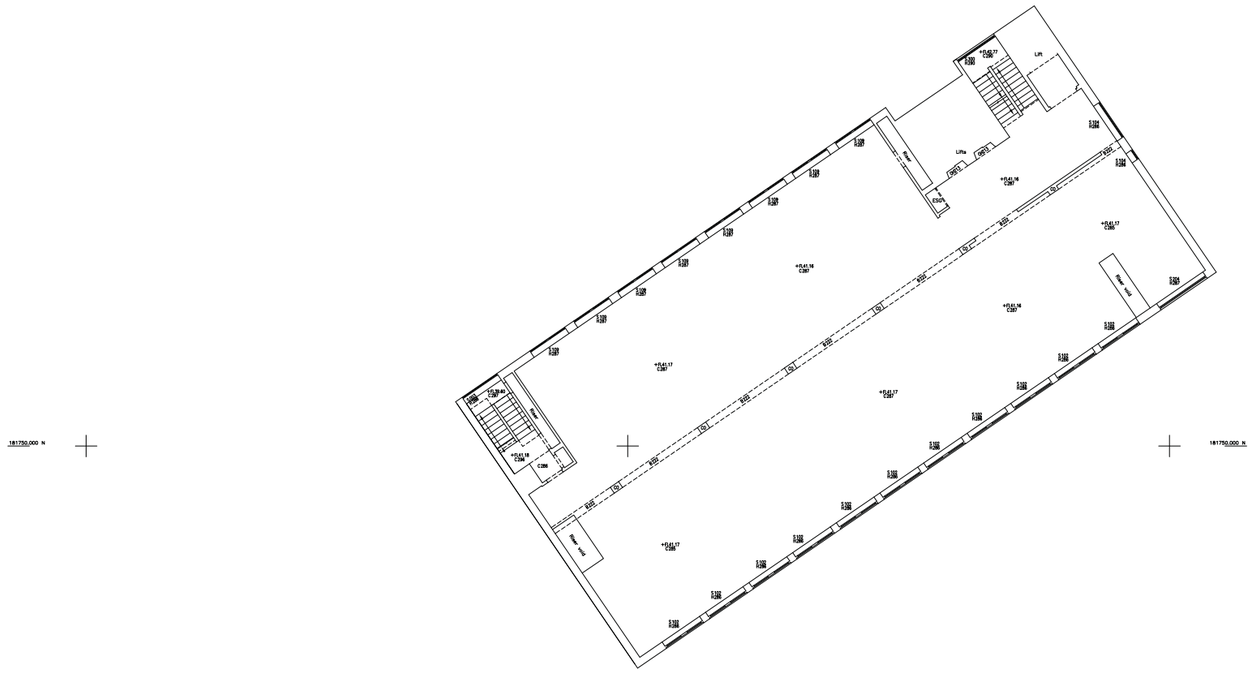
3,000,000 E
3,000,250 E
3,000,500 E

4th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Lifts
Shaft
Shaft
Shaft
Shaft
C386
C387
C388
C389
C390
C391
C392
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C396
C397
C398
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C409
C410
C411
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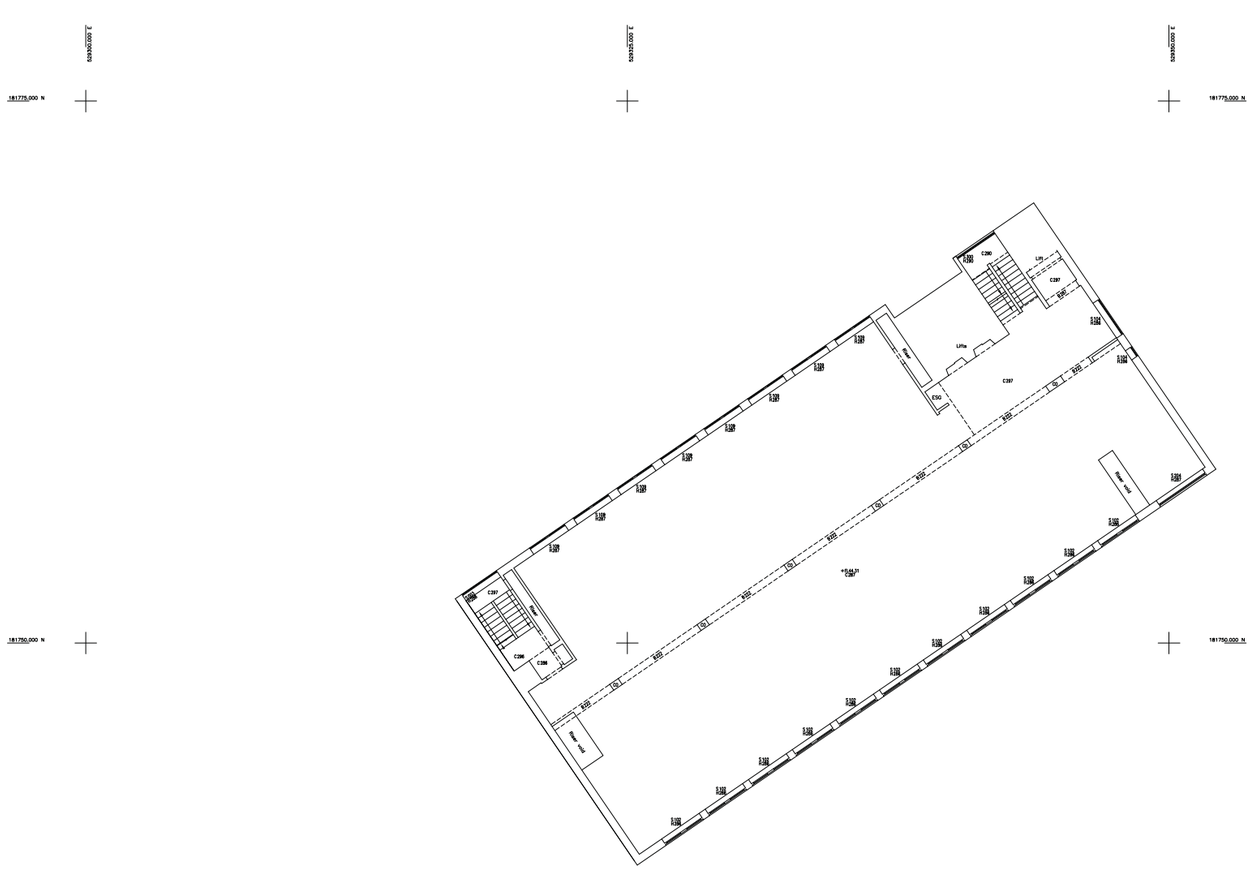
C416
C417
C418
C419
C420
C421
C422
C423
C424
C425

5th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C287
C286
C288
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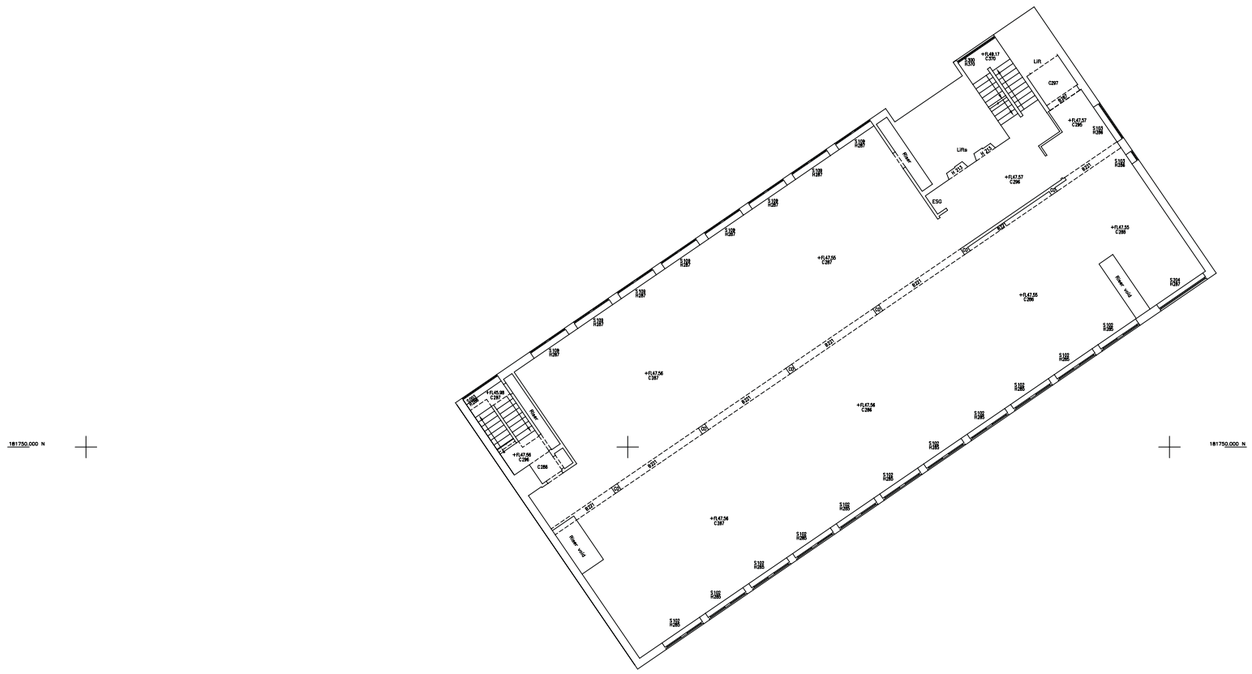
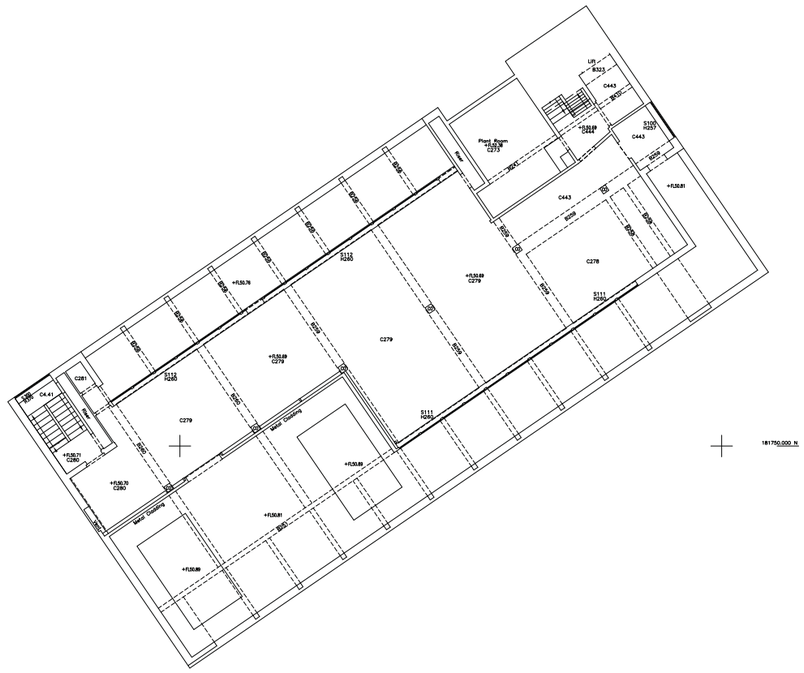
Lifts
Wall
Water Void
+0.45 FF
C287

6th



7th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529350.000 E
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181775.000 N
Lift
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C443
B410
S100
H257
C443
+FL50.69
C444
Plant Room
+FL52.38
C273
B241
Riser
B259
+FL50.81
C443
C0
B259
B259
B259
C278
S111
H260
+FL50.69
C279
B256
S112
H260
+FL50.76
C279
B260
+FL50.69
C279
C0
S300
H370
C4.41
C281
Riser
S112
H260
C279
B260
Metal Cladding
+FL50.71
C280
+FL50.70
C280
S111
H260
+FL50.89
Vent
Metal Cladding
+FL50.81
B251
+FL50.89
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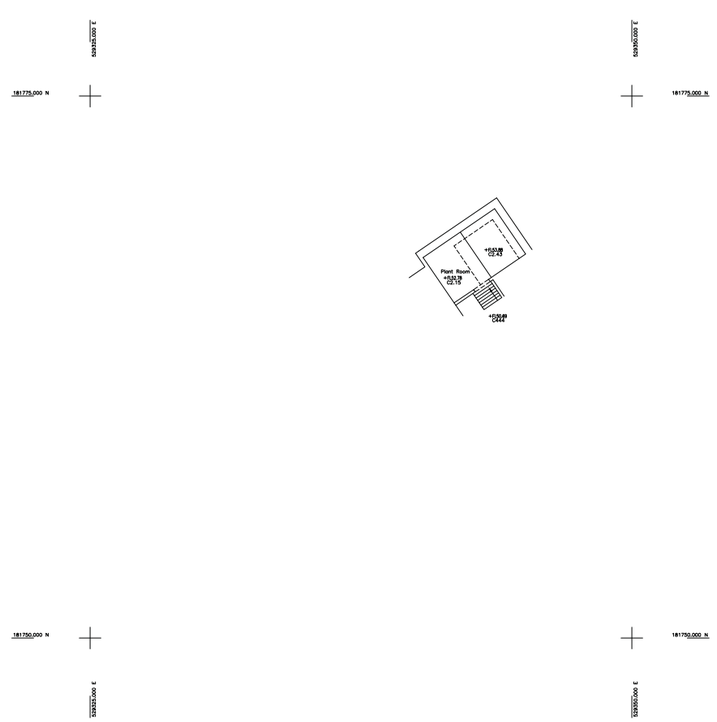
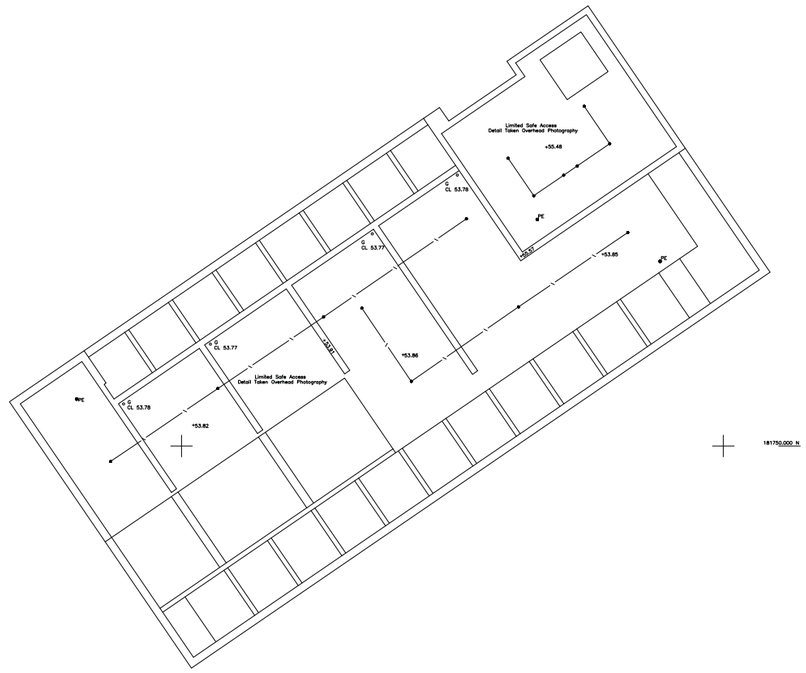
529350.000 E

7th Plant Room



Roof



181775.000 N
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181725.000 N
529300.000 E
529325.000 E
529350.000 E

LASER SURVEYS

LAND AND BUILDING SURVEYS, UNDERGROUND SERVICES LOCATION, CCTV DRAINAGE SURVEYS.
Established 1975. Member of The Survey Association.

BROCKMAN HOUSE, LEIGH, WORCESTER, WR6 5JU.
TEL 01886 833173 FAX 01886 833485 email: worcester@lasersurveys.com

142-144 HILLVIEW AVENUE, HORNCHURCH, ESSEX. RM11 2DL
TEL 01708 438406 FAX 01708 438405 email: london@lasersurveys.com

DATUM NOTES

GRID IS BASED ON ORDNANCE SURVEY COORDINATES AND THE DRAWING IS ORIENTATED BY BEST GRAPHICAL FIT.

LEVELS ARE RELATED TO :- ARBITRARY SURVEY DATUM.
DATUM USED IS LOCATED AT :-

SURVEY CONTROL STATION 1
(AS SHOWN ON DRAWING L6302/1)

VALUE GIVEN AS 20.00m (ARBITRARY DATUM)

E 529329.588 181731.072 N

SURVEY CONTROL STATIONS SHOWN ⚠

ABBREVIATIONS (where applicable)

AV	Air Valve	MH	Manhole Cover
BK	Brick	MK	Marker
BL	Bollard	MS	Milestone
BS	Bus Stop	MT	Meter
BT	British Telecom	MY	Mercury
CB	Control Box	OH	Overhead
C/B	Close Boarded	PAV	Paving
CL	Cover Level	PB	Post Box
CLK	Chainlink	PE	Pipe
CO	Column	PM	Parking Meter
Conc	Concrete	P/R	Post and Rail
CP	Catch Pit	PT	Post
CPS	Concrete Paving Slabs	P/W	Post and Wire
CATV	Cable Television	RE	Rodding Eye
DC	Drainage Channel	RET	Retaining
DP	Drain Pipe	RS	Road Sign
EC	Electricity Cover	RSJ	Rolled Steel Joist
ER	Earthing Rod	SC	Stop Cock
FB	Flower Bed	SK	Soakaway
FE	Fence	ST	Signpost
FH	Fire Hydrant	TP	Traffic Lamp
FL	Floor Level	TV	Stop Valve
FP	Flag Pole	SVC	Security Video Camera
GP	Gate Post	TCB	Telephone Call Box
GV	Gas Valve	TL	Traffic Light
GT/G	Gully	TK	Tank
HT	Height	TP	Telegraph Pole
IC	Inspection Cover	UG	Underground
IL	Invert Level	UTF	Unable To Trace Further
IN	Interceptor	UTL	Unable To Lift
I/R	Iron Railings	VP	Vent Pipe
KO	Kerb Outlet	WL	Water Level
LB	Litter Bin	WM	Water Meter
LP	Lamp Post	WO	Wash Out

NOTES

* Drainage pipe sizes (where shown) have been gauged from the surface for safety reasons and should be regarded as approximate only.
* Tree species (where shown) should be treated with caution and expert identification is advised.
* Although this is a digital survey the accuracy and amount of detail shown on this plan is dependent on the limitations of the survey method as specified. Care should be exercised when working to larger scales.
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* Kerb levels have been taken in the bottom of the channel.
* Areas of dense undergrowth cannot be surveyed in detail, these areas will be shown in outline only and marked as 'dense undergrowth' on the plan.
* An attempt has been made to measure or assume full ceiling heights where false ceilings obstructed or partially obstructed the on site survey.

SHEET LAYOUT
NOT TO SCALE

ARTHUR STANLEY HOUSE
LONDON
W1T 4RN

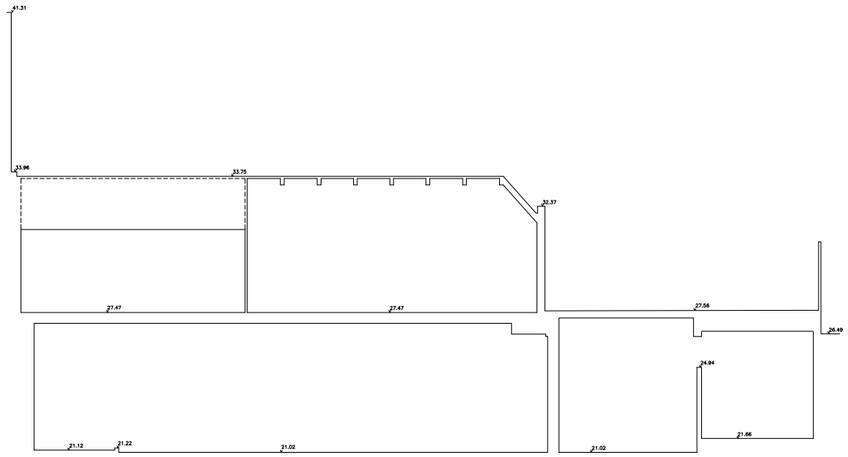
FLOOR PLAN AND ROOF SURVEY

SURVEYED FOR University College London Hospitals Charity
Care of Llewelyn Davies
44-46 Whitfield Street
London
W1T 2RJ

SURVEYOR A.E./A.J.M
DATE APR/MAY 2014

NO	DATE	REVISION
1	JUNE 2014	ADDITIONAL FLOORS SURVEYED

DRAWING NO	L L6302/FP/R REV 0
SCALE	1 : 100
SEE ALSO DWG NOS	
SHEET	2 of 4
REF NO	L 6302



0 meters above site datum

SECTION A

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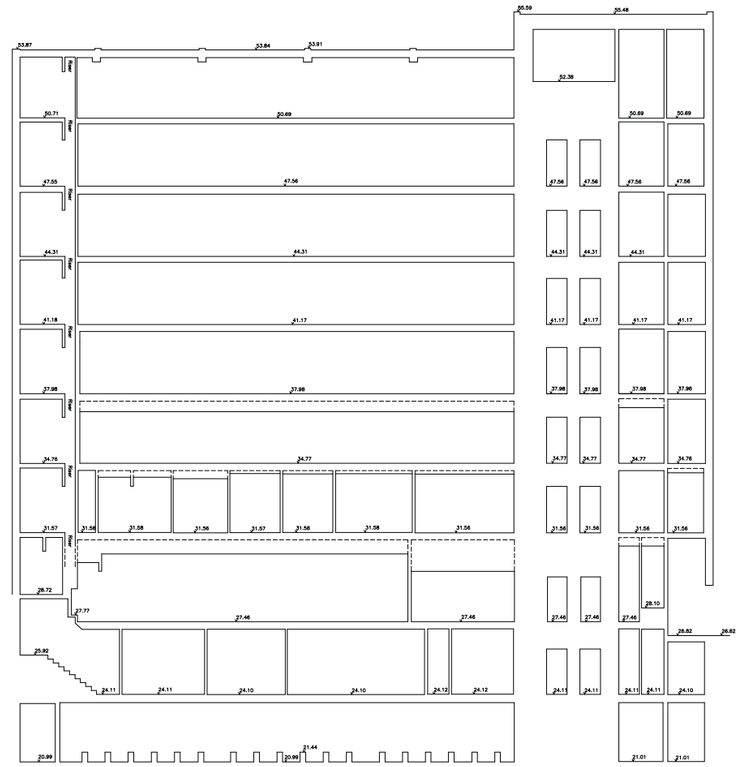

0 meters above site datum

SECTION B

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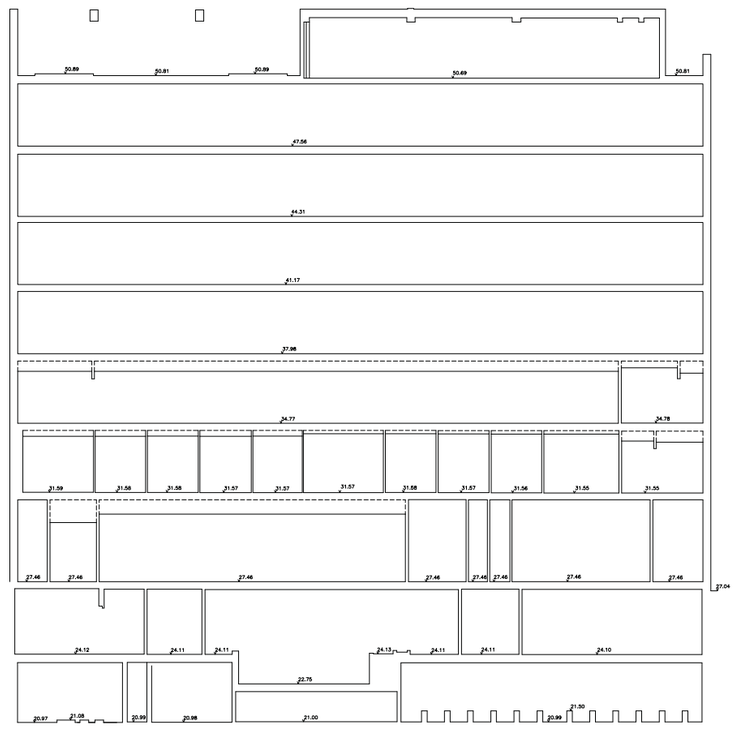
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31.58
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31.56
31.55
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27.46
27.46
27.46
27.46
27.46
27.46
27.46
27.04
24.12
24.11
24.11
24.13
24.11
24.11
24.10
22.75
20.97
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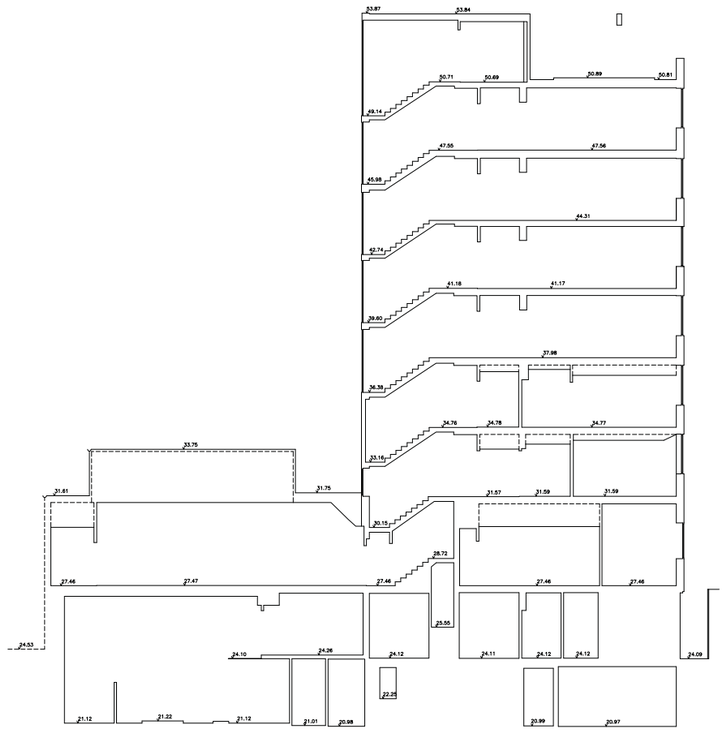
20.99
20.98
21.00
21.30
20.99
0 meters above site datum
SECTION C
0 1 2 3 4 5 Metres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47.56
45.98
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34.78
34.77
33.16
33.75
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31.57
31.59
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25.55
24.53
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24.11
24.12
24.12
24.09
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21.12
21.01
20.98
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20.97
0 meters above site datum
SECTION D
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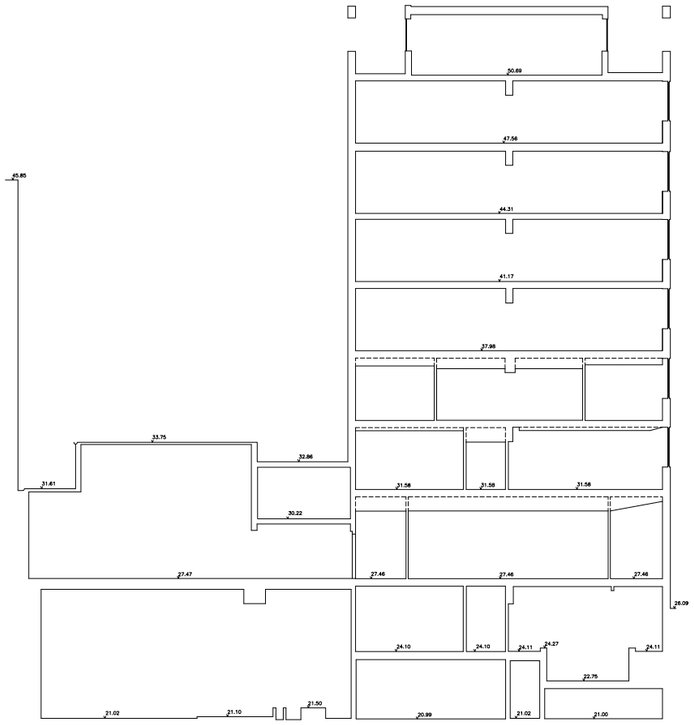

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SECTION E

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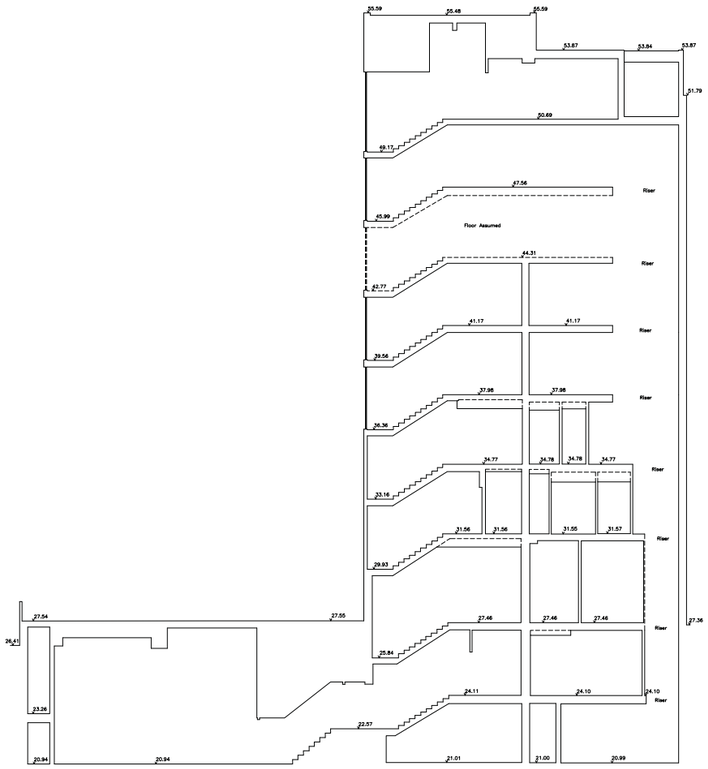

0 meters above site datum

SECTION F

0 1 2 3 4 5 Metres

LASER SURVEYS

LAND AND BUILDING SURVEYS, UNDERGROUND SERVICES LOCATION, CCTV DRAINAGE SURVEYS.
Established 1975. Member of The Survey Association.

BROOKHAMIN HOUSE, LEDIGH, WORCESTER, WR6 5AJ.
TEL 01886 833173 FAX 01886 833485 email: worcester@lasersurveys.com

142-144 HILLVIEW AVENUE, HORNCHURCH, ESSEX. RM11 2DL
TEL 01708 438408 FAX 01708 438405 email: london@lasersurveys.com

DATUM NOTES

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LEVELS ARE RELATED TO :- GPS DATUM.
DATUM USED IS LOCATED AT :-

SURVEY CONTROL STATION 1
(AS SHOWN ON DRAWING L6302/1)

VALUE GIVEN AS 20.00m (GPS DATUM)

E 529329.588 181731.072 N

SURVEY CONTROL STATIONS SHOWN ⚠

ABBREVIATIONS (where applicable)

AV	Air Valve	MH	Manhole Cover
BK	Brick	MK	Marker
BL	Bollard	MS	Milestone
BS	Bus Stop	MT	Meter
BT	British Telecom	MY	Mercury
CB	Control Box	OH	Overhead
C/B	Close Boarded	PAV	Paving
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CLK	Chainlink	PE	Pipe
CO	Column	PM	Parking Meter
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CP	Catch Pit	PT	Post
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DC	Drainage Channel	RET	Retaining
DP	Drain Pipe	RS	Road Sign
EC	Electricity Cover	RSJ	Rolled Steel Joist
ER	Earthing Rod	SC	Stop Cock
FB	Flower Bed	SH	Soakaway
FE	Fence	SI	Signpost
FH	Fire Hydrant	ST	Stop Tap
FL	Floor Level	SV	Stop Valve
FP	Flag Pole	SVC	Security Video Camera
GP	Gate Post	TCB	Telephone Call Box
GV	Gas Valve	TL	Traffic Light
GY/G	Gully	TK	Tank
HT	Height	TP	Telegraph Pole
IC	Inspection Cover	UG	Underground
IL	Invert Level	UTF	Unable To Trace Further
IN	Interceptor	UTL	Unable To Lift
I/R	Iron Railings	VP	Vent Pipe
KO	Kerb Outlet	WL	Water Level
LB	Litter Bin	WM	Water Meter
LP	Lamp Post	WO	Wash Out

NOTES

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* An attempt has been made to measure or assume full ceiling heights where false ceilings obstructed or partially obstructed the on site survey.

SHEET LAYOUT
NOT TO SCALE

ARTHUR STANLEY HOUSE
LONDON
W1T 4RN

SECTION SURVEY

SURVEYED FOR University College London Hospitals Charity
Care of Llewelyn Davies
44-46 Whitfield Street
London
W1T 2RJ

SURVEYOR A.E./A.J.M./D.C
DATE JANUARY 2015

NO	DATE	REVISION
1	JUNE 2014	ADDITIONAL FLOORS SURVEYED
2	JULY 2014	AMENDMENT TO TOPOGRAPHIC SURVEY
3	JAN 2015	SURVEY RELATED TO OS DATUM.

DRAWING NO	L L6302/S	REV 3
SCALE	1 : 100	
SEE ALSO DWG NOS		
SHEET	4 of 4	
REF NO	L 6302	

Appendix B

Thames Water Asset Location Search

Asset Location Search

Heyne Tillett Steel Limited
4

LONDON
EC1R 0DS

Search address supplied Arthur Stanley House
40-50
Tottenham Street
London
W1T 4RN

Your reference 1431

Our reference ALS/ALS Standard/2015_3173299

Search date 20 October 2015

You are now able to order your Asset Location Search requests online by visiting
www.thameswater-propertysearches.co.uk

Asset Location Search

Search address supplied: Arthur Stanley House, 40-50, Tottenham Street, London, W1T 4RN

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

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

Asset Location Search

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.

Asset Location Search

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

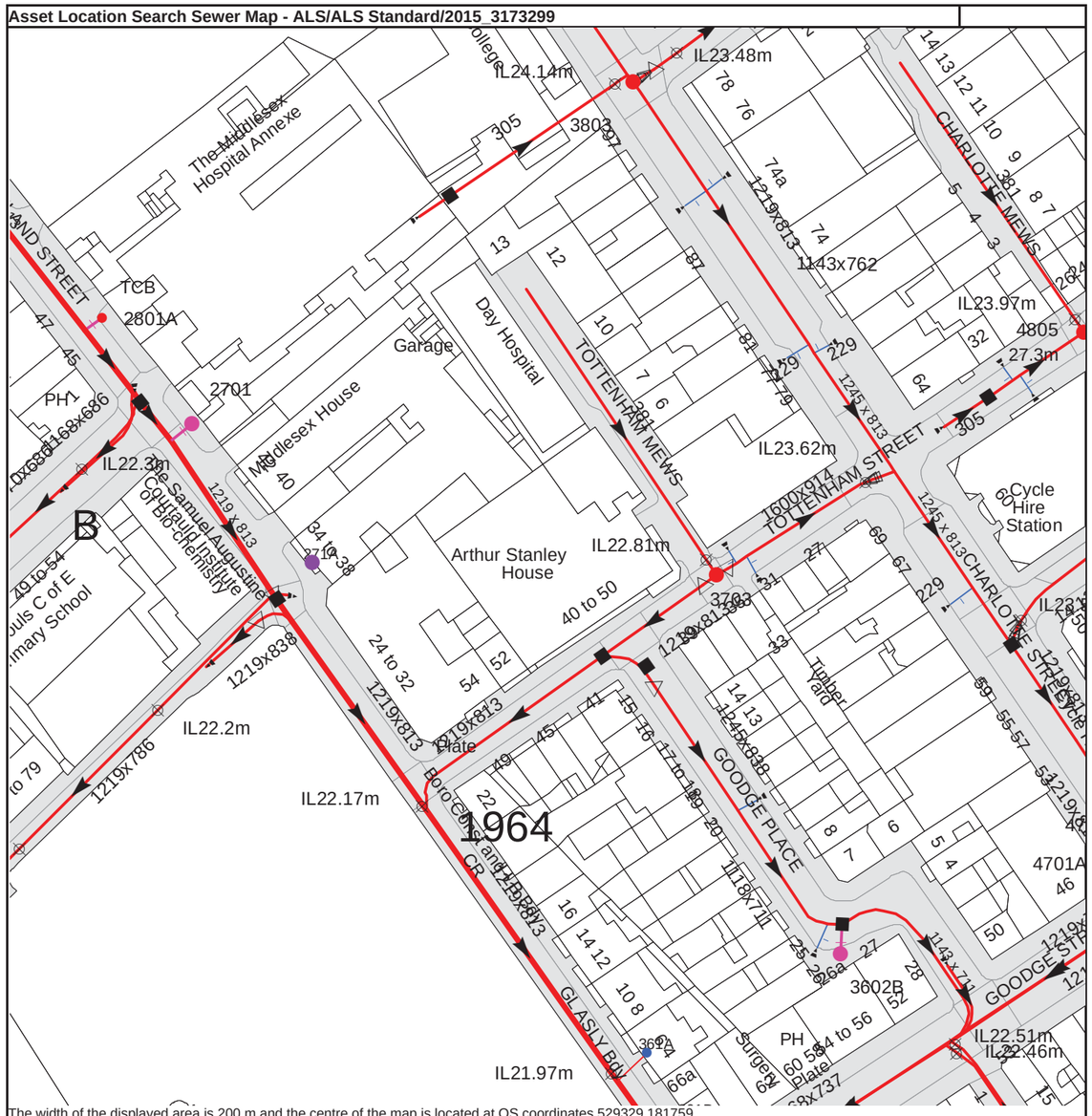
Tel: 0845 850 2777
Email: developer.services@thameswater.co.uk

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: 0845 850 2777
Email: developer.services@thameswater.co.uk



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.

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
4805	n/a	n/a
2801A	27.7	25.7
2701	27.05	n/a
271A	n/a	n/a
3803	27.34	23.12
3703	n/a	n/a
361A	n/a	n/a
3602B	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

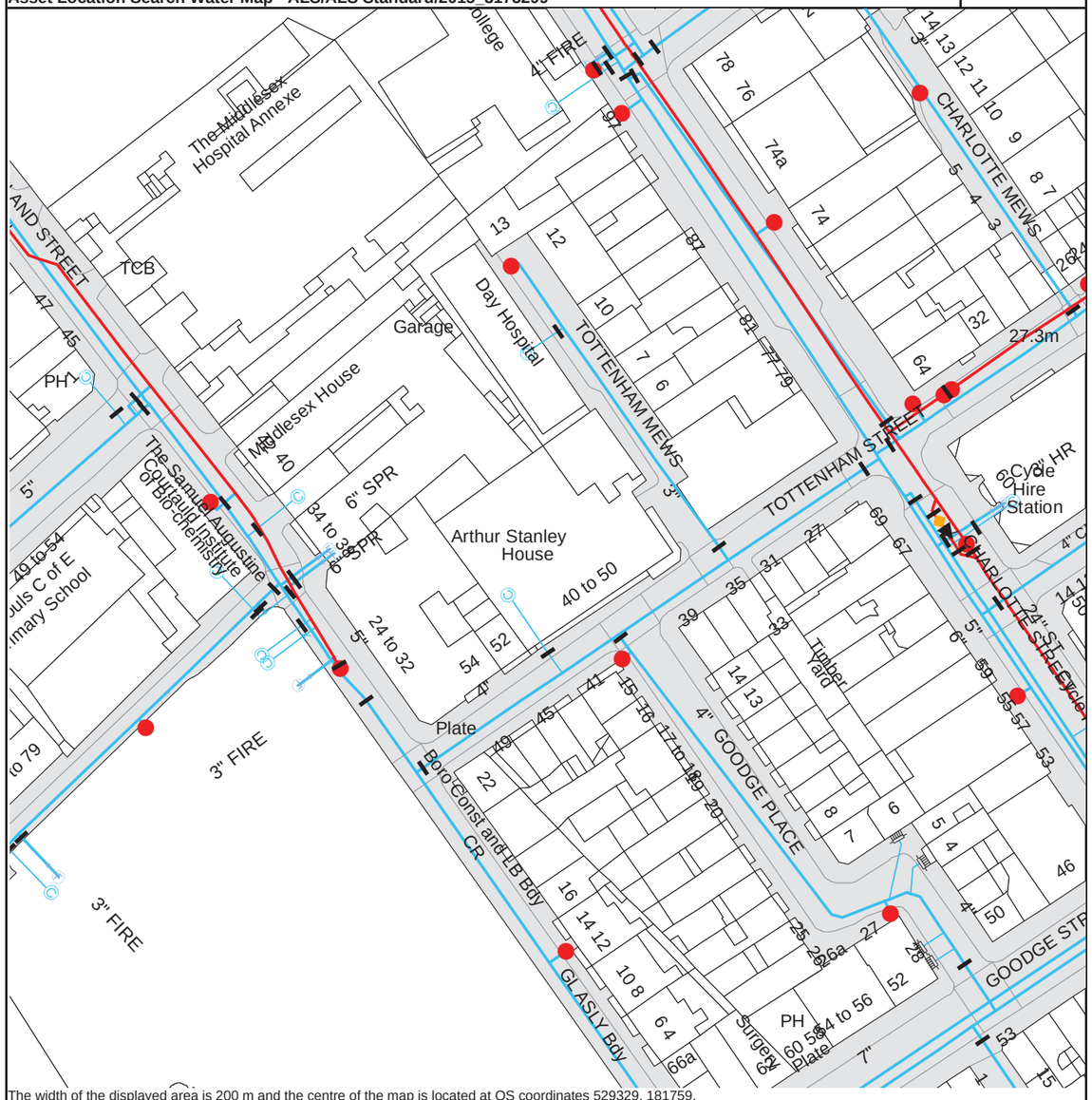
Proposed

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/2015_3173299



The width of the displayed area is 200 m and the centre of the map is located at OS coordinates 529329, 181759.

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.

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.

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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.
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Credit Card	**BACS Payment**	**Telephone Banking**	**Cheque**
Call **0845 070 9148** quoting your invoice number starting CBA or ADS.	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**

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Search Code

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- 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.

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- 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 he finds that you have suffered actual loss as a result of your search provider failing to keep to the Code.

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

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