KEY

TOPOGRAPHICAL KEY

SURVEY STATION 5
BANKING (TOP / BOTTOM)
HEDGE SPREADS
WOODLAND CANOPY
ARROW ON STEPS / RAMPS INDICATES DIRECTION UPWARDS
TREES (SPREAD & GIRTH SHOWN TO SCALE)
GATE
KERB CHANNEL
ROAD UNKERBED
FENCE
WALL
BUILDING
OPEN SIDED BUILDING
OVERHANG / CANOPY
GLASSHOUSE
CONTOUR 25.50
SPOT LEVEL + 127.13
SONAR LEVEL 127.13
BORE HOLE BH
TRIAL HOLE TH
FOOTPATH
CHANGE IN SURFACE

GENERAL

Av.	AVERAGE
COW	CABLE ON WALL
CW	COMBINED WATER
DIS	DISUSED
DK	DROP KERB
EML	ELECTROMAGNETIC LOCATOR
EOT	END OF TRACE
FO	FIBRE OPTIC
FP	FOOTPATH
FW	FOUL WATER
GP	GATE POST
GPR	GROUND PENETRATING RADAR
HB	HARD BED
H/P	HIGH PRESSURE
HV	HIGH VOLTAGE
KV	KILO VOLT
I/P	INTERMEDIATE PRESSURE
L/P	LOW PRESSURE
LV	LOW VOLTAGE
M/P	MEDIUM PRESSURE
NDI	NO DEPTH INFORMATION
NFI	NO FURTHER INFORMATION
NDV	NO DUCTS VISIBLE
NPV	NO PIPES VISIBLE
OSBM	ORDNANCE SURVEY BENCHMARK
POW	PIPE ON WALL
P.BOX	POST BOX
RED	REDUNDANT SERVICE
RW	RETAINING WALL
SB	SOFT BED
SNP	STREET NAME PLATE
SW	SURFACE WATER
TAC	TACTILE PAVING
TOW	TOP OF WALL
TW	TRADE EFFLUENT WATER
UTL	UNABLE TO LOCATE
UTR	UNABLE TO RAISE
UTS	UNABLE TO SURVEY

APPARATUS

ACU	AIR CONDITIONING UNIT
AV	AIR VALVE
BB	BELISHA BEACON
BO	BOLLARD
BOL	BOLLARD LIGHT
BS	BUS STOP
CATV	CABLE TELEVISION
CB	CONTROL BOX
CCB	CROSSING CONTROL BUTTON
CP	CATCH PIT
CR	CABLE RISER
DCH	DRAINAGE CHANNEL
EB	ELECTRIC CONTROL BOX
EP	ELECTRIC POLE
ER	EARTH ROD
FD	FILTER DRAIN
FFP	FUEL TANK FILL POINT
FH	FIRE HYDRANT
GR	GAS RISER
GV	GAS VALVE
GY	GULLY
IC	INSPECTION COVER
INT	INTERCEPTOR
IT	INLET
KO	KERB OUTLET
LD	LOOP DETECTOR
LH	LAMP HOLE
LP	LAMP POST
MH	MANHOLE
MK	MARKER POST / PLATE
MT	METER
MW	MONITORING WELL
OL	OUTLET
OU	OUTFALL
PO	POST
PTG	PIPE TO GROUND
PTS	PIPE TO SURFACE
PU	PUMP
RE	RODDING EYE
RS	ROAD SIGN
RM	RISING MAIN
RWP	RAIN WATER PIPE
SC	STOP COCK
SO	SOAKAWAY
SP	SOIL PIPE
ST	STAY CABLE
SV	STOP / SLUICE VALVE
SVP	SOIL VENT PIPE
TCB	TELEPHONE CALL BOX
TEL	TELECOM INSPECTION COVER
TL	TRAFFIC LIGHT
TLC	TRAFFIC LIGHT COVER
TM	TICKET MACHINE
TP	TELECOM POLE
VP	VENT PIPE
WM	WATER METER
WO	WASH OUT
WR	WATER RISER
WT	WATER TAP
WW	WET WELL

DEPTHS

d	ELECTRONICALLY DERIVED
Pd	PASSIVELY DERIVED
Bd	BASE DEPTH
Cd	DEPTH TO CROWN
Id	DEPTH TO INVERT
Sd	DEPTH TO SOFFIT
STd	DEPTH TO SILT

PIPE MATERIALS

AC	ASBESTOS CEMENT
ALK	ALKATHENE
BK	BRICK
CI	CAST IRON
CO	CONCRETE
DI	DUCTILE IRON
HDPE	HIGH DENSITY PE
MDPE	MEDIUM DENSITY PE
PE	POLYETHYLENE
PF	PITCH FIBRE
PP	POLYPROPYLENE
PVC	POLYVINYL CHLORIDE
PVC-U	ULTRA RIB (PVC)
SI	SPUN IRON
ST	STEEL
VC	VITRIFIED CLAY

FENCES

B/W	BARBED WIRE FENCE
C/B	CLOSED BOARDED FENCE
CPL	CONCRETE PANEL FENCE
C/I	CORRUGATED IRON FENCE
CNP	CHESTNUT PAILING
C/L	CHAIN LINK FENCE
I/R	IRON RAILINGS
L/L	LARCH LAP FENCE
P/R	POST AND RAIL FENCE
P/W	POST AND WIRE FENCE
W/M	WIRE MESH FENCE

LEVELS

BD	BACKDROP LEVEL
BL	BASE LEVEL
CL	COVER LEVEL
CWL	CROWN LEVEL
DPC	DAMP PROOF COURSE
FL	FLOOR LEVEL
IL	INVERT LEVEL
PT	P TRAP LEVEL
RL	ROOF LEVEL
SL	SILT LEVEL
SOF	SOFFIT LEVEL
THL	THRESHOLD LEVEL
WL	WATER LEVEL

LINESTYLE

INTERNAL METER (MT)
POT ENDED SERVICE
SEWER CAPPED RUN
SURVEY ABANDONED
INTERNAL VALVE
UNKNOWN UNDERGROUND ANOMALY
UNDERGROUND CHAMBERS
VERIFICATION TRIAL HOLE/EXCAVATION
ABOVE GROUND (AG)
ASSUMED ROUTE QB4(AR)
EMPTY DUCTS (E)
OVERHEAD (OH)
BACK DROP
P TRAP
UTILITY CROSSOVER
SURVEY BOUNDARY
VERBAL INFORMATION QB4(VI)
RECORD INFORMATION QB4(R)
REDUNDANT SERVICE
RISING MAIN
CCTV SECTION 4 AND 5 FAULTS ARE SHOWN IN RED

SERVICE TYPE

CATV / DATA
ELECTRICITY (HV)
ELECTRICITY (LV)
FUEL
GAS
HEATING
OVERHEAD ELECTRIC
OVERHEAD TELECOM
TRADE EFFLUENT
COMBINED SEWER
FOUL SEWER
SURFACE SEWER
UNIDENTIFIED SEWER
TELECOM
UNKNOWN SERVICE
WATER

SERVICES SURVEY WARNING

CAUTIONARY NOTES

1. EML techniques have been used in the detection of underground utilities as outlined in Table 2 of PAS 128:2022, the results are not infallible and trial excavations must be carried out in order to confirm identification, position and in particular depth of the utility.
2. GPR techniques has been used in the detection of non-metallic utilities as outlined in Table 2 of PAS 128:2022. The interpretation of these results is not infallible and success will depend on a number of factors including soil type, ground water levels and surface conditions, hence trial excavations must be carried out in order to confirm identification, position and in particular depth of the utility.
3. Depths derived via EML are taken to the centre of the conductor (cable, metallic pipe) and those derived via GPR are usually to the crown of the utility unless otherwise indicated.
4. Where cables cannot be detected individually an average depth has been obtained and trial excavations are recommended to confirm number and depths of cables banded together.
5. 'Pot-ended' cables are often difficult to detect and although we have made all reasonable efforts to locate or transpose this information from records, we cannot guarantee that all 'pot-ended' cables have been located.
6. Fibre optic cables are often difficult to detect, and commonly access chambers can be locked and thereby made inaccessible by the utility provider. All reasonable efforts have been made to locate these ducts using GPR. Cables not located have been transposed from records.
7. Within close proximity of electric substations and similar structures results using EML may become distorted. All reasonable efforts have been made to verify our results using GPR wherever conditions permitted.
8. Underneath overhead power lines results using EML may become distorted. All reasonable efforts have been made to verify our results using GPR wherever conditions permitted.
9. Drainage information has been obtained without man entry into the chamber.
10. Wherever possible we have attempted to locate the route of the sewer. Issues such as blockages, surcharging, flooding, sedimentation, sewer collapse, root ingress, excessive depth, obstructions or heavy traffic flow may have affected our ability to obtain meaningful results. In these cases recommendations have been made for further survey or maintenance work.
11. Pipe / duct sizes have been recorded from surface inspection or taken from record information. Pipe sizes have been recorded in millimetres and depths in metres, except in instances where sizes are indicated in imperial units on the record information.
12. Water and Gas utilities to individual properties are often of a size that cannot be detected using EML or GPR investigation, whenever possible the route has been added from surface evidence (pipe risers, valves, etc), but this should be viewed as a guide only.
13. All utilities detected by MK Surveys should be considered live unless confirmed otherwise by client or service provider.
14. MK Surveys cannot confirm when utilities are redundant unless there is visual or record evidence to indicate this. In addition MK Surveys cannot guarantee being able to detect all redundant utilities.
15. Wherever available the results of our investigations have been cross referenced with record information. If a utility shown on the records cannot be detected on site, the information has been added to the drawing and indicated as QB4 (R). However it should be noted that the completeness and accuracy of the records cannot be guaranteed.
16. The utility information has been obtained from non-intrusive survey techniques; it always remains possible that there are additional utilities within the survey boundary that we have not been able to detect. We recommend that care is taken on site and that all utility records are used in conjunction with this survey.
17. The responsibility for avoiding damage to assets and utilities on site shall be that of the persons proposing to excavate within the surveyed area, who shall be liable to the asset owner and any third party who may be affected in any way for any loss or damage.

ALWAYS EXERCISE CAUTION WHEN EXCAVATING.

Desktop Utility Records

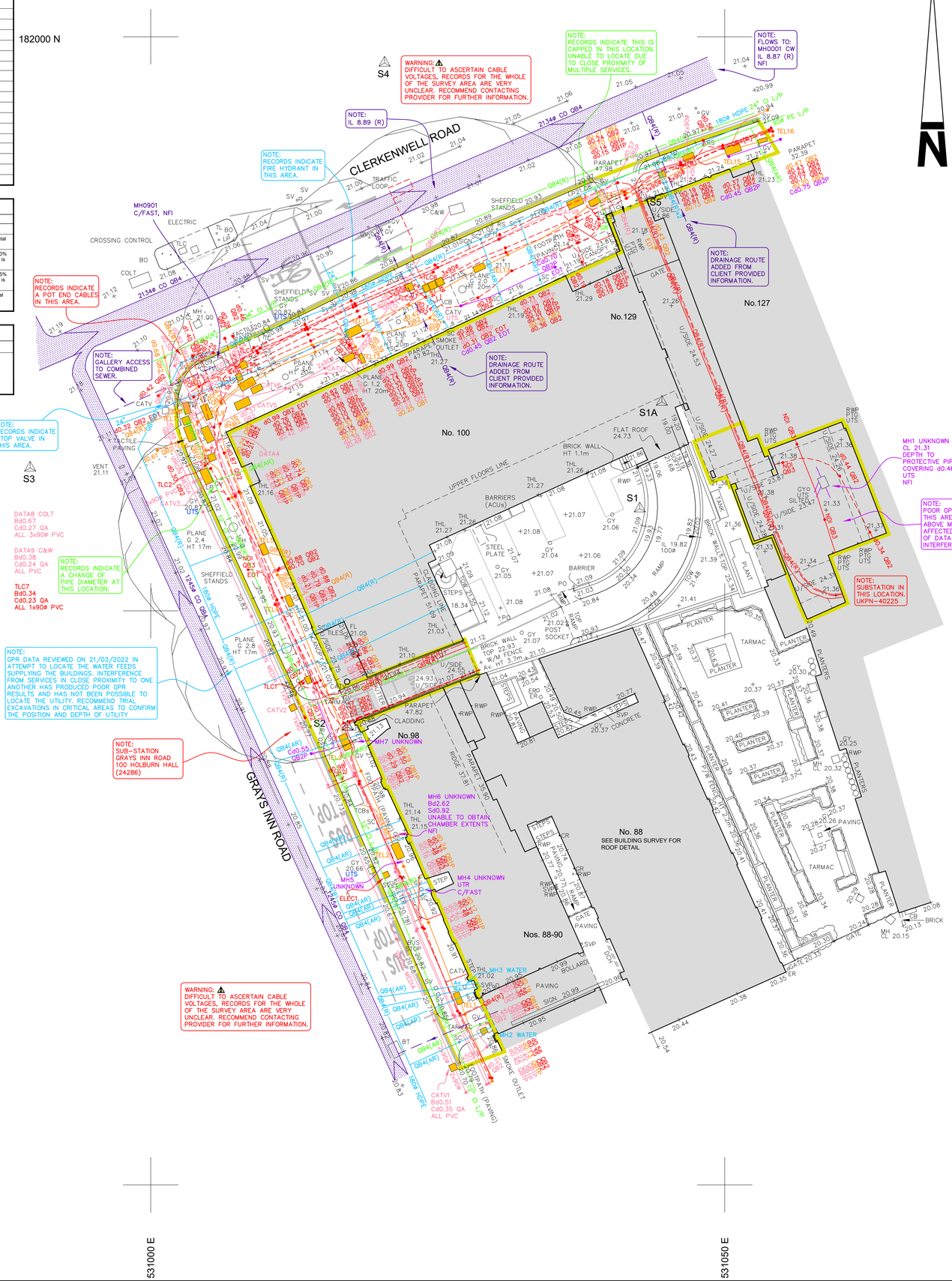
Utility Type	Provider Details	Date Acquired
Drainage	Thames Water	01/02/2023
Water	Thames Water	01/02/2023
Gas	Cadent	01/02/2023
Gas	ESP Utilities	01/02/2023
Electricity	UK Power Networks	01/02/2023
Telecom	Openreach	01/02/2023
CATV	Virgin Media	01/02/2023
Communications	City Fibre	01/02/2023
Communications	Colt	02/02/2023
Communications	euNetworks	01/02/2023
Communications	EXA	01/02/2023
Communications	Mast Data	01/02/2023
Communications	Neos Networks	01/02/2023
Communications	OCU Group	02/02/2023
Communications	Verizon	08/02/2023
Communications	Vodafone	02/02/2023
Communications	Zayo	01/02/2023
New Installations	Last Mile	01/02/2023
Tunnels & Pipelines	LinesearchbeforeUdig	01/02/2023

PAS 128:2022 Quality Level Guide

Quality Level		Description	Accuracy	
QB4	(QL-B4)	A utility is expected to exist but cannot be detected - (AR), (R), (VI)	Undefined	
QB3	(QL-B3)	Horizontal location only using one geophysical technique. No depth information - NDI.	+/- 500mm Horizontal	Undefined Vertical
QB2	(QL-B2)	Horizontal and vertical location only using one geophysical technique.	+/- 250mm or +/- 40% of depth whichever is greater	
QB1	(QL-B1)	Horizontal and vertical location only using two geophysical techniques.	+/- 150mm or +/- 15% of depth whichever is greater	
QB1P	(QB-1P)			
QA	(QL-A)	Service verified in an open excavation, inside an inspection chamber / draw pit, or at the point the service enters / exits the ground.	+/- 50mm Horizontal	+/- 50mm Vertical

Coordinate Table

Station	Description	Easting	Northing	Level
S1	HILTI	531042.598	181958.898	21.090
S2	HILTI	531017.142	181939.896	20.882
S3	ROAD NAIL	530989.495	181962.458	21.160
S4	ROAD NAIL	531020.367	181997.724	21.049
S5	ROAD NAIL	531042.737	181985.982	21.072



Notes :

1. GRID AND LEVELS BASED ON ORDNANCE DATUM, DERIVED FROM THE NATIONAL GNSS NETWORK. LOCAL SCALE FACTOR REMOVED/APPLIED.
2. TREE AND HEDGE SPECIES HAVE BEEN IDENTIFIED AS ACCURATELY AS POSSIBLE BUT SHOULD BE CROSS CHECKED IN CRITICAL AREAS.
3. THIS SURVEY SHOULD ALWAYS BE READ IN CONJUNCTION WITH THE DESKTOP UTILITY REPORT, THAT WAS CARRIED OUT AS A PREREQUISITE TO THIS DETECTION SURVEY.
4. UTILITY SURVEY INFORMATION ADDED TO JOB NUMBER 28643 CARRIED OUT BY MK SURVEYS MAY 2020. NO SITE VERIFICATION HAS BEEN CARRIED OUT.

Equipment Information

Equipment	Manufacturer	Model	Serial Number	MKS REF	Date of Calibration
EML Tx Transmitter	SPX Radiodetection	RD8000	10/TX-3-15534	RD8	01/01/2024
EML Rx Receiver	SPX Radiodetection	RD8200	10/82-GB-65	RD8	19/03/2023
GPR	IDS	Stream C	SN-010-17-000201	STREAMC	Day of Survey

DETECTION SURVEY REPORT

GENERAL
This survey was carried out in accordance with PAS 128:2022 (Publicly Available Specification from BSI). After a pre-survey consultation with the client it was agreed to carry out the detection survey using methodology **M3P** as per Table 2 of the PAS 128:2022. The survey boundary has been shown on the drawing; please see linestyle section of the key for reference.

DESKTOP UTILITY REPORT
Prior to the survey commencing record information was gathered and compiled in a separate desktop utility report. This report should be read in conjunction with the information contained in this utility detection survey. Record information was at the time of the survey the most recent available in accordance with the requirements of the PAS 128:2022. For a full list of the providers searched, records received and the dates the information was obtained, please refer to the attachments page of the desktop utility report. Revised survey boundary due to no traffic management at time of survey.

DETECTION SURVEY
DRAINAGE
Drainage was lifted with pipe sizes and invert levels recorded. Wherever possible the chamber sizes have been recorded and positioned on the drawing. All connections from gullies, external rainwater pipes and external soil stacks have been proven wherever possible into manholes and sewer runs by radio sonde location and/or GPR. Where a saddle connection is present the position is assumed only until proven to QB2 or above. In instances where other detection methods were unsuccessful connections between manholes have been assumed to be straight and labelled as QB4. All drainage should be cross checked in critical areas by CCTV survey or verification survey type A.
Unable to survey MHs located in the main road. Details on these will be obtained when working in tandem with the traffic management team.

WATER
Water utilities could not be located using GPR techniques due to being in close proximity of multiple services. More successful results may be possible when collecting data in the road when working with the traffic management team. Record information has been added to quality level QB4(R), Recommend trial excavations in critical areas to confirm the exact depth and position of the utility.

GAS
Gas utilities could not be located using GPR techniques due to being in close proximity of multiple services. A 24" and 12" CI gas main could not be located in the road due to having no traffic management present at time of survey. More successful results may be possible when collecting data in the road when working with the traffic management team. Record information has been added to quality level QB4(R). Recommend trial excavations in critical areas to confirm exact depth and position of the utility.

ELECTRICITY
Electricity cables have been located using EML techniques with electronically derived depths recorded to quality level QB2. In areas where EML and GPR techniques have been used to confirm position and depth of utility the quality level has been enhanced to QB1. When EML and GPR methodologies have been unsuccessful, record information has been added to quality level QB4(R). Recommend trial excavations in critical areas to confirm the position and depth of utility. Note, separating signals and ascertaining the voltages of the cables was not possible in most area due to the congested nature of the services on site and the records being extremely unclear.

TELECOM
Telecom ducts have been traced with depths recorded. Due to laws protecting British Telecom apparatus all ducts have been located using remote detection techniques only and compared with record information. Chamber sizes have been recorded using GPR techniques wherever possible. For further information regarding BT apparatus please contact Openreach directly.

CATV
Data cables have been located using EML techniques with electronically derived depths recorded to quality level QB2. In areas where EML and GPR techniques have been used to confirm position and depth of utility the quality level is enhanced to QB1. When EML and GPR techniques have been unsuccessful, record information has been added to quality level QB4(R). Recommend trial excavations in critical areas to confirm position and depth of utility.

UNKNOWNS
Some unknown targets identified on the drawing using GPR are classified as "non-linear targets". These are not consistent with what we expect to see when identifying a buried utility, and appear on the drawing as single targets with depths (i.e. not linking two or more depth readings). This does not mean they are not utilities, we are just unable to positively identify them as a utility. We would strongly recommend that further verification surveys (PAS 128:2022 survey type A) are carried out to identify these targets in critical areas.

SEE CAUTIONARY NOTES WITHIN THE UTILITY KEY

1	Up-dated as per clients comments and info provided.	LPH	AH	AH	21/03/2023

0m 2 4 6 8 10 12 14 16 18 20 22

Topographical and PAS 128:2022 Utility Survey

MAX FORDHAM

88 & 100 Grays Inn Road
Bloomsbury
London
WC1X 8AA

Scale:	Sheet Size:	Sheet Number:	Date:
1:200	A1	1	March 2023

Project Number:	Rev:	Surveyed by:	Checked by:	Approved by:
32245	1	LPH	AC	AH

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