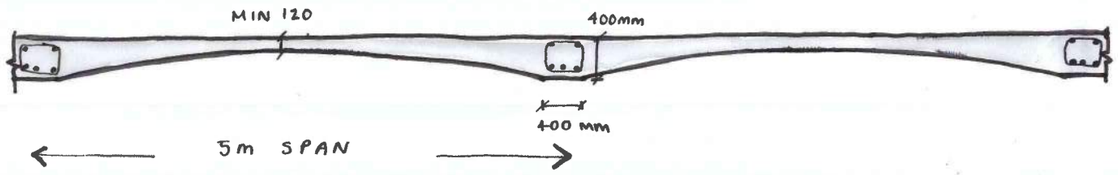
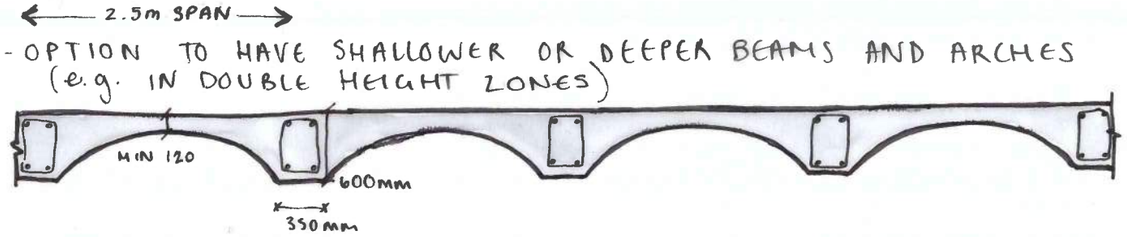
CONCRETE ARCH OPTIONS

EAST SIDE MOUND BUILDING:



- SHALLOW BEAMS REQUIRED DUE TO HEIGHT RESTRICTIONS

WEST CAFE & OPERATIONS BUILDING:



- OPTION TO HAVE SHALLOWER OR DEEPER BEAMS AND ARCHES (e.g. IN DOUBLE HEIGHT ZONES)

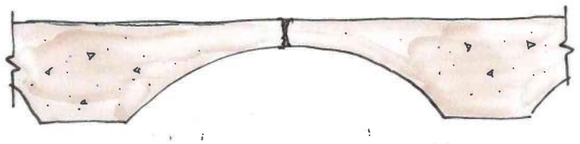
350 deep vs 600 deep:

- **350 DEEP** → LOWER CONCRETE VOLUME
  → MORE REINFORCEMENT REQUIRED. ~ 83 kg CO_2e/m^2 *
- **600 DEEP** → REDUCES HORIZONTAL FORCES ON EDGE BEAMS.
  → ARCH SHAPE EXPRESSED WITH STRONGER CURVE? ~ 114 kg CO_2e/m^2 *

PRECAST VS IN-SITU CONSTRUCTION:

- **PRECAST:**
  - PRECAST PANEL SPLIT LOCATION OPTIONS:

OR



→ LONGER WKING → CAN USE LATER AGE STRENGTH GAIN (56-day vs 28-day)

→ LESS TIME ONSITE, ELEMENTS CRANED IN.

- **IN-SITU:**
  - CUSTOM FORMWORK REQUIRED TO FORM ARCH ON SITE.
  - LONGER CONSTRUCTION TIMES DUE TO CURING TIME & TEMPORARY PROPS.

CONCRETE:

- CONCRETE MIX TO ACHIEVE A MINIMUM STRENGTH EQUIVALENT TO RC 28/35,
- CONCRETE TO BE SUITABLE FOR EXPOSURE CLASSES XC3, AND XF1 WHERE VEHICLES ARE PRESENT (ATTACK FROM DE-ICING SALTS)
- CONCRETE SUPPLIER EARLY INVOLVEMENT RECOMMEDED TO GUIDE FINISH, EMBODIED CARBON, AND ADDITION CHOICES.

* VALUES SHOWN IN kg CO_2e/m^2 (FLOOR AREA), CONSIDERING CONCRETE WITH 75% CEMENT REPLACEMENT FOR THE STRUCTURAL SLAB.

WEBB YATES ENGINEERS
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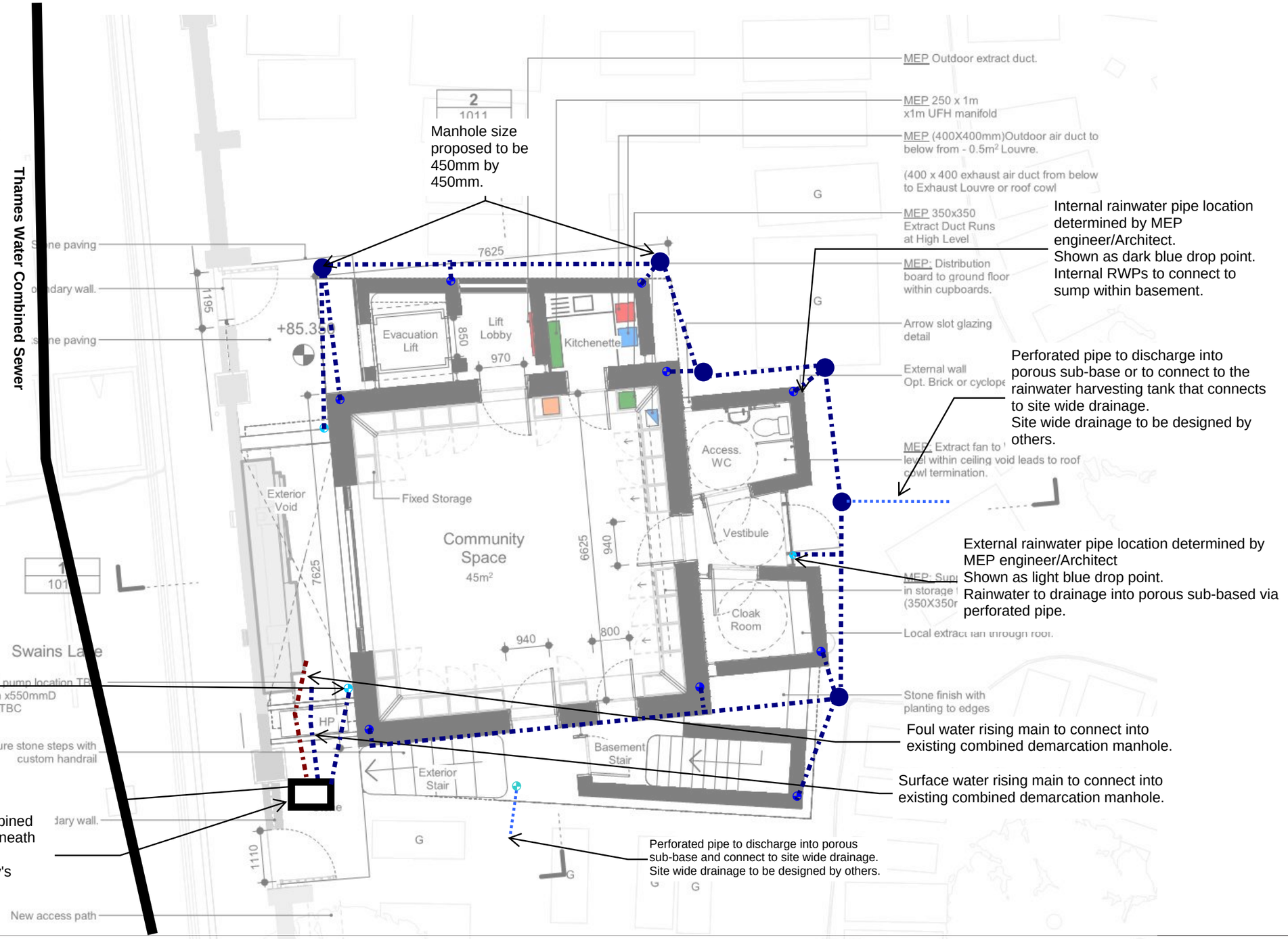
Drawing No J4565-S-SK-0021			
Project HIGHGATE CEMETERY		Status S9	
Drawing Title CONCRETE ARCH OPTIONS			
Date 4/6/24	Drawn by AA	Scale NTS	Revision 0

APPENDIX C. STAGE 3 CIVIL SKETCHES

Option to connect surface water to the combined Thames Water sewer on Swain's Lane was considered, however it is not a sustainable option. Nevertheless, if necessary could be done. This will require pre-planning application to Thames Water to determine whether it is feasible.

Current design routes rainwater drainage around the building.
This is designed on the assumption there is space around the building for the proposed manholes.



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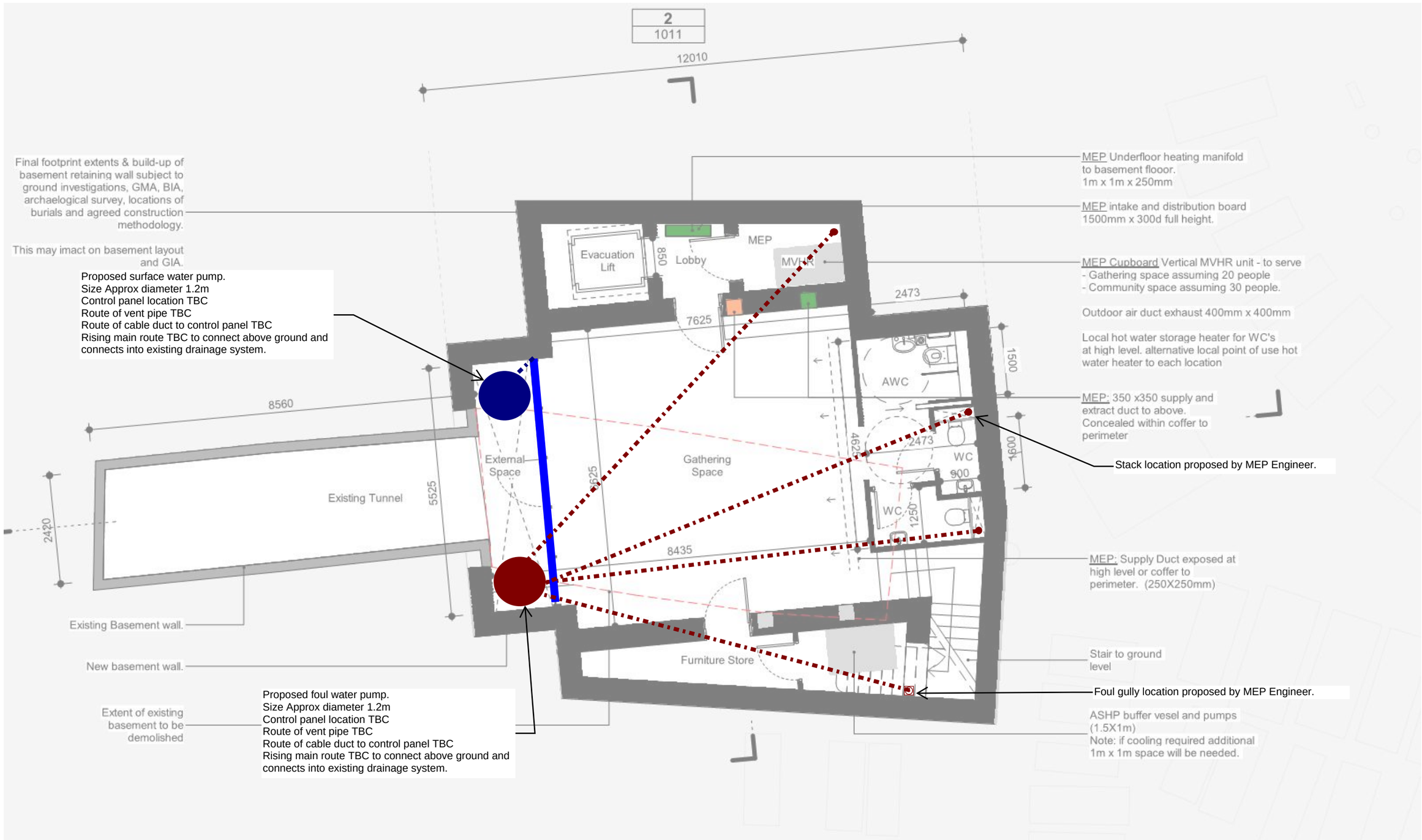
DRAFT

Drawing No. J4565-C-SK-0001			
Project: Highgate Cemetery			Status: S3
Drawing Title: P1 - Ground Floor - East Side Education and Community Building			
Date: 03.07.24	Drawn by: ZA	Scale: NTS	Revision: DRAFT



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Drawing No. J4565-C-SK-0002

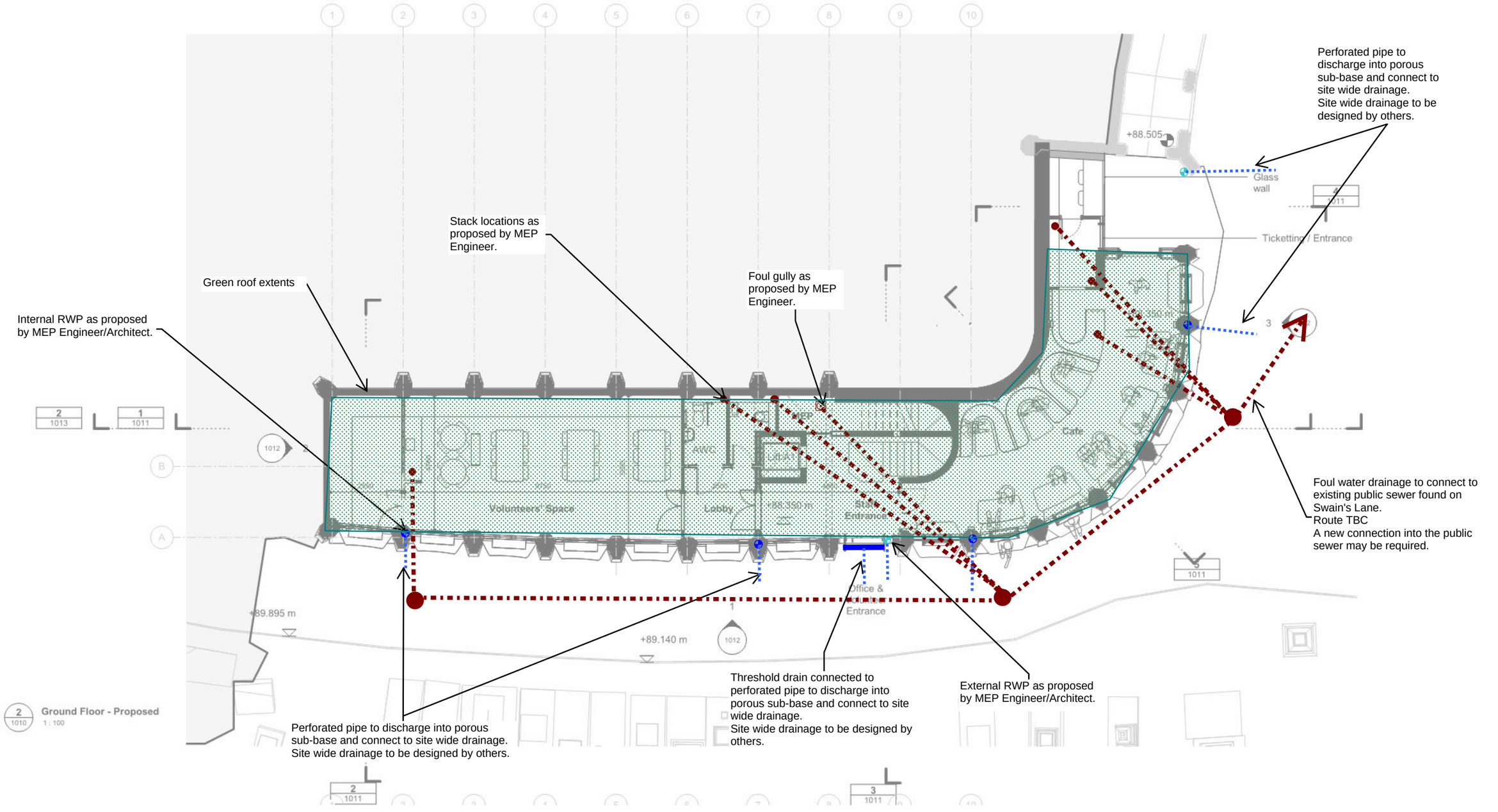
Project: Highgate Cemetery

Status: S3

Drawing Title: P1 - Basememt - East Side Education and Community Building

Date: 03.07.24 | Drawn by: ZA | Scale: NTS | Revision: DRAFT

DRAFT



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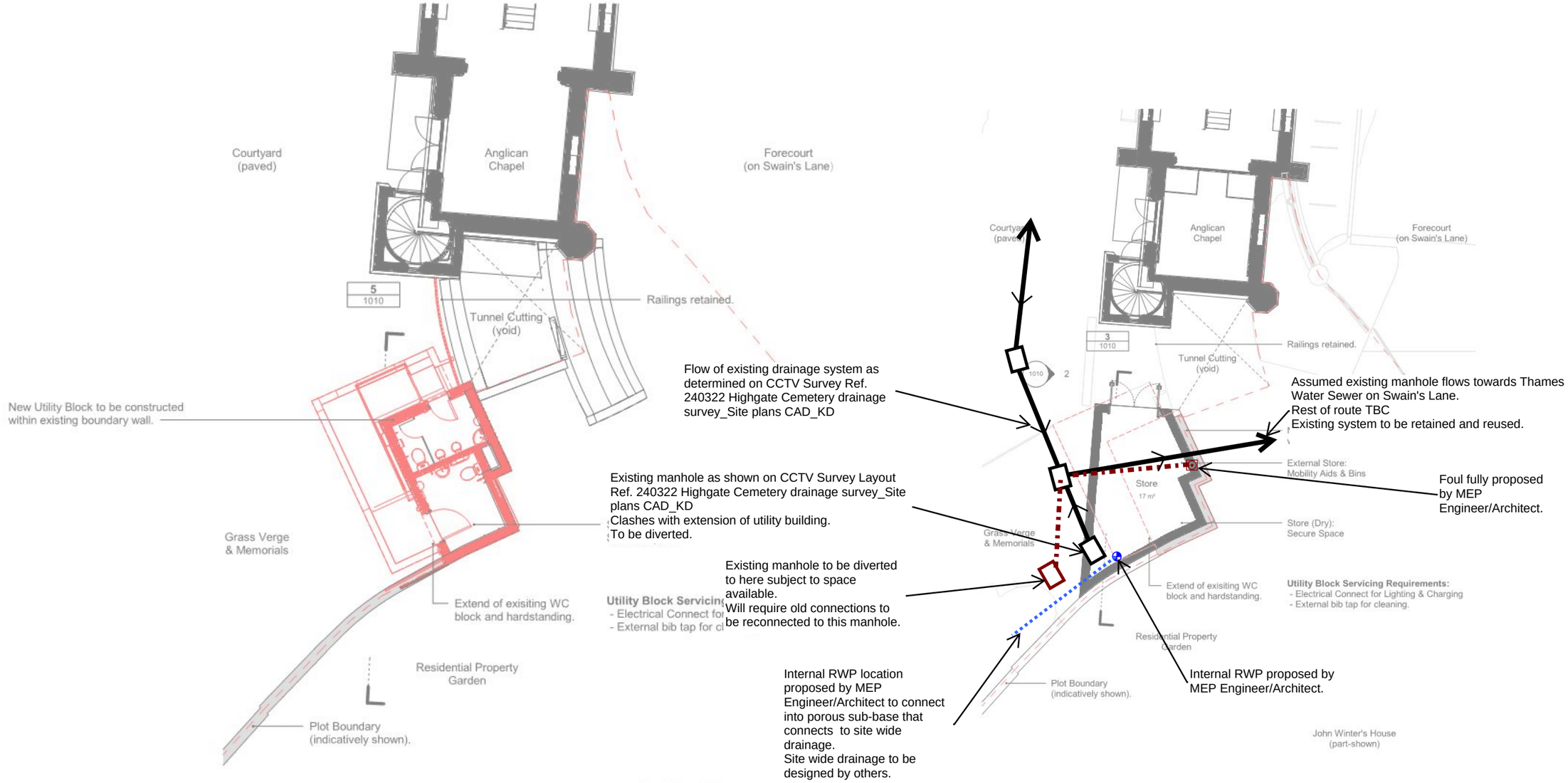
www.webbyates.com

DRAFT

Drawing No. J4565-C-SK-0003			
Project: Highgate Cemetery			Status: S3
Drawing Title: P2 - Ground Floor - Operations and visitor building			
Date: 03.07.24	Drawn by: ZA	Scale: NTS	Revision: DRAFT



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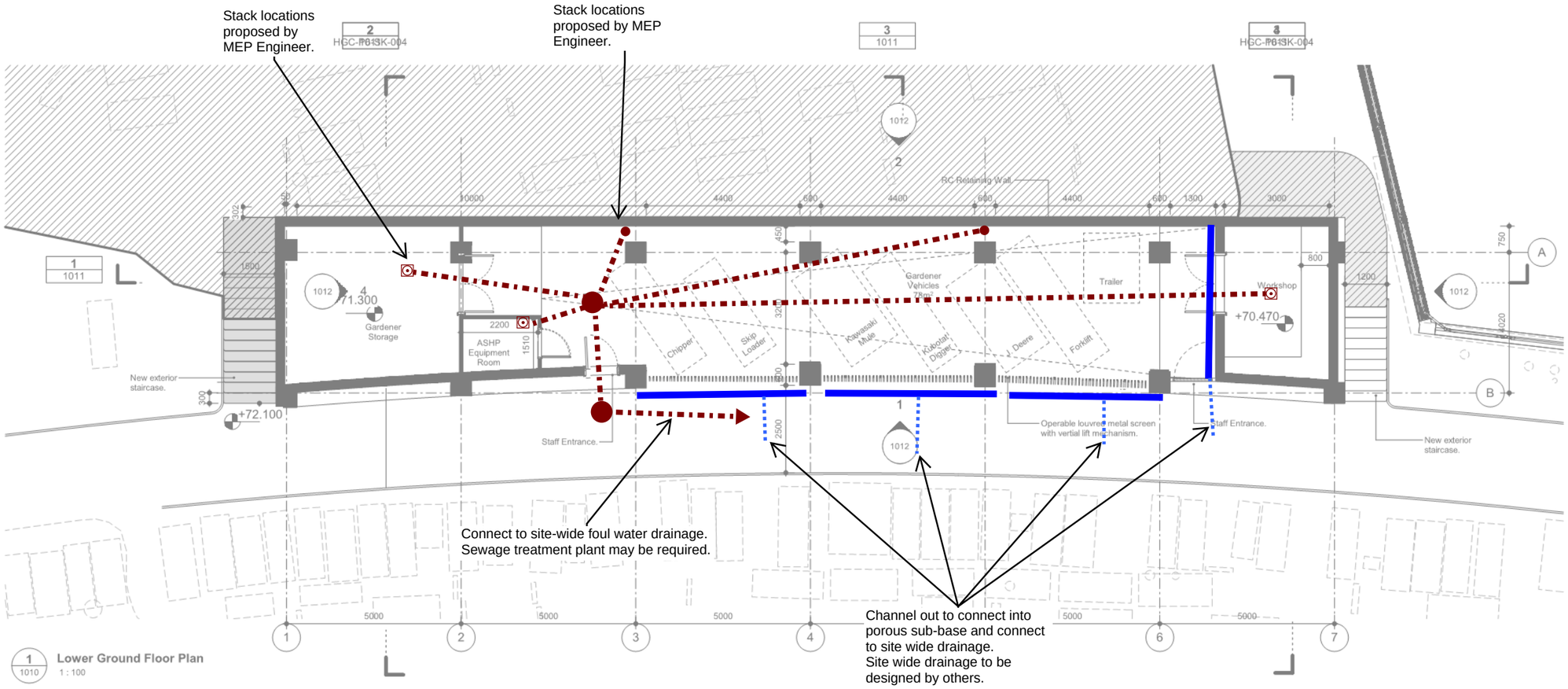
Drawing No. J4565-C-SK-0004			
Project: Highgate Cemetery			Status: S3
Drawing Title: P4 - Utility Block			
Date: 03.07.24	Drawn by: ZA	Scale: NTS	Revision: DRAFT

DRAFT



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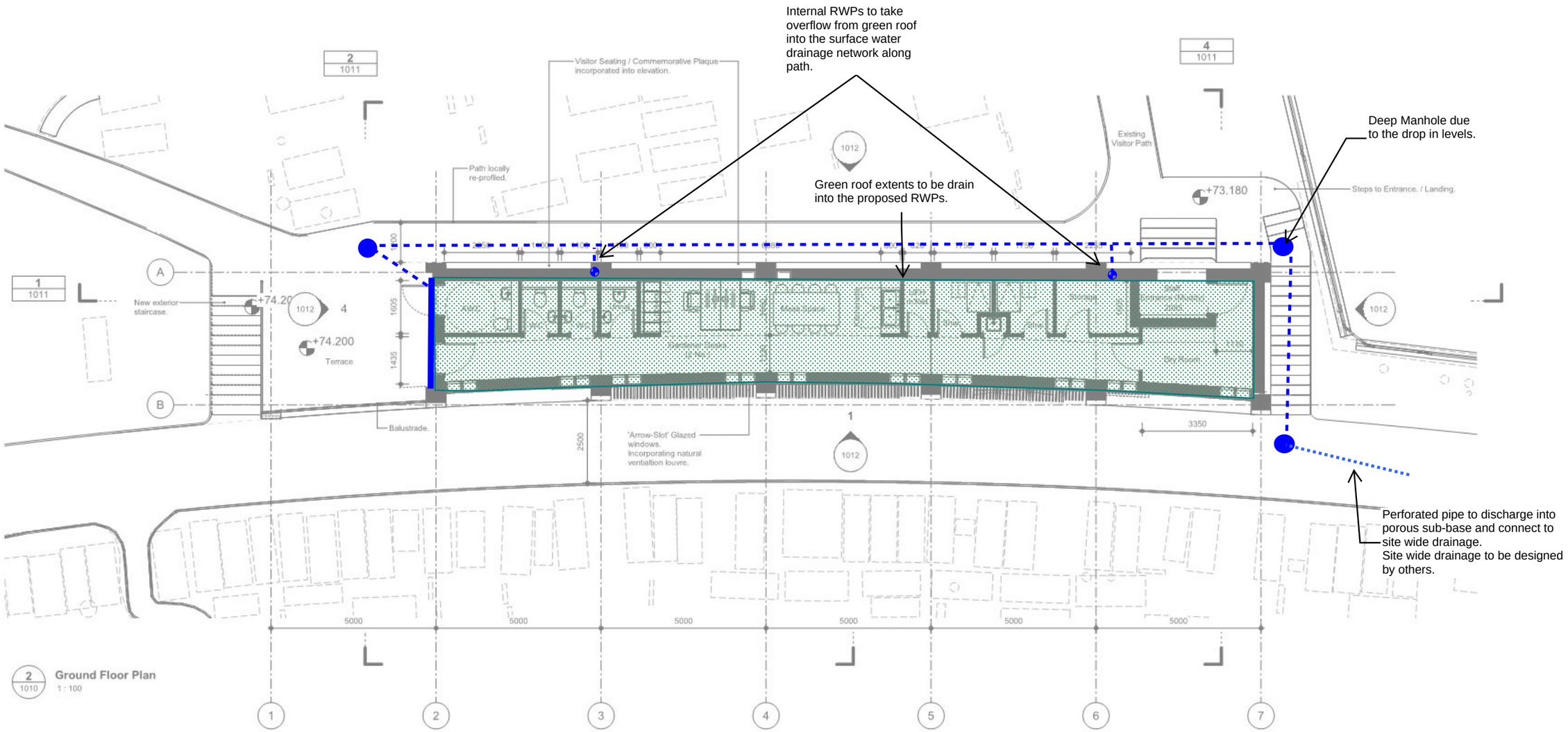
DRAFT

Drawing No. J4565-C-SK-0005			
Project Highgate Cemetery			Status S3
Drawing Title P6 - Basement - Gardeners building			
Date 03.07.24	Drawn by ZA	Scale NTS	Revision DRAFT



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www.webbyates.com

DRAFT

Drawing No. J4565-C-SK-0006			
Project Highgate Cemetery			Status S3
Drawing Title P6 - Ground Floor - Gardeners building			
Date 03.07.24	Drawn by ZA	Scale NTS	Revision DRAFT

APPENDIX D. EXISTING DRAINAGE AND GROUND INVESTIGATION REPORTS

The Morton Partnership
Structural Engineers

Registered in England No. 2727193

Old Timber Yard House, 55 The Timber Yard
Drysdale Street, London N1 6ND
Tel: 020 7324 7270 Fax: 020 7729 1196
Email: london@themortonpartnership.co.uk
www.themortonpartnership.co.uk

Our ref: EJM/CH/20360~02

29th July 2021

Ross Macaskill
Artelia UK
High Holborn House
52-54 High Holborn
London WC1V 6RL

by email only: ross.macaskill@uk.arteliagroup.com

Dear Ross,

RE: HIGHGATE CEMETERY, SWAIN'S LANE, HIGHGATE, LONDON N6 6PJ

We have now received the final report from Albury SI. We had agreed to provide a summary report of the findings and we do so below.

The site investigation was carried out in June 2021 and involved 2No boreholes to depth and 10No trial pits to existing buildings across the site. A desk based study of the site and its history was also included.

The site historically was part of the 17thC Ashurst estate until the founding of the cemetery in the 1830's. There is no evidence of industrial use on the site and no contamination or hazardous waste was found during the investigation. There is also no evidence of UXO's in close proximity and the risk is considered small for any being on site.

Borehole 1 extended to a depth of 25m and revealed 200mm made ground over 4m of soft clay over London Clay formation to the base of the borehole. From nearby published data, the layer of London Clay is approximately 125m thick. Standpipes were installed in the boreholes to monitor long term water levels. Monitoring indicates that there is groundwater 2.5m below ground level which could be the result of a perched water table.

Borehole 2 also extended to a depth of 25m and revealed 1m of made ground over 1.5m soft clay over stiffer London Clay formation to the base of the borehole. Ground water in borehole 2 was recorded at 1.5 and 1.2m below ground level following return visits and 5m depth during drilling.

The trial pits exposed stepped brick footings and concrete strip foundations to the various buildings and structures as one would expect. The ground around these structures was generally made ground and water levels varied between 1.2m and 3.3m below ground level. Sections and photographs of the existing foundation arrangements are in the full report.

Laboratory testing was carried out to samples retrieved from the boreholes. The mechanical properties are included in the report which will provide data for foundation and pile design and retaining wall design.

The report concludes that traditional mass concrete foundations can achieve a permissible bearing pressure of 100kPa provided the foundations extend into the Clay formation and not the made ground. Considerations will be required in close proximity to trees where tree roots can cause volumetric change of shrinkable clay. To avoid risks of settlement or if the loads will apply greater pressures than 100kPa consideration of piled foundations will be necessary.

If basement structures are proposed, heave will need to be considered and allowed for. The report suggests that the underlying soils have moderate to high potential of heave occurring. Therefore if any overburden is removed, the ground will apply upwards pressure as heave recovery occurs so it will be necessary to consider ground anchors or suspended floor slabs with anti heave protection under.

The report has identified a perched water table across the site therefore any large excavations will need a dewatering system to manage the inflow of groundwater or a water exclusion system to prevent water entering the excavation. The permanent structure will also need to be designed to resist hydrostatic pressures.

RE: HIGHGATE CEMETERY, SWAIN'S LANE, HIGHGATE, LONDON N6 6PJ

Any buried concrete in contact with the ground should have a design sulphate class of DS-2.

A preliminary test of the ground for waste assessment has concluded that any materials removed from site can be disposed of as non hazardous waste. Regular testing of any excavated material will need to be carried out as excavations are ongoing.

If you have any comments or queries on the above then please do not hesitate to contact me.

Yours sincerely
For THE MORTON PARTNERSHIP LTD

PETER CORCORAN BSc (Hons) MICE CEng

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Highgate Cemetery M&E Infrastructure Review

Project No: 204057

Document Revision and Status

Date	Rev	Issue	Notes	Checked	Approved
23/11/2021	01	Draft	For Comment	TT	TT

London 23/11/2021
Project No. 204057

Tom Taylor
Associate Director

tom.taylor@steensenvarming.com

Table of Contents

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1.0 Introduction

Steensen Varming were appointed in November 2020 to undertake surveys and site investigations in order to establish the extent of existing services infrastructure at Highgate Cemetery.

Following an initial site visit and visual survey at the end of 2020 the project was paused before a follow up Ground Penetrating Radar (GPR) survey was completed in October 2021.

This report presents the findings from the initial non-intrusive visual survey and the follow up GPR survey. The report also includes some commentary with regards to the extent of the existing services and incoming supplies to the site in light of planned future development works. It should however be noted that Steensen Varming have not re-visited the site since late 2020 and as such the commentary included in this report with respect to the existing services relates to the findings from the initial site visit.

Sketches summarising the existing services and the full GPR survey results are included as appendices to this report.

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2.0 Services Overview

The services as described below are marked on the existing services sketch and GPR survey information included in the appendices to this report.

2.1 West Cemetery

Water
There is a single incoming water supply to the West Cemetery at the North Lodge. The supply runs through the West Cemetery to serve the South Lodge and the Main Office/ Chapel. Additional pipework branches serve watering points along the route. A second supply runs parallel to the site supply to serve a private house adjacent to the cemetery grounds.

Electricity
There are three incoming electrical supplies (fed from Swain's Lane) to the West Cemetery feeding the Main Office/ Chapel; the South Lodge; and the North Lodge.

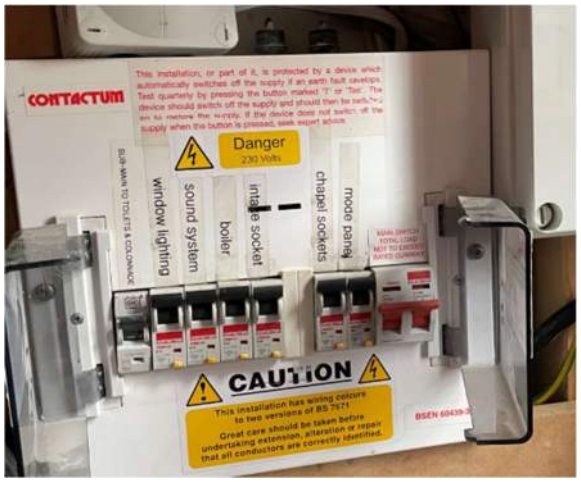

Figure 1 and 2 – Main Office Electrical Intake and Distribution Board

Figure 3 – South Lodge Electric Meter/ Distribution Board and Gas Meter

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Secondary supplies are taken from the North Lodge intake to serve the Terrace Catacombs; the Julius Beer Mausoleum; and the Simpson Vault.

Figure 4 and 5 – North Lodge Electrical Distribution Board and Secondary Supply

Secondary supplies are taken from the Office/ Chapel intake to serve the adjacent WC block; the Colonnade; and the Gardener's Compound containers.

Figure 6 and 7 Electrical Distribution Boards in Colonnade and Gardener's Compound

As the above images show, the existing electrical installations vary in age and condition. The installation in the South Lodge is relatively new. The Main Office/ Chapel incoming supply and associated switchgear is considerably older (and difficult to access). The externally mounted 'secondary' distribution boards are generally in poor condition have been exposed to external conditions.

Gas

There are two gas supplies to the West Cemetery, one serving the South Lodge via an internal meter (Figure 3) and one serving the Office/ Chapel via an external gas meter (Figure 8).

Figure 8 – Main Office/ Chapel Gas Meter

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The existing supplies which are typical for domestic installations each serve a single gas boiler. The supplies are fed from a gas main in Swain's Lane.

BT/ Fibre
A BT supply fed from Swain's Lane serves the Main Office/ Chapel.

Drainage
Refer to GPS survey results for details of surface, foul and combined drains.

2.2 East Cemetery

Water
A single incoming supply serves the East Cemetery. The supply enters the site at the Chester Road entrance from where it runs through the site to serve the Gardener's Compound, branching off to serve various watering points along the route.

Electricity
There are two electrical supplies to the East Cemetery.

A relatively new 3-phase supply has been installed at the Chester Road entrance.

An older single-phase supply feeds an external electrical intake adjacent to the Strathcona. The external intake in turn supplies the Strathcona, the Entrance Kiosk, and the East Cemetery Gardener's Compound.


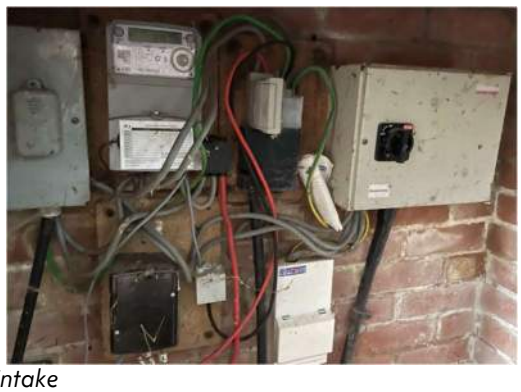

Figure 9 and 10 – Strathcona Electrical Intake

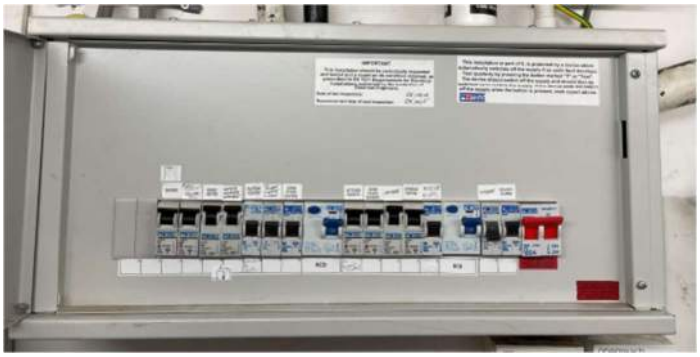

Figure 11 – East Cemetery Gardener's Compound Distribution Board

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Gas
There is no gas supply to the East Cemetery.

BT/ Fibre
A BT supply fed from Swain's Lane serves the Entrance Kiosk.

Drainage
Refer to GPS survey results for details of surface, foul and combined drains.

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3.0 Findings in relation to masterplan proposals

It is understood that the main area of interest in terms of future development plans is the area identified as 'Project Area 01' on the existing services sketch in Appendix A which comprises the Main Office and Chapel; the Colonnade; and the courtyard in between.

The existing services in the vicinity of Project Area 01 are of interest with respect to both potential clashes with the any new development works and the potential to meet the services demands of any new development.

3.1 Existing Services

The site survey sketch and GRP survey outputs in the appendices show that there are multiple services running below ground within the courtyard area including electrical feeds from the main office building to the WC Block, Colonnade and Gardener's Compound; and a combined sewer. In addition, there are several unidentified traces.

Whilst there are multiple services running below ground, the GPR survey results suggest that these services generally run around the perimeter of the courtyard, and that the central courtyard area is relatively free from any existing services that could potentially be impacted by any excavation works with the main incoming electrical and gas supplies to the site are fed from Swain's Lane and stop short of the courtyard.

3.2 Capacity to serve new development

Water
The existing water supply to the Western Cemetery is fed through the site from the North Lodge.

Whilst the existing supply is understood to be sufficient to meet the existing water demand across the Western Cemetery, depending on the demands associated with any new development, it may be necessary to upgrade the supply which could mean renewing the existing pipework from the point of entry to the site at the North Lodge. Alternatively, it may be possible to install local storage to help meet any peaks in demand that may be associated with any new development.

Electricity
There are two existing electrical supplies in the area of the proposed development works, one which serves the Main Office/ Chapel building, and one serving the South Lodge. Secondary supplies are taken from the Main Office/ Chapel intake to serve adjacent buildings and areas including the Colonnade and Gardener's Compound.

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Whilst dependent on the extent of works, it is likely that any significant new build works would require a new electrical supply connection from Swain's Lane, with any significant works in the area of the Courtyard perhaps presenting the opportunity to upgrade and rationalise the existing electrical supply and local distribution in this area.

Whilst the extent of proposed works are unknown, it may be necessary to install a new 3-phase supply to serve any new development, particularly if there are likely to be significant electrical loads as may for example be associated with heat pumps or cooling equipment.

Gas
There are two existing gas supplies in the area of the proposed development works, one supplying the Main Office/ Chapel and one supplying the South Lodge. Both supplies and associated meters are as would be expected for a typical domestic installation.

If there is likely to be any significant gas demand associated with the new development, for example as may be expected of a commercial size gas boiler, or a commercial kitchen, it is likely that a new supply connection (from Swain's Lane) or an upgrade to one of the existing supplies would be required to meet the associated demand.

Drainage
A combined sewer runs behind the Main Office/ Chapel building. It is assumed that this sewer picks up foul and surface water drainage connections from the Main Office/ Chapel building, and the adjacent WC block before discharging to the public sewer in Swain's Lane.

Depending on the extent of any proposed development works, it may be possible to utilise the existing sewer, with alterations as may be required, to meet associated drainage demands.

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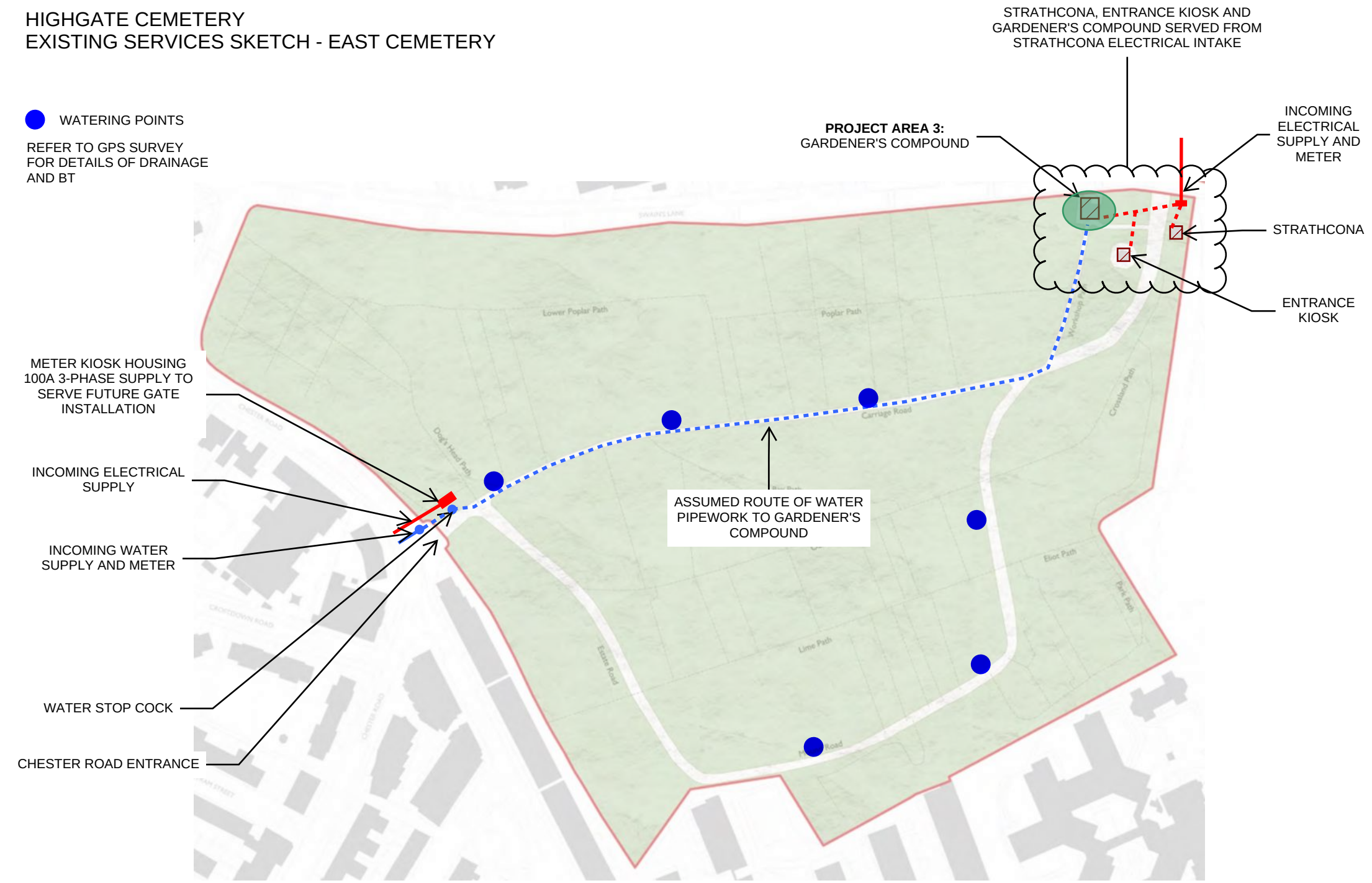
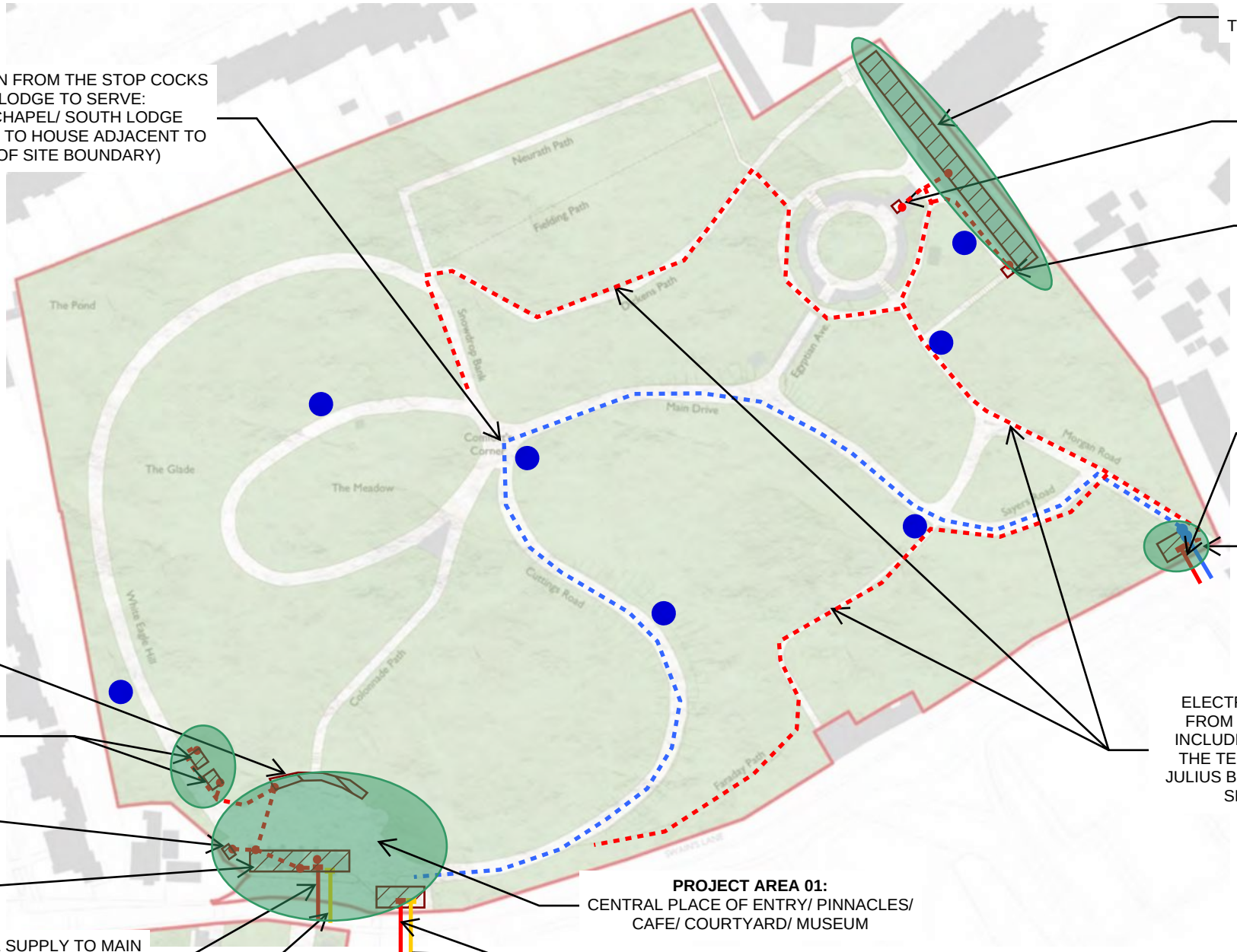
4.0 Appendix A – Existing Services Sketches

HIGHGATE CEMETERY
EXISTING SERVICES SKETCH - EAST CEMETERY



HIGHGATE CEMETERY
EXISTING SERVICES SKETCH - WEST CEMETERY



2 X WATER SUPPLIES RUN FROM THE STOP COCKS OUTSIDE NORTH LODGE TO SERVE:
1. THE MAIN OFFICE/ CHAPEL/ SOUTH LODGE
2. PRIVATE CONNECTION TO HOUSE ADJACENT TO CHAPEL (OUTSIDE OF SITE BOUNDARY)

PROJECT AREA 02
TERRACE CATACOMBS

JULIUS BEER MAUSOLEUM

SIMPSON VAULT

INCOMING ELECTRICAL SUPPLY AND METER

PROJECT AREA 04:
NORTH LODGE

ELECTRICAL SUPPLIES FED FROM THE NORTH LODGE, INCLUDING FEEDS TO SERVE THE TERRACE CATACOMBS; JULIUS BEER MAUSOLEUM AND SIMPSON VAULT.

COLONNADE

PROJECT AREA 03:
GARDENER'S COMPOUND (CONTAINERS)

WCs

MAIN OFFICE AND CHAPEL

INCOMING ELECTRICAL SUPPLY TO MAIN OFFICE AND CHAPEL

INCOMING GAS SUPPLY TO MAIN OFFICE AND CHAPEL (GAS METER IN EXTERNAL HOUSING)

PROJECT AREA 01:
CENTRAL PLACE OF ENTRY/ PINNACLES/ CAFE/ COURTYARD/ MUSEUM

INCOMING ELECTRICAL SUPPLY TO SOUTH LODGE

INCOMING GAS SUPPLY TO SOUTH LODGE (METER INTERNAL)

WATERING POINTS

REFER TO GPS SURVEY FOR DETAILS OF DRAINAGE AND BT

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5.0 Appendix B – GRP Surveys

GENERAL SYNOPSIS

This survey has been carried out in accordance with PAS 128: 2014 & our version of the Royal Institution of Chartered Surveyors (RICS) specification for Measured Surveys of Land, Buildings and Utilities. Our survey extents have been agreed and confirmed with formal acceptance of 32482BWUG-01 from STEENSEN VARMING. If you have any queries regarding the final services layout, please may we ask you to carefully read all the information within this title block in its entirety before continuing to do so.

TOPOGRAPHICAL/.DWG DRAWING INFORMATION
TOPOGRAPHICAL SURVEY DATE 04/2018

SURVEY TYPE	DESCRIPTION	EFFECT ON SURVEY RESULTS
TOPO	ATLANTIC GEOMATICS	ALL COVERS AND STREET FURNITURE ADDED
OUTDATED		BY SURVEY SOLUTIONS AS APPROXIMATE
OS		POSITION.
NTS		

GENERAL SITE CONDITIONS
BELOW AVERAGE

ADDITIONAL INFORMATION	EFFECT ON SURVEY RESULTS
GRAVESTONES AND UNEVEN GROUND.	SURVEYED WHERE POSSIBLE IN PATHS

SURVEY RECOMMENDATIONS

LIST RECOMMENDATIONS TO IMPROVE SURVEY DATA

Due to the geophysical nature of subsurface technology, we always recommend excavation works to be carried out for verification, especially within critical areas.

We would suggest an up to date, more detailed and comprehensive topographical survey.

PAS 128: 2014 QUALITY LEVEL GUIDE

Q-LEVEL	DESCRIPTION	ACC.	Q-LEVEL	DESCRIPTION
QL-D	Service positions taken from records.	Undefined	QL-B2	Horizontal & vertical location using only one geophysical technique.
QL-C	Visual evidence of service existence but undetectable by geophysical technology.	Undefined	QL-B1	Horizontal & vertical location using multiple geophysical techniques.
QL-B4	Undetectable service present shown as an assumed route. (AR)	H: +/- 500mm V: N/A	QL-A	Horizontal & vertical position verification by open excavation, manholes and/or inspection chambers.
QL-B3	Horizontal location by one geophysical technique but with none or poor depth information.			

DETECTION METHOD
IN ACCORDANCE WITH PAS 128: 2014 SURVEY TYPE B

DRAINAGE SURVEY
All accessible Manholes and Inspection chambers have had their respective covers lifted with pipe sizes, inverts, chamber sizes/types and service data recorded from ground level. All connections from DPs, Gullies, Drains, VP's, RE's and lampholes have been proven wherever possible using audible connections (AC) and/or sonde instrumentation where applicable. Where these methods have proved unsuccessful then assumed (AR) straight line connections will be shown.

CCTV DRAINAGE SURVEY
All accessible Manholes and Inspection chambers have had their respective covers lifted with pipe sizes, inverts, chamber sizes/type and service data recorded from ground level. Pipework has been traced, accessed and collected for post processing. Drainage layout, including manhole covers not located by topographical survey, may be taken from CCTV chainage and will be shown as indicative only.

Electricity
Elec cables will have been predominantly located using EML methodology with electronically derived depths shown. GPR techniques will be employed to achieve greater quality levels as required.

British Telecoms
BT cables will have been predominantly located using EML methodology with electronically derived depths shown. GPR techniques will be employed to achieve greater quality levels as required. Due to current laws and legislation protecting all BT apparatus, cabling can only be located remotely. We therefore compare all our telecom findings against record information to produce the final service layout. In some instances, where high amount of cable ducts are present, we may only be able to identify a linear centre peak signal rather than identifying all the individual duct positions. For further information regarding Telecoms apparatus, please contact Openreach directly.

Cable TV & Communications
CTV and/or Com cables will have been predominantly located using EML methodology with electronically derived depths shown. GPR techniques will be employed to achieve greater quality levels as required.

Fibre Optic
FO cables will have been predominantly located using GPR methodology. This is due to the materials used within fibre optic cabling. In some rare instances, tracer cabling or conductible non fibre optic cabling will be present within some or all ducting. When this is the case, both EML and GPR methodology will be combined to identify service network and achieve greater quality levels.

Lighting, Traffic Signal & Security Cables
LC, TS and/or Sec cables will have been predominantly located using EML methodology with electronically derived depths shown. GPR techniques will be employed to achieve greater quality levels as required.

Gas & Water Inc. Fuel Pipes and Hot Water Pipes
GM/GS and/or WM/WS pipe work will have been attempted and located using both EML & GPR methodology with electronically derived depths shown for the former and depths to crown levels shown for the latter.
When the Gas/Water pipe work is constructed using conductible materials, then we are able to to employ multiple geophysical techniques to identify service network and achieve greater quality levels. When a non conductible material is used, GPR methodology will be employed to locate and plot the final service layout.

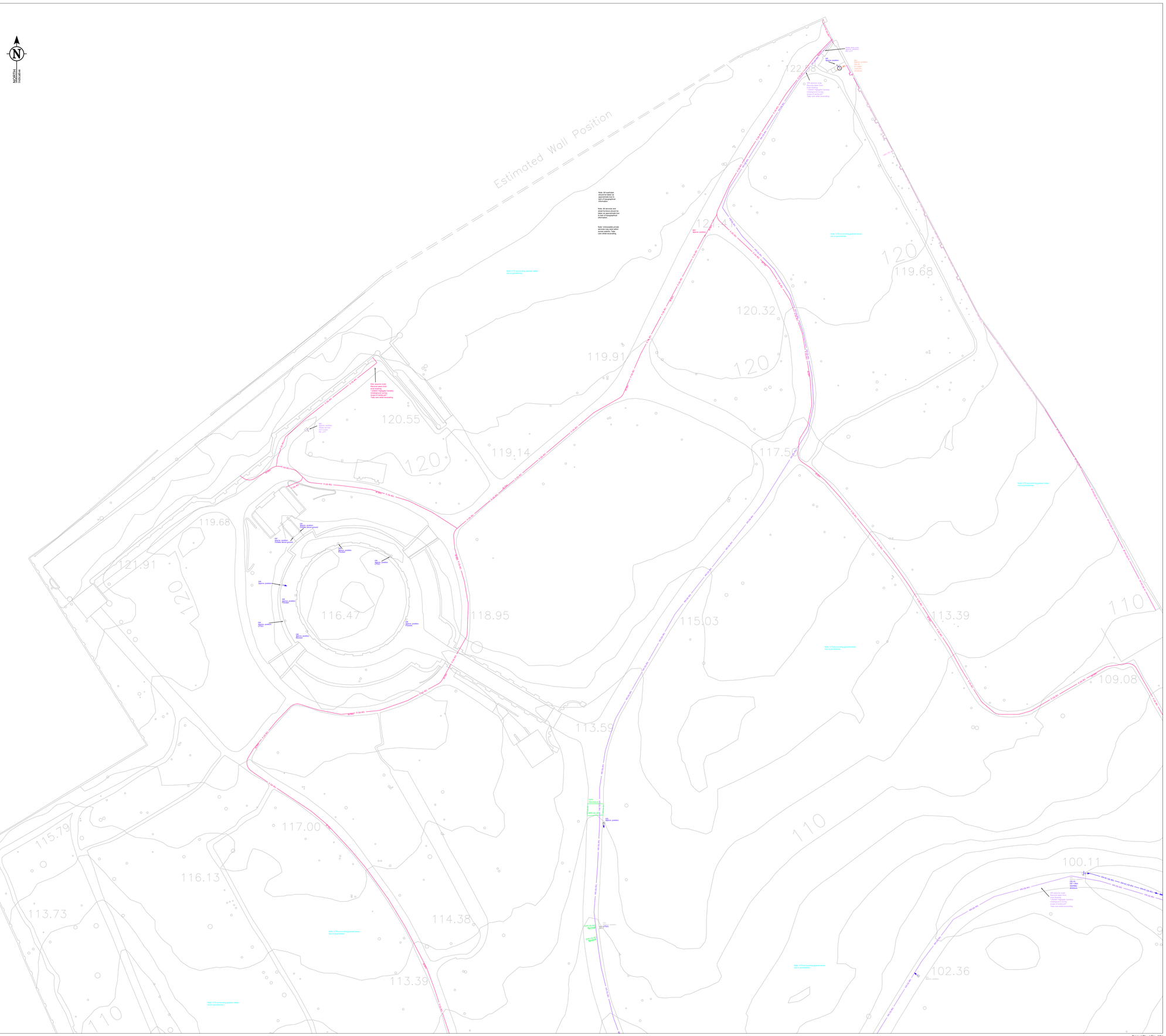
Ground Penetrating Radar
GPR methodology is used to identify and locate all non metallic, non conductible piping and cabling. We also employ GPR to obtain a greater accuracy levels on EML located services. The GPR has a greater success rate on pipe or service diameter upward of Ø63mm,C63mm, as size increments increase, so does the chance of detection. The GPR can produces varying results and as such, wouldn't be used as an independent utility surveying instrument.

Unidentified Traces
All UITs will have been predominantly located using EML methodology with electronically derived depths shown. GPR techniques will be employed to achieve greater quality levels as required. Every effort has been made to identify the service but in this instance, is not achievable. We recommend excavation work to determine identity and depth where applicable.

Scarring (QL-C)
Scarring has been identified on site with a potential of an undetectable service present.

Assumed Routes & Taken from Records (QL-B4/D)
Assumed routes (AR) are shown if there is evidence that a service exists but we are unable to trace it whilst on site. The surveyor will attempt to locate various risers/ics/valves/meters (service evidence) etc. around site area to successfully determine an assumed route between these points. If there is little evidence on site but they believe a service is still present, then a common sense approach to an assumed route shall be employed.

Taken from records (TFR) are service routes that are taken from STAT record plans or previous survey information and overlaid onto our drawings.



Original Sheet Size A0H

UTILITIES & UNDERGROUND INVESTIGATIONS

ABBREVIATIONS & SYMBOLS

1D 5C	1 Duct 5 Cables	DCr	Depth To Crown	RBC	Rectangular Brick Chamber
Ø	Diameter	DI	Depth To Invert	RCC	Rectangular Conc Chamber
AC	Audible Connection	DS	Depth To Silt	RE	Rodding Eye
AG	Above Ground	DTB	Depth To Base	SA	Survey Abandoned
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CrL	Crown Level	PDR	Poor Depth Response	UTT	Unable To Trace
CU	Camera Under Water ⟶	RB ●	Rest Bend	WL	Water Level

BT	BT CABLE(S)
O/BT	OVERHEAD BT CABLE(S)
COM	COMMUNICATIONS CABLE(S)
CTV	CABLE TV CABLE(S)
DUCT	EMPTY DUCT
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O/E	OVERHEAD ELECTRIC CABLE(S)
FO	FIBREOPTIC CABLE(S)
FUEL	FUEL PIPE(S)
GM	GAS MAIN
GS	GAS SERVICE
GPR	GROUND PENETRATING RADAR (GPR) TRACE
HW	HOT WATER PIPE
LC	LIGHTING CIRCUIT
OIL	OIL PIPE(S)
SCAR	VISIBLE SCARRING
SEC	SECURITY CABLING
TC	TELECOM CABLE(S)
TS	TRAFFIC SIGNAL
UIS	UNIDENTIFIED SERVICE
UIT	UNIDENTIFIED TRACE
WM	WATER MAIN
WS	WATER SERVICE
CW ►	COMBINED SEWER
CW RM ►	COMBINED WATER RISING MAIN
EW ►	EFFLUENT WATER
►	FOUL SEWER
FW RM ►	FOUL WATER RISING MAIN
RM	RISING MAIN
►	SURFACE WATER SEWER
SW RM ►	SURFACE WATER RISING MAIN
▬	INVESTIGATION EXTENTS

NORTH
Indicative

Note:	UTILITIES COMMENT BOX (GENERAL NOTES)
d0.37m	DEPTH TO SERVICE
??-AC	AUDIBLE CONNECTION
??-AG	SERVICE ABOVE GROUND
??-CU	CAMERA UNDER WATER
??-OH	SERVICE OVERHEAD

DRAWING NOTES

All below ground details shown have been identified from above ground without excavation. Survey Solution use electro-magnetic and/or ground penetrating radar (GPR) methods to investigate for underground utilities, services and features. Results using these methods are not infallible and we recommend trial excavations are carried out for verification of positions, depths and identification.

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Depths obtained using electro-magnetic or GPR are effected by ground conditions and should be treated as indicative only. Electro-magnetic depths to utilities and services are generally taken to the centre of a feature, GPR depths to the top of a feature and drainage depth shown to inverts, unless otherwise indicated.

Drainage pipe sizes will be obtained without entering the chamber and therefore should be treated as approximate. Pipe dimensions which have not been obtained visually will be taken from records when available.

All services, drainage and utilities routes are assumed straight between access points, unless otherwise stated. The numbers of cables in runs will not be shown unless specifically requested. All services are below ground unless indicated.

Services, utilities and features may not have been surveyed if obstructed or not reasonably visible or accessible at the time of survey.

Survey Solutions accept no responsibility for the completeness or accuracy of either the topographical survey or base mapping on this project.

All critical dimensions and measurements should be checked and verified with any errors or discrepancies notified to Survey Solutions immediately. The accuracy of the digital data is the same as the plotting scale implies. All dimensions are in metres unless otherwise stated.

The contractor must check and verify all site and building dimensions, levels, utilities and drainage details and connections prior to commencing work.

Do not scale from this drawing.

DESKTOP UTILITY RECORDS (PAS 128: 2014 SURVEY TYPE D)
PREREQUISITE FOR PAS 128: 2014 SURVEY TYPE B
COMMISSIONED: NO

UTILITY	AVAILABILITY	UTILITY COMPANY PROVIDER
SEWER	NO	N/A
WATER MAIN	NO	N/A
GAS MAIN	NO	N/A
TELECOM	PUBLIC	BRITISH TELECOMS
CABLE TV	NO	N/A
ELECTRICITY	NO	N/A
OIL PIPES	NO	N/A
OTHER	NO	N/A

REV	DESCRIPTION	DRAWN	APPR	DATE

SURVEY
SOLUTIONS

LAND SURVEYING
BUILDING SURVEYING
UNDERGROUND SURVEYING
SITE ENGINEERING
MONITORING

0845 040 5969
survey-solutions.co.uk

IPSWICH BEDFORD COVENTRY GLASGOW LONDON MANCHESTER NORWICH
NOTTINGHAM YEOVIL

PROJECT TITLE
HIGHGATE CEMETERY, SWAINS LANE,
LONDON, N6 6PJ.

DRAWING DETAIL
UTILITIES AND DRAINAGE SURVEY.
SHEET 1 OF 9

CLIENT				SCALE
STEENSEN VARMING				1:250
SURVEYOR	SURVEY DATE	CHECKED BY	APPROVED BY	DWG STATUS
LJT	20/10/2021	JAB	GSB	FINAL
DRAWING NUMBER			REVISION	ISSUE DATE
32482BWUG-01				28/10/2021

RICS chartered ices THE SURVEY ASSOCIATION QMS ISO 9001 REGISTERED FIRM QMS ISO 14001 : 2015 REGISTERED

GENERAL SYNOPSIS

This survey has been carried out in accordance with PAS 128: 2014 & our version of the Royal Institution of Chartered Surveyors (RICS) specification for Measured Surveys of Land, Buildings and Utilities. Our survey extents have been agreed and confirmed with formal acceptance of 32482BWUG-01 from STEENSEN VARMING. If you have any queries regarding the final services layout, please may we ask you to carefully read all the information within this title block in its entirety before continuing to do so.

TOPOGRAPHICAL/.DWG DRAWING INFORMATION

TOPOGRAPHICAL SURVEY DATE 04/2018

SURVEY TYPE	DESCRIPTION	EFFECT ON SURVEY RESULTS
TOPO	ATLANTIC GEOMATICS	ALL COVERS AND STREET FURNITURE ADDED
OUTDATED		BY SURVEY SOLUTIONS AS APPROXIMATE
OS		POSITION.
NTS		

GENERAL SITE CONDITIONS

BELOW AVERAGE

ADDITIONAL INFORMATION	EFFECT ON SURVEY RESULTS
GRAVESTONES AND UNEVEN GROUND.	SURVEYED WHERE POSSIBLE IN PATHS

SURVEY RECOMMENDATIONS

LIST RECOMMENDATIONS TO IMPROVE SURVEY DATA

Due to the geophysical nature of subsurface technology, we always recommend excavation works to be carried out for verification, especially within critical areas.

We would suggest an up to date, more detailed and comprehensive topographical survey.

PAS 128: 2014 QUALITY LEVEL GUIDE

Q-LEVEL	DESCRIPTION	ACC.	Q-LEVEL	DESCRIPTION
QL-D	Service positions taken from records.	Undefined	QL-B2	Horizontal & vertical location using only one geophysical technique.
QL-C	Visual evidence of service existence but undetectable by geophysical technology.	Undefined	QL-B1	Horizontal & vertical location using multiple geophysical techniques.
QL-B4	Undetectable service present shown as an assumed route. (AR)	H: +/- 500mm V: N/A	QL-A	Horizontal & vertical position verification by open excavation, manholes and/or inspection chambers.
QL-B3	Horizontal location by one geophysical technique but with none or poor depth information.			

DETECTION METHOD

IN ACCORDANCE WITH PAS 128: 2014 SURVEY TYPE B

DRAINAGE SURVEY

All accessible Manholes and Inspection chambers have had their respective covers lifted with pipe sizes, inverts, chamber sizes/types and service data recorded from ground level. All connections from DPs, Gullies, Drains, VP's, RE's and lampholes have been proven wherever possible using audible connections (AC) and/or sonde instrumentation where applicable. Where these methods have proved unsuccessful then assumed (AR) straight line connections will be shown.

CCTV DRAINAGE SURVEY

All accessible Manholes and Inspection chambers have had their respective covers lifted with pipe sizes, inverts, chamber sizes/type and service data recorded from ground level. Pipework has been traced, accessed and collected for post processing. Drainage layout, including manhole covers not located by topographical survey, may be taken from CCTV chainage and will be shown as indicative only.

Electricity

Elec cables will have been predominantly located using EML methodology with electronically derived depths shown. GPR techniques will be employed to achieve greater quality levels as required.

British Telecoms

BT cables will have been predominantly located using EML methodology with electronically derived depths shown. GPR techniques will be employed to achieve greater quality levels as required. Due to current laws and legislation protecting all BT apparatus, cabling can only be located remotely. We therefore compare all our telecom findings against record information to produce the final service layout. In some instances, where high amount of cable ducts are present, we may only be able to identify a linear centre peak signal rather than identifying all the individual duct positions. For further information regarding Telecoms apparatus, please contact Openreach directly.

Cable TV & Communications

CTV and/or Com cables will have been predominantly located using EML methodology with electronically derived depths shown. GPR techniques will be employed to achieve greater quality levels as required.

Fibre Optic

FO cables will have been predominantly located using GPR methodology. This is due to the materials used within fibre optic cabling. In some rare instances, tracer cabling or conductible non fibre optic cabling will be present within some or all ducting. When this is the case, both EML and GPR methodology will be combined to identify service network and achieve greater quality levels.

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Scarring (QL-C)

Scarring has been identified on site with a potential of an undetectable service present.

Assumed Routes & Taken from Records (QL-B4/D)

Assumed routes (AR) are shown if there is evidence that a service exists but we are unable to trace it whilst on site. The surveyor will attempt to locate various risers/ics/valves/meters (service evidence) etc. around site area to successfully determine an assumed route between these points. If there is little evidence on site but they believe a service is still present, then a common sense approach to an assumed route shall be employed.

Taken from records (TFR) are service routes that are taken from STAT record plans or previous survey information and overlaid onto our drawings.

Note: UTS surrounding grassed areas due to gravestones.

WS assume route.
Records taken from
local drawing.
" 204057 Highgate Cemetry
Underground survey
scope of works.pdf "
Take care while excavating.

Drainage channel
approx. position.
UTDO.

Note: All manholes should be taken as approximate due to lack of topographical information.

Note: All services and street furniture should be taken as approximate due to lack of topographical information.

Note: Untraceable private services may exist within survey extents. Take care whilst excavating.

Note: UTS hatched area, due to dense vegetation, uneven ground.

UTILITIES & UNDERGROUND INVESTIGATIONS

ABBREVIATIONS & SYMBOLS

1D 5C	1 Duct 5 Cables	DCr	Depth To Crown	RBC	Rectangular Brick Chamber
Ø	Diameter	DI	Depth To Invert	RCC	Rectangular Conc Chamber
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FUEL	FUEL PIPE(S)
GM	GAS MAIN
GS	GAS SERVICE
GPR	GROUND PENETRATING RADAR (GPR) TRACE
HW	HOT WATER PIPE
LC	LIGHTING CIRCUIT
OIL	OIL PIPE(S)
SCAR	VISIBLE SCARRING
SEC	SECURITY CABLING
TC	TELECOM CABLE(S)
TS	TRAFFIC SIGNAL
UIS	UNIDENTIFIED SERVICE
UIT	UNIDENTIFIED TRACE
WM	WATER MAIN
WS	WATER SERVICE
CW	COMBINED SEWER
CW RM	COMBINED WATER RISING MAIN
EW	EFFLUENT WATER
	FOUL SEWER
FW RM	FOUL WATER RISING MAIN
RM	RISING MAIN
	SURFACE WATER SEWER
SW RM	SURFACE WATER RISING MAIN
	INVESTIGATION EXTENTS

N
NORTH
Indicative

Note:	UTILITIES COMMENT BOX (GENERAL NOTES)
d0.37m	DEPTH TO SERVICE
??-AC	AUDIBLE CONNECTION
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??-OH	SERVICE OVERHEAD

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DESKTOP UTILITY RECORDS (PAS 128: 2014 SURVEY TYPE D)
PREREQUISITE FOR PAS 128: 2014 SURVEY TYPE B
COMMISSIONED: NO

UTILITY	AVAILABILITY	UTILITY COMPANY PROVIDER
SEWER	NO	N/A
WATER MAIN	NO	N/A
GAS MAIN	NO	N/A
TELECOM	PUBLIC	BRITISH TELECOMS
CABLE TV	NO	N/A
ELECTRICITY	NO	N/A
OIL PIPES	NO	N/A
OTHER	NO	N/A

REV	DESCRIPTION	DRAWN	APPR	DATE

SURVEY SOLUTIONS

LAND SURVEYING
BUILDING SURVEYING
UNDERGROUND SURVEYING
SITE ENGINEERING
MONITORING

0845 040 5969
survey-solutions.co.uk

IPSWICH BEDFORD COVENTRY GLASGOW LONDON MANCHESTER NORWICH
NOTTINGHAM YEOVIL

PROJECT TITLE
HIGHGATE CEMETERY, SWAINS LANE,
LONDON, N6 6PJ.

DRAWING DETAIL
UTILITIES AND DRAINAGE SURVEY.
SHEET 2 OF 9

CLIENT STEENSEN VARMING				SCALE 1:250
SURVEYOR LJT	SURVEY DATE 20/10/2021	CHECKED BY JAB	APPROVED BY GSB	DWG STATUS FINAL
DRAWING NUMBER 32482BWUG-02			REVISION	ISSUE DATE 28/10/2021

RICS chartered ICES THE SURVEY ASSOCIATION QMS ISO 9001 REGISTERED FIRM QMS ISO 14001 : 2015 REGISTERED

Original Sheet Size A0H

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TOPOGRAPHICAL SURVEY DATE 04/2018

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OUTDATED		BY SURVEY SOLUTIONS AS APPROXIMATE
OS		POSITION.
NTS		

GENERAL SITE CONDITIONS

BELOW AVERAGE

ADDITIONAL INFORMATION	EFFECT ON SURVEY RESULTS
GRAVESTONES AND UNEVEN GROUND.	SURVEYED WHERE POSSIBLE IN PATHS

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DETECTION METHOD

IN ACCORDANCE WITH PAS 128: 2014 SURVEY TYPE B

DRAINAGE SURVEY

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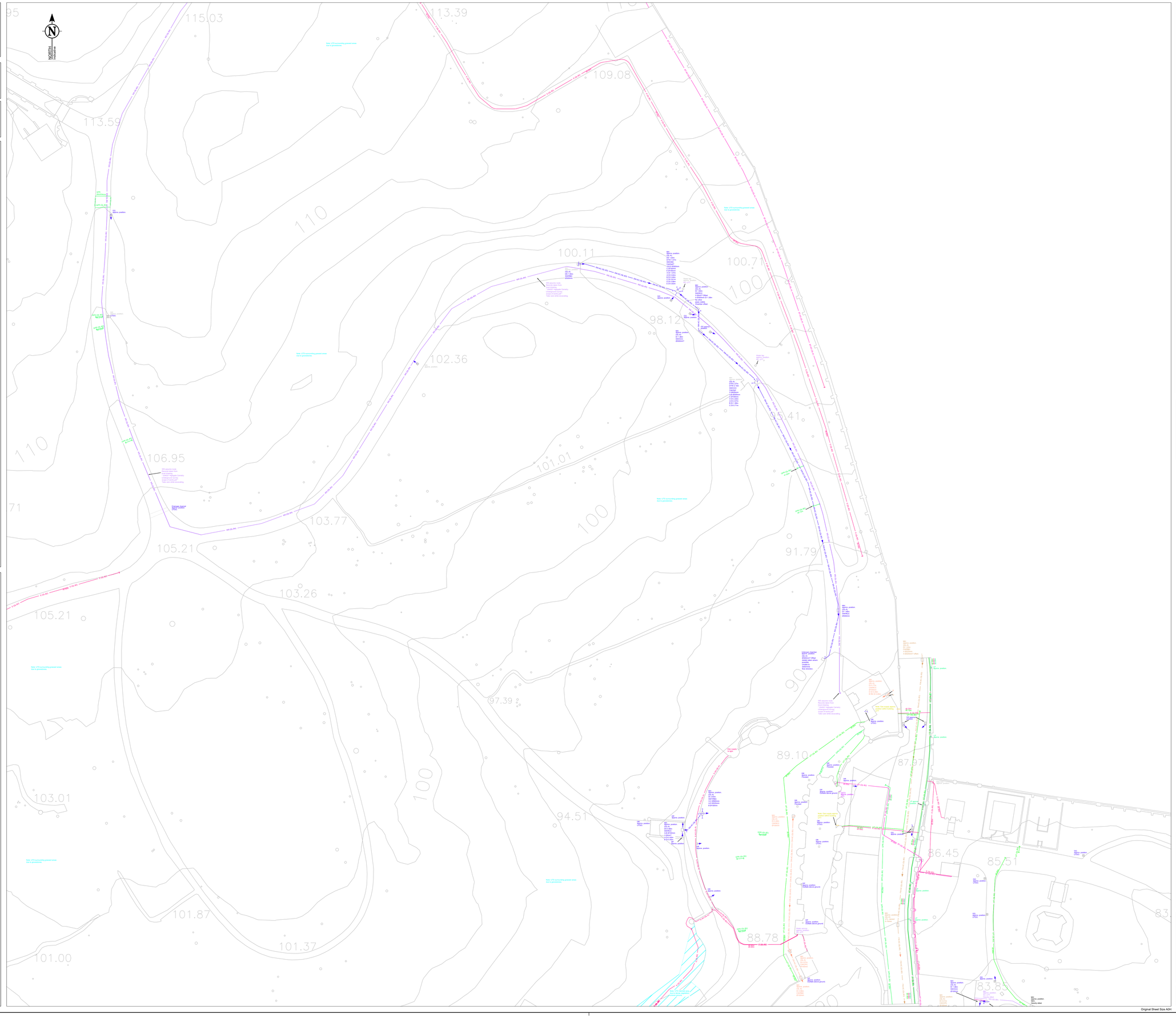

UTILITIES & UNDERGROUND INVESTIGATIONS

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GS	GAS SERVICE
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LC	LIGHTING CIRCUIT
OIL	OIL PIPE(S)
SCAR	VISIBLE SCARRING
SEC	SECURITY CABLING
TC	TELECOM CABLE(S)
TS	TRAFFIC SIGNAL
UIS	UNIDENTIFIED SERVICE
UIT	UNIDENTIFIED TRACE
WM	WATER MAIN
WS	WATER SERVICE
CW	COMBINED SEWER
CW RM	COMBINED WATER RISING MAIN
EW	EFFLUENT WATER
	FOUL SEWER
FW RM	FOUL WATER RISING MAIN
RM	RISING MAIN
	SURFACE WATER SEWER
SW RM	SURFACE WATER RISING MAIN
	INVESTIGATION EXTENTS

Note:	UTILITIES COMMENT BOX (GENERAL NOTES)
d0.37m	DEPTH TO SERVICE
??-AC	AUDIBLE CONNECTION
??-AG	SERVICE ABOVE GROUND
??-CU	CAMERA UNDER WATER
??-OH	SERVICE OVERHEAD

N
NORTH
Indicative

DRAWING NOTES

All below ground details shown have been identified from above ground without excavation. Survey Solution use electro-magnetic and/or ground penetrating radar (GPR) methods to investigate for underground utilities, services and features. Results using these methods are not infallible and we recommend trial excavations are carried out for verification of positions, depths and identification.

Any areas on the drawing where services or features have not been shown are not necessarily clear of services or features but are an indication that no items have been identified during our investigations. All reasonable care and normal good practice should still be employed during design and construction processes.

Certain types of services such as plastic or concrete pipes, some conduit and ducting where direct access can not be achieved for tracing may not be shown and alternative locating methods should be used.

Survey Solutions has used all reasonable care to research available service records but the completeness or use of the service records supplied to or by Survey Solutions cannot be guaranteed. Therefore Survey Solutions cannot be held responsible for any features annotated as 'taken from records' (TFR).

Depths obtained using electro-magnetic or GPR are effected by ground conditions and should be treated as indicative only. Electro-magnetic depths to utilities and services are generally taken to the centre of a feature, GPR depths to the top of a feature and drainage depth shown to inverts, unless otherwise indicated.

Drainage pipe sizes will be obtained without entering the chamber and therefore should be treated as approximate. Pipe dimensions which have not been obtained visually will be taken from records when available.

All services, drainage and utilities routes are assumed straight between access points, unless otherwise stated. The numbers of cables in runs will not be shown unless specifically requested. All services are below ground unless indicated.

Services, utilities and features may not have been surveyed if obstructed or not reasonably visible or accessible at the time of survey.

Survey Solutions accept no responsibility for the completeness or accuracy of either the topographical survey or base mapping on this project.

All critical dimensions and measurements should be checked and verified with any errors or discrepancies notified to Survey Solutions immediately. The accuracy of the digital data is the same as the plotting scale implies. All dimensions are in metres unless otherwise stated.

The contractor must check and verify all site and building dimensions, levels, utilities and drainage details and connections prior to commencing work.

Do not scale from this drawing.

DESKTOP UTILITY RECORDS (PAS 128: 2014 SURVEY TYPE D)
PREREQUISITE FOR PAS 128: 2014 SURVEY TYPE B
COMMISSIONED: NO

UTILITY	AVAILABILITY	UTILITY COMPANY PROVIDER
SEWER	NO	N/A
WATER MAIN	NO	N/A
GAS MAIN	NO	N/A
TELECOM	PUBLIC	BRITISH TELECOMS
CABLE TV	NO	N/A
ELECTRICITY	NO	N/A
OIL PIPES	NO	N/A
OTHER	NO	N/A

REV	DESCRIPTION	DRAWN	APPR	DATE

SURVEY SOLUTIONS

LAND SURVEYING
BUILDING SURVEYING
UNDERGROUND SURVEYING
SITE ENGINEERING
MONITORING

0845 040 5969
survey-solutions.co.uk

IPSWICH BEDFORD COVENTRY GLASGOW LONDON MANCHESTER NORWICH NOTTINGHAM YEOVIL

PROJECT TITLE HIGHGATE CEMETERY, SWAINS LANE, LONDON, N6 6PJ.				
DRAWING DETAIL UTILITIES AND DRAINAGE SURVEY. SHEET 3 OF 8				
CLIENT STEENSEN VARMING				SCALE 1:250
SURVEYOR LJT	SURVEY DATE 20/10/2021	CHECKED BY JAB	APPROVED BY GSB	DWG STATUS FINAL
DRAWING NUMBER 32482BWUG-03			REVISION	ISSUE DATE 28/10/2021

GENERAL SYNOPSIS

This survey has been carried out in accordance with PAS 128: 2014 & our version of the Royal Institution of Chartered Surveyors (RICS) specification for Measured Surveys of Land, Buildings and Utilities. Our survey extents have been agreed and confirmed with formal acceptance of 32482BWUG-01 from STEENSEN VARMING. If you have any queries regarding the final services layout, please may we ask you to carefully read all the information within this title block in its entirety before continuing to do so.

TOPOGRAPHICAL/.DWG DRAWING INFORMATION

TOPOGRAPHICAL SURVEY DATE 04/2018

SURVEY TYPE	DESCRIPTION	EFFECT ON SURVEY RESULTS
TOPO	ATLANTIC GEOMATICS	ALL COVERS AND STREET FURNITURE ADDED
OUTDATED		BY SURVEY SOLUTIONS AS APPROXIMATE
OS		POSITION.
NTS		

GENERAL SITE CONDITIONS

BELOW AVERAGE

ADDITIONAL INFORMATION	EFFECT ON SURVEY RESULTS
GRAVESTONES AND UNEVEN GROUND.	SURVEYED WHERE POSSIBLE IN PATHS

SURVEY RECOMMENDATIONS

LIST RECOMMENDATIONS TO IMPROVE SURVEY DATA

Due to the geophysical nature of subsurface technology, we always recommend excavation works to be carried out for verification, especially within critical areas.

We would suggest an up to date, more detailed and comprehensive topographical survey.

PAS 128: 2014 QUALITY LEVEL GUIDE

Q-LEVEL	DESCRIPTION	ACC.	Q-LEVEL	DESCRIPTION
QL-D	Service positions taken from records.	Undefined	QL-B2	Horizontal & vertical location using only one geophysical technique.
QL-C	Visual evidence of service existence but undetectable by geophysical technology.	Undefined	QL-B1	Horizontal & vertical location using multiple geophysical techniques.
QL-B4	Undetectable service present shown as an assumed route. (AR)	H: +/- 500mm V: N/A	QL-A	Horizontal & vertical position verification by open excavation, manholes and/or inspection chambers.
QL-B3	Horizontal location by one geophysical technique but with none or poor depth information.			

DETECTION METHOD

IN ACCORDANCE WITH PAS 128: 2014 SURVEY TYPE B

DRAINAGE SURVEY

All accessible Manholes and Inspection chambers have had their respective covers lifted with pipe sizes, inverts, chamber sizes/types and service data recorded from ground level. All connections from DPs, Gullies, Drains, VP's, RE's and lampholes have been proven wherever possible using audible connections (AC) and/or sonde instrumentation where applicable. Where these methods have proved unsuccessful then assumed (AR) straight line connections will be shown.

CCTV DRAINAGE SURVEY

All accessible Manholes and Inspection chambers have had their respective covers lifted with pipe sizes, inverts, chamber sizes/type and service data recorded from ground level. Pipework has been traced, accessed and collected for post processing. Drainage layout, including manhole covers not located by topographical survey, may be taken from CCTV chainage and will be shown as indicative only.

Electricity

Elec cables will have been predominantly located using EML methodology with electronically derived depths shown. GPR techniques will be employed to achieve greater quality levels as required.

British Telecoms

BT cables will have been predominantly located using EML methodology with electronically derived depths shown. GPR techniques will be employed to achieve greater quality levels as required. Due to current laws and legislation protecting all BT apparatus, cabling can only be located remotely. We therefore compare all our telecom findings against record information to produce the final service layout. In some instances, where high amount of cable ducts are present, we may only be able to identify a linear centre peak signal rather than identifying all the individual duct positions. For further information regarding Telecoms apparatus, please contact Openreach directly.

Cable TV & Communications

CTV and/or Com cables will have been predominantly located using EML methodology with electronically derived depths shown. GPR techniques will be employed to achieve greater quality levels as required.

Fibre Optic

FO cables will have been predominantly located using GPR methodology. This is due to the materials used within fibre optic cabling. In some rare instances, tracer cabling or conductible non fibre optic cabling will be present within some or all ducting. When this is the case, both EML and GPR methodology will be combined to identify service network and achieve greater quality levels.

Lighting, Traffic Signal & Security Cables

LC, TS and/or Sec cables will have been predominantly located using EML methodology with electronically derived depths shown. GPR techniques will be employed to achieve greater quality levels as required.

Gas & Water Inc. Fuel Pipes and Hot Water Pipes

GM/GS and/or WM/WS pipe work will have been attempted and located using both EML & GPR methodology with electronically derived depths shown for the former and depths to crown levels shown for the latter.
When the Gas/Water pipe work is constructed using conductible materials, then we are able to to employ multiple geophysical techniques to identify service network and achieve greater quality levels. When a non conductible material is used, GPR methodology will be employed to locate and plot the final service layout.

Ground Penetrating Radar

GPR methodology is used to identify and locate all non metallic, non conductible piping and cabling. We also employ GPR to obtain a greater accuracy levels on EML located services. The GPR has a greater success rate on pipe or service diameter upward of Ø63mm,C63mm, as size increments increase, so does the chance of detection. The GPR can produces varying results and as such, wouldn't be used as an independent utility surveying instrument.

Unidentified Traces

All UITs will have been predominantly located using EML methodology with electronically derived depths shown. GPR techniques will be employed to achieve greater quality levels as required. Every effort has been made to identify the service but in this instance, is not achievable. We recommend excavation work to determine identity and depth where applicable.

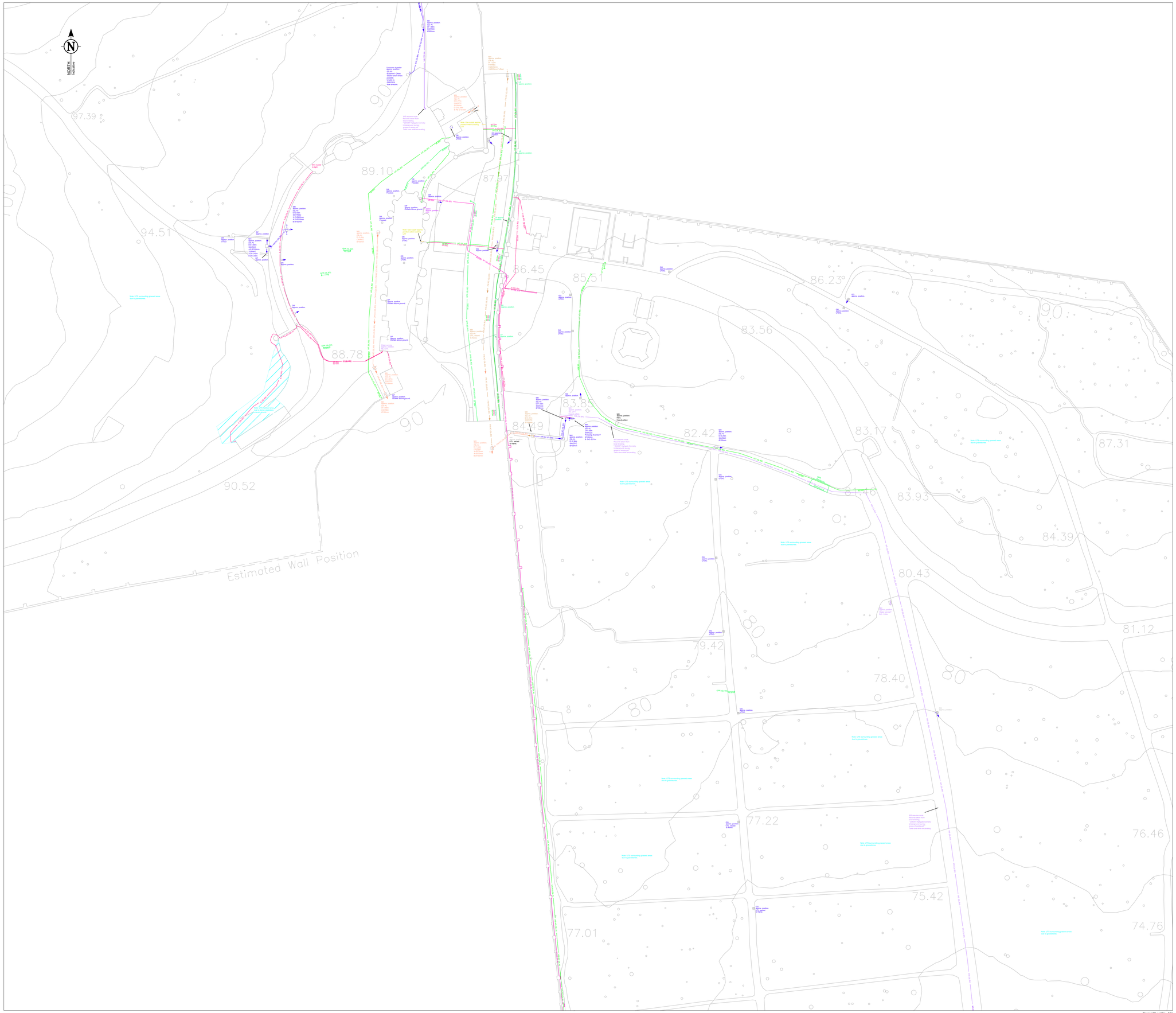
Scarring (QL-C)

Scarring has been identified on site with a potential of an undetectable service present.

Assumed Routes & Taken from Records (QL-B4/D)

Assumed routes (AR) are shown if there is evidence that a service exists but we are unable to trace it whilst on site. The surveyor will attempt to locate various risers/ics/valves/meters (service evidence) etc. around site area to successfully determine an assumed route between these points. If there is little evidence on site but they believe a service is still present, then a common sense approach to an assumed route shall be employed.

Taken from records (TFR) are service routes that are taken from STAT record plans or previous survey information and overlaid onto our drawings.



UTILITIES & UNDERGROUND INVESTIGATIONS

ABBREVIATIONS & SYMBOLS

1D 5C	1 Duct 5 Cables	DCr	Depth To Crown	RBC	Rectangular Brick Chamber
Ø	Diameter	DI	Depth To Invert	RCC	Rectangular Conc Chamber
AC	Audible Connection	DS	Depth To Silt	RE	Rodding Eye
AG	Above Ground	DTB	Depth To Base	SA	Survey Abandoned
AR	Assumed Route	DTW	Depth To Water	SL	Silt Level
BL	Base Level	DTS	Depth To Surcharge	SuL	Surcharge Level
CB	Concrete Benching	EBD	External Backdrop	TFR	Taken From Records
CBC	Circular Brick Chamber	EOT	End Of Trace ⟶	UTC	Unable To CCTV
CCC	Circular Conc Chamber	IBD	Internal Backdrop	UTDO	Unable To Determine Outfall
CL	Cover Level	IL	Invert Level	UTL	Unable To Lift
CPC	Circ Plastic Chamber	OH	Overhead	UTS	Unable To Survey
CrL	Crown Level	PDR	Poor Depth Response	UTT	Unable To Trace
CU	Camera Under Water ⟶	RB ●	Rest Bend	WL	Water Level

BT	BT CABLE(S)
O/BT	OVERHEAD BT CABLE(S)
COM	COMMUNICATIONS CABLE(S)
CTV	CABLE TV CABLE(S)
DUCT	EMPTY DUCT
E	ELECTRIC CABLE(S)
O/E	OVERHEAD ELECTRIC CABLE(S)
FO	FIBREOPTIC CABLE(S)
FUEL	FUEL PIPE(S)
GM	GAS MAIN
GS	GAS SERVICE
GPR	GROUND PENETRATING RADAR (GPR) TRACE
HW	HOT WATER PIPE
LC	LIGHTING CIRCUIT
OIL	OIL PIPE(S)
SCAR	VISIBLE SCARRING
SEC	SECURITY CABLING
TC	TELECOM CABLE(S)
TS	TRAFFIC SIGNAL
UIS	UNIDENTIFIED SERVICE
UIT	UNIDENTIFIED TRACE
WM	WATER MAIN
WS	WATER SERVICE
CW	COMBINED SEWER
CW RM	COMBINED WATER RISING MAIN
EW	EFFLUENT WATER
	FOUL SEWER
FW RM	FOUL WATER RISING MAIN
RM	RISING MAIN
	SURFACE WATER SEWER
SW RM	SURFACE WATER RISING MAIN
	INVESTIGATION EXTENTS

Note:	UTILITIES COMMENT BOX (GENERAL NOTES)
d0.37m	DEPTH TO SERVICE
??-AC	AUDIBLE CONNECTION
??-AG	SERVICE ABOVE GROUND
??-CU	CAMERA UNDER WATER
??-OH	SERVICE OVERHEAD

N
NORTH
Indicative

DRAWING NOTES

All below ground details shown have been identified from above ground without excavation. Survey Solution use electro-magnetic and/or ground penetrating radar (GPR) methods to investigate for underground utilities, services and features. Results using these methods are not infallible and we recommend trial excavations are carried out for verification of positions, depths and identification.

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Drainage pipe sizes will be obtained without entering the chamber and therefore should be treated as approximate. Pipe dimensions which have not been obtained visually will be taken from records when available.

All services, drainage and utilities routes are assumed straight between access points, unless otherwise stated. The numbers of cables in runs will not be shown unless specifically requested. All services are below ground unless indicated.

Services, utilities and features may not have been surveyed if obstructed or not reasonably visible or accessible at the time of survey.

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The contractor must check and verify all site and building dimensions, levels, utilities and drainage details and connections prior to commencing work.

Do not scale from this drawing.

DESKTOP UTILITY RECORDS (PAS 128: 2014 SURVEY TYPE D)
PREREQUISITE FOR PAS 128: 2014 SURVEY TYPE B
COMMISSIONED: NO

UTILITY	AVAILABILITY	UTILITY COMPANY PROVIDER
SEWER	NO	N/A
WATER MAIN	NO	N/A
GAS MAIN	NO	N/A
TELECOM	PUBLIC	BRITISH TELECOMS
CABLE TV	NO	N/A
ELECTRICITY	NO	N/A
OIL PIPES	NO	N/A
OTHER	NO	N/A

REV	DESCRIPTION	DRAWN	APPR	DATE

SURVEY
SOLUTIONS

LAND SURVEYING
BUILDING SURVEYING
UNDERGROUND SURVEYING
SITE ENGINEERING
MONITORING

0845 040 5969
survey-solutions.co.uk

IPSWICH BEDFORD COVENTRY GLASGOW LONDON MANCHESTER NORWICH NOTTINGHAM YEOVIL

PROJECT TITLE
HIGHGATE CEMETERY, SWAINS LANE,
LONDON, N6 6PJ.

DRAWING DETAIL
UTILITIES AND DRAINAGE SURVEY.
SHEET 4 OF 9

CLIENT STEENSEN VARMING				SCALE 1:250
SURVEYOR LJT	SURVEY DATE 20/10/2021	CHECKED BY JAB	APPROVED BY GSB	DWG STATUS FINAL
DRAWING NUMBER 32482BWUG-04			REVISION	ISSUE DATE 28/10/2021

RICS chartered ices THE SURVEY ASSOCIATION ISO 9001 REGISTERED FIRM QMS ISO 14001 : 2015 REGISTERED

Original Sheet Size A0H

GENERAL SYNOPSIS

This survey has been carried out in accordance with PAS 128: 2014 & our version of the Royal Institution of Chartered Surveyors (RICS) specification for Measured Surveys of Land, Buildings and Utilities. Our survey extents have been agreed and confirmed with formal acceptance of 32482BWUG-01 from STEENSEN VARMING. If you have any queries regarding the final services layout, please may we ask you to carefully read all the information within this title block in its entirety before continuing to do so.

TOPOGRAPHICAL/.DWG DRAWING INFORMATION
TOPOGRAPHICAL SURVEY DATE 04/2018

SURVEY TYPE	DESCRIPTION	EFFECT ON SURVEY RESULTS
TOPO	ATLANTIC GEOMATICS	ALL COVERS AND STREET FURNITURE ADDED
OUTDATED		BY SURVEY SOLUTIONS AS APPROXIMATE
OS		POSITION.
NTS		

GENERAL SITE CONDITIONS
BELOW AVERAGE

ADDITIONAL INFORMATION	EFFECT ON SURVEY RESULTS
GRAVESTONES AND UNEVEN GROUND.	SURVEYED WHERE POSSIBLE IN PATHS

SURVEY RECOMMENDATIONS

LIST RECOMMENDATIONS TO IMPROVE SURVEY DATA

Due to the geophysical nature of subsurface technology, we always recommend excavation works to be carried out for verification, especially within critical areas.

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PAS 128: 2014 QUALITY LEVEL GUIDE

Q-LEVEL	DESCRIPTION	ACC.	Q-LEVEL	DESCRIPTION
QL-D	Service positions taken from records.	Undefined	QL-B2	Horizontal & vertical location using only one geophysical technique.
QL-C	Visual evidence of service existence but undetectable by geophysical technology.	Undefined	QL-B1	Horizontal & vertical location using multiple geophysical techniques.
QL-B4	Undetectable service present shown as an assumed route. (AR)	H: +/- 500mm V: N/A	QL-A	Horizontal & vertical position verification by open excavation, manholes and/or inspection chambers.
QL-B3	Horizontal location by one geophysical technique but with none or poor depth information.			

DETECTION METHOD
IN ACCORDANCE WITH PAS 128: 2014 SURVEY TYPE B

DRAINAGE SURVEY
All accessible Manholes and Inspection chambers have had their respective covers lifted with pipe sizes, inverts, chamber sizes/types and service data recorded from ground level. All connections from DPs, Gullies, Drains, VP's, RE's and lampholes have been proven wherever possible using audible connections (AC) and/or sonde instrumentation where applicable. Where these methods have proved unsuccessful then assumed (AR) straight line connections will be shown.

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All accessible Manholes and Inspection chambers have had their respective covers lifted with pipe sizes, inverts, chamber sizes/type and service data recorded from ground level. Pipework has been traced, accessed and collected for post processing. Drainage layout, including manhole covers not located by topographical survey, may be taken from CCTV chainage and will be shown as indicative only.

Electricity
Elec cables will have been predominantly located using EML methodology with electronically derived depths shown. GPR techniques will be employed to achieve greater quality levels as required.

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BT cables will have been predominantly located using EML methodology with electronically derived depths shown. GPR techniques will be employed to achieve greater quality levels as required. Due to current laws and legislation protecting all BT apparatus, cabling can only be located remotely. We therefore compare all our telecom findings against record information to produce the final service layout. In some instances, where high amount of cable ducts are present, we may only be able to identify a linear centre peak signal rather than identifying all the individual duct positions. For further information regarding Telecoms apparatus, please contact Openreach directly.

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Ground Penetrating Radar
GPR methodology is used to identify and locate all non metallic, non conductible piping and cabling. We also employ GPR to obtain a greater accuracy levels on EML located services. The GPR has a greater success rate on pipe or service diameter upward of Ø63mm,C63mm, as size increments increase, so does the chance of detection. The GPR can produces varying results and as such, wouldn't be used as an independent utility surveying instrument.

Unidentified Traces
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Scarring (QL-C)
Scarring has been identified on site with a potential of an undetectable service present.

Assumed Routes & Taken from Records (QL-B4/D)
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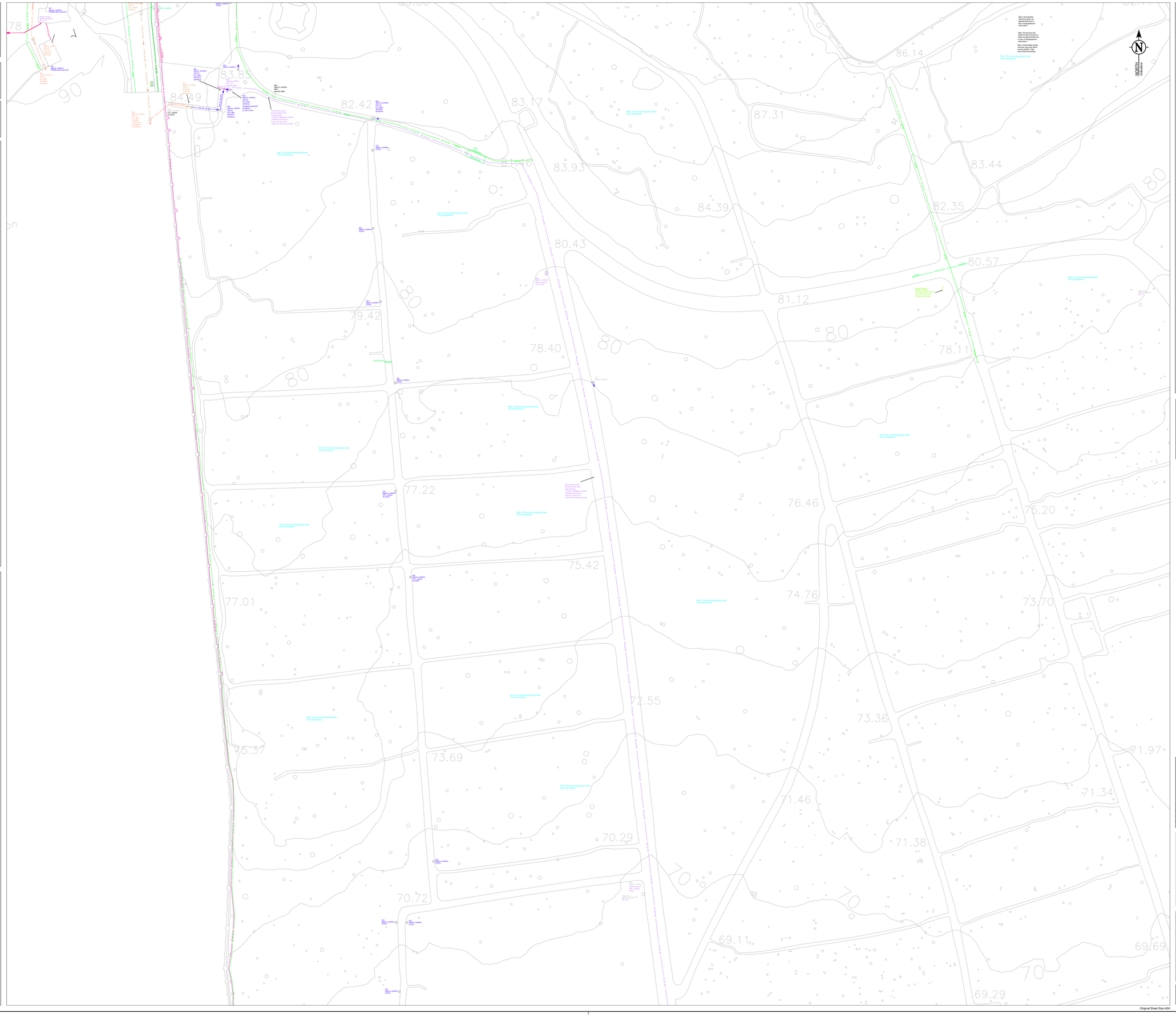
Taken from records (TFR) are service routes that are taken from STAT record plans or previous survey information and overlaid onto our drawings.



Original Sheet Size A0H

UTILITIES & UNDERGROUND INVESTIGATIONS

ABBREVIATIONS & SYMBOLS

1D 5C	1 Duct 5 Cables	DCr	Depth To Crown	RBC	Rectangular Brick Chamber
Ø	Diameter	DI	Depth To Invert	RCC	Rectangular Conc Chamber
AC	Audible Connection	DS	Depth To Silt	RE	Rodding Eye
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CPC	Circ Plastic Chamber	OH	Overhead	UTS	Unable To Survey
CrL	Crown Level	PDR	Poor Depth Response	UTT	Unable To Trace
CU	Camera Under Water ⟶	RB ●	Rest Bend	WL	Water Level

BT	BT CABLE(S)
O/BT	OVERHEAD BT CABLE(S)
COM	COMMUNICATIONS CABLE(S)
CTV	CABLE TV CABLE(S)
DUCT	EMPTY DUCT
E	ELECTRIC CABLE(S)
O/E	OVERHEAD ELECTRIC CABLE(S)
FO	FIBREOPTIC CABLE(S)
FUEL	FUEL PIPE(S)
GM	GAS MAIN
GS	GAS SERVICE
GPR	GROUND PENETRATING RADAR (GPR) TRACE
HW	HOT WATER PIPE
LC	LIGHTING CIRCUIT
OIL	OIL PIPE(S)
SCAR	VISIBLE SCARRING
SEC	SECURITY CABLING
TC	TELECOM CABLE(S)
TS	TRAFFIC SIGNAL
UIS	UNIDENTIFIED SERVICE
UIT	UNIDENTIFIED TRACE
WM	WATER MAIN
WS	WATER SERVICE
CW	COMBINED SEWER
CW RM	COMBINED WATER RISING MAIN
EW	EFFLUENT WATER
	FOUL SEWER
FW RM	FOUL WATER RISING MAIN
RM	RISING MAIN
	SURFACE WATER SEWER
SW RM	SURFACE WATER RISING MAIN
	INVESTIGATION EXTENTS

Note:	UTILITIES COMMENT BOX (GENERAL NOTES)
d0.37m	DEPTH TO SERVICE
??-AC	AUDIBLE CONNECTION
??-AG	SERVICE ABOVE GROUND
??-CU	CAMERA UNDER WATER
??-OH	SERVICE OVERHEAD

DRAWING NOTES

All below ground details shown have been identified from above ground without excavation. Survey Solution use electro-magnetic and/or ground penetrating radar (GPR) methods to investigate for underground utilities, services and features. Results using these methods are not infallible and we recommend trial excavations are carried out for verification of positions, depths and identification.

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Drainage pipe sizes will be obtained without entering the chamber and therefore should be treated as approximate. Pipe dimensions which have not been obtained visually will be taken from records when available.

All services, drainage and utilities routes are assumed straight between access points, unless otherwise stated. The numbers of cables in runs will not be shown unless specifically requested. All services are below ground unless indicated.

Services, utilities and features may not have been surveyed if obstructed or not reasonably visible or accessible at the time of survey.

Survey Solutions accept no responsibility for the completeness or accuracy of either the topographical survey or base mapping on this project.

All critical dimensions and measurements should be checked and verified with any errors or discrepancies notified to Survey Solutions immediately. The accuracy of the digital data is the same as the plotting scale implies. All dimensions are in metres unless otherwise stated.

The contractor must check and verify all site and building dimensions, levels, utilities and drainage details and connections prior to commencing work.

Do not scale from this drawing.

DESKTOP UTILITY RECORDS (PAS 128: 2014 SURVEY TYPE D)
PREREQUISITE FOR PAS 128: 2014 SURVEY TYPE B
COMMISSIONED: NO

UTILITY	AVAILABILITY	UTILITY COMPANY PROVIDER
SEWER	NO	N/A
WATER MAIN	NO	N/A
GAS MAIN	NO	N/A
TELECOM	PUBLIC	BRITISH TELECOMS
CABLE TV	NO	N/A
ELECTRICITY	NO	N/A
OIL PIPES	NO	N/A
OTHER	NO	N/A

REV	DESCRIPTION	DRAWN	APPR	DATE

SURVEY SOLUTIONS

LAND SURVEYING
BUILDING SURVEYING
UNDERGROUND SURVEYING
SITE ENGINEERING
MONITORING

0845 040 5969
survey-solutions.co.uk

IPSWICH BEDFORD COVENTRY GLASGOW LONDON MANCHESTER NORWICH NOTTINGHAM YEOVIL

PROJECT TITLE HIGHGATE CEMETERY, SWAINS LANE, LONDON, N6 6PJ.				
DRAWING DETAIL UTILITIES AND DRAINAGE SURVEY. SHEET 5 OF 8				
CLIENT STEENSEN VARMING				SCALE 1:250
SURVEYOR LJT	SURVEY DATE 20/10/2021	CHECKED BY JAB	APPROVED BY GSB	DWG STATUS FINAL
DRAWING NUMBER 32482BWUG-05			REVISION	ISSUE DATE 28/10/2021

GENERAL SYNOPSIS

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TOPOGRAPHICAL SURVEY DATE 04/2018

SURVEY TYPE	DESCRIPTION	EFFECT ON SURVEY RESULTS
TOPO	ATLANTIC GEOMATICS	ALL COVERS AND STREET FURNITURE ADDED
OUTDATED		BY SURVEY SOLUTIONS AS APPROXIMATE
OS		POSITION.
NTS		

GENERAL SITE CONDITIONS

BELOW AVERAGE

ADDITIONAL INFORMATION	EFFECT ON SURVEY RESULTS
GRAVESTONES AND UNEVEN GROUND.	SURVEYED WHERE POSSIBLE IN PATHS

SURVEY RECOMMENDATIONS

LIST RECOMMENDATIONS TO IMPROVE SURVEY DATA

Due to the geophysical nature of subsurface technology, we always recommend excavation works to be carried out for verification, especially within critical areas.

We would suggest an up to date, more detailed and comprehensive topographical survey.

PAS 128: 2014 QUALITY LEVEL GUIDE

Q-LEVEL	DESCRIPTION	ACC.	Q-LEVEL	DESCRIPTION
QL-D	Service positions taken from records.	Undefined	QL-B2	Horizontal & vertical location using only one geophysical technique.
QL-C	Visual evidence of service existence but undetectable by geophysical technology.	Undefined	QL-B1	Horizontal & vertical location using multiple geophysical techniques.
QL-B4	Undetectable service present shown as an assumed route. (AR)	H: +/- 500mm V: N/A	QL-A	Horizontal & vertical position verification by open excavation, manholes and/or inspection chambers.
QL-B3	Horizontal location by one geophysical technique but with none or poor depth information.			

DETECTION METHOD

IN ACCORDANCE WITH PAS 128: 2014 SURVEY TYPE B

DRAINAGE SURVEY

All accessible Manholes and Inspection chambers have had their respective covers lifted with pipe sizes, inverts, chamber sizes/types and service data recorded from ground level. All connections from DPs, Gullies, Drains, VP's, RE's and lampholes have been proven wherever possible using audible connections (AC) and/or sonde instrumentation where applicable. Where these methods have proved unsuccessful then assumed (AR) straight line connections will be shown.

CCTV DRAINAGE SURVEY

All accessible Manholes and Inspection chambers have had their respective covers lifted with pipe sizes, inverts, chamber sizes/type and service data recorded from ground level. Pipework has been traced, accessed and collected for post processing. Drainage layout, including manhole covers not located by topographical survey, may be taken from CCTV chainage and will be shown as indicative only.

Electricity

Elec cables will have been predominantly located using EML methodology with electronically derived depths shown. GPR techniques will be employed to achieve greater quality levels as required.

British Telecoms

BT cables will have been predominantly located using EML methodology with electronically derived depths shown. GPR techniques will be employed to achieve greater quality levels as required. Due to current laws and legislation protecting all BT apparatus, cabling can only be located remotely. We therefore compare all our telecom findings against record information to produce the final service layout. In some instances, where high amount of cable ducts are present, we may only be able to identify a linear centre peak signal rather than identifying all the individual duct positions. For further information regarding Telecoms apparatus, please contact Openreach directly.

Cable TV & Communications

CTV and/or Com cables will have been predominantly located using EML methodology with electronically derived depths shown. GPR techniques will be employed to achieve greater quality levels as required.

Fibre Optic

FO cables will have been predominantly located using GPR methodology. This is due to the materials used within fibre optic cabling. In some rare instances, tracer cabling or conductible non fibre optic cabling will be present within some or all ducting. When this is the case, both EML and GPR methodology will be combined to identify service network and achieve greater quality levels.

Lighting, Traffic Signal & Security Cables

LC, TS and/or Sec cables will have been predominantly located using EML methodology with electronically derived depths shown. GPR techniques will be employed to achieve greater quality levels as required.

Gas & Water Inc. Fuel Pipes and Hot Water Pipes

GM/GS and/or WM/WS pipe work will have been attempted and located using both EML & GPR methodology with electronically derived depths shown for the former and depths to crown levels shown for the latter.
When the Gas/Water pipe work is constructed using conductible materials, then we are able to to employ multiple geophysical techniques to identify service network and achieve greater quality levels. When a non conductible material is used, GPR methodology will be employed to locate and plot the final service layout.

Ground Penetrating Radar

GPR methodology is used to identify and locate all non metallic, non conductible piping and cabling. We also employ GPR to obtain a greater accuracy levels on EML located services. The GPR has a greater success rate on pipe or service diameter upward of Ø63mm,C63mm, as size increments increase, so does the chance of detection. The GPR can produces varying results and as such, wouldn't be used as an independent utility surveying instrument.

Unidentified Traces

All UITs will have been predominantly located using EML methodology with electronically derived depths shown. GPR techniques will be employed to achieve greater quality levels as required. Every effort has been made to identify the service but in this instance, is not achievable. We recommend excavation work to determine identity and depth where applicable.

Scarring (QL-C)

Scarring has been identified on site with a potential of an undetectable service present.

Assumed Routes & Taken from Records (QL-B4/D)

Assumed routes (AR) are shown if there is evidence that a service exists but we are unable to trace it whilst on site. The surveyor will attempt to locate various risers/ics/valves/meters (service evidence) etc. around site area to successfully determine an assumed route between these points. If there is little evidence on site but they believe a service is still present, then a common sense approach to an assumed route shall be employed.

Taken from records (TFR) are service routes that are taken from STAT record plans or previous survey information and overlaid onto our drawings.

UTILITIES & UNDERGROUND INVESTIGATIONS

ABBREVIATIONS & SYMBOLS

1D 5C	1 Duct 5 Cables	DCr	Depth To Crown	RBC	Rectangular Brick Chamber
Ø	Diameter	DI	Depth To Invert	RCC	Rectangular Conc Chamber
AC	Audible Connection	DS	Depth To Silt	RE	Rodding Eye
AG	Above Ground	DTB	Depth To Base	SA	Survey Abandoned
AR	Assumed Route	DTW	Depth To Water	SL	Silt Level
BL	Base Level	DTS	Depth To Surcharge	SuL	Surcharge Level
CB	Concrete Benching	EBD	External Backdrop	TFR	Taken From Records
CBC	Circular Brick Chamber	EOT	End Of Trace ⟶	UTC	Unable To CCTV
CCC	Circular Conc Chamber	IBD	Internal Backdrop	UTDO	Unable To Determine Outfall
CL	Cover Level	IL	Invert Level	UTL	Unable To Lift
CPC	Circ Plastic Chamber	OH	Overhead	UTS	Unable To Survey
CrL	Crown Level	PDR	Poor Depth Response	UTT	Unable To Trace
CU	Camera Under Water ⟶	RB ●	Rest Bend	WL	Water Level

BT	BT CABLE(S)
O/BT	OVERHEAD BT CABLE(S)
COM	COMMUNICATIONS CABLE(S)
CTV	CABLE TV CABLE(S)
DUCT	EMPTY DUCT
E	ELECTRIC CABLE(S)
O/E	OVERHEAD ELECTRIC CABLE(S)
FO	FIBREOPTIC CABLE(S)
FUEL	FUEL PIPE(S)
GM	GAS MAIN
GS	GAS SERVICE
GPR	GROUND PENETRATING RADAR (GPR) TRACE
HW	HOT WATER PIPE
LC	LIGHTING CIRCUIT
OIL	OIL PIPE(S)
SCAR	VISIBLE SCARRING
SEC	SECURITY CABLING
TC	TELECOM CABLE(S)
TS	TRAFFIC SIGNAL
UIS	UNIDENTIFIED SERVICE
UIT	UNIDENTIFIED TRACE
WM	WATER MAIN
WS	WATER SERVICE
CW	COMBINED SEWER
CW RM	COMBINED WATER RISING MAIN
EW	EFFLUENT WATER
	FOUL SEWER
FW RM	FOUL WATER RISING MAIN
RM	RISING MAIN
	SURFACE WATER SEWER
SW RM	SURFACE WATER RISING MAIN
	INVESTIGATION EXTENTS

Note:	UTILITIES COMMENT BOX (GENERAL NOTES)
d0.37m	DEPTH TO SERVICE
??-AC	AUDIBLE CONNECTION
??-AG	SERVICE ABOVE GROUND
??-CU	CAMERA UNDER WATER
??-OH	SERVICE OVERHEAD

N
NORTH
Indicative

DRAWING NOTES

All below ground details shown have been identified from above ground without excavation. Survey Solution use electro-magnetic and/or ground penetrating radar (GPR) methods to investigate for underground utilities, services and features. Results using these methods are not infallible and we recommend trial excavations are carried out for verification of positions, depths and identification.

Any areas on the drawing where services or features have not been shown are not necessarily clear of services or features but are an indication that no items have been identified during our investigations. All reasonable care and normal good practice should still be employed during design and construction processes.

Certain types of services such as plastic or concrete pipes, some conduit and ducting where direct access can not be achieved for tracing may not be shown and alternative locating methods should be used.

Survey Solutions has used all reasonable care to research available service records but the completeness or use of the service records supplied to or by Survey Solutions cannot be guaranteed. Therefore Survey Solutions cannot be held responsible for any features annotated as 'taken from records' (TFR).

Depths obtained using electro-magnetic or GPR are effected by ground conditions and should be treated as indicative only. Electro-magnetic depths to utilities and services are generally taken to the centre of a feature, GPR depths to the top of a feature and drainage depth shown to inverts, unless otherwise indicated.

Drainage pipe sizes will be obtained without entering the chamber and therefore should be treated as approximate. Pipe dimensions which have not been obtained visually will be taken from records when available.

All services, drainage and utilities routes are assumed straight between access points, unless otherwise stated. The numbers of cables in runs will not be shown unless specifically requested. All services are below ground unless indicated.

Services, utilities and features may not have been surveyed if obstructed or not reasonably visible or accessible at the time of survey.

Survey Solutions accept no responsibility for the completeness or accuracy of either the topographical survey or base mapping on this project.

All critical dimensions and measurements should be checked and verified with any errors or discrepancies notified to Survey Solutions immediately. The accuracy of the digital data is the same as the plotting scale implies. All dimensions are in metres unless otherwise stated.

The contractor must check and verify all site and building dimensions, levels, utilities and drainage details and connections prior to commencing work.

Do not scale from this drawing.

DESKTOP UTILITY RECORDS (PAS 128: 2014 SURVEY TYPE D)
PREREQUISITE FOR PAS 128: 2014 SURVEY TYPE B
COMMISSIONED: NO

UTILITY	AVAILABILITY	UTILITY COMPANY PROVIDER
SEWER	NO	N/A
WATER MAIN	NO	N/A
GAS MAIN	NO	N/A
TELECOM	PUBLIC	BRITISH TELECOMS
CABLE TV	NO	N/A
ELECTRICITY	NO	N/A
OIL PIPES	NO	N/A
OTHER	NO	N/A

REV	DESCRIPTION	DRAWN	APPR	DATE

SURVEY SOLUTIONS

LAND SURVEYING
BUILDING SURVEYING
UNDERGROUND SURVEYING
SITE ENGINEERING
MONITORING

0845 040 5969
survey-solutions.co.uk

IPSWICH BEDFORD COVENTRY GLASGOW LONDON MANCHESTER NORWICH
NOTTINGHAM YEOVIL

PROJECT TITLE HIGHGATE CEMETERY, SWAINS LANE, LONDON, N6 6PJ.				
DRAWING DETAIL UTILITIES AND DRAINAGE SURVEY. SHEET 6 OF 8				
CLIENT STEENSEN VARMING				SCALE 1:250
SURVEYOR LJT	SURVEY DATE 20/10/2021	CHECKED BY JAB	APPROVED BY GSB	DWG STATUS FINAL
DRAWING NUMBER 32482BWUG-06			REVISION	ISSUE DATE 28/10/2021

RICS chartered ICES THE SURVEY ASSOCIATION ISO 9001 REGISTERED FIRM QMS ISO 14001 : 2015 REGISTERED

GENERAL SYNOPSIS

This survey has been carried out in accordance with PAS 128: 2014 & our version of the Royal Institution of Chartered Surveyors (RICS) specification for Measured Surveys of Land, Buildings and Utilities. Our survey extents have been agreed and confirmed with formal acceptance of 32482BWUG-01 from STEENSEN VARMING. If you have any queries regarding the final services layout, please may we ask you to carefully read all the information within this title block in its entirety before continuing to do so.

TOPOGRAPHICAL/.DWG DRAWING INFORMATION
TOPOGRAPHICAL SURVEY DATE 04/2018

SURVEY TYPE	DESCRIPTION	EFFECT ON SURVEY RESULTS
TOPO	ATLANTIC GEOMATICS	ALL COVERS AND STREET FURNITURE ADDED
OUTDATED		BY SURVEY SOLUTIONS AS APPROXIMATE
OS		POSITION.
NTS		

GENERAL SITE CONDITIONS
BELOW AVERAGE

ADDITIONAL INFORMATION	EFFECT ON SURVEY RESULTS
GRAVESTONES AND UNEVEN GROUND.	SURVEYED WHERE POSSIBLE IN PATHS

SURVEY RECOMMENDATIONS

LIST RECOMMENDATIONS TO IMPROVE SURVEY DATA

Due to the geophysical nature of subsurface technology, we always recommend excavation works to be carried out for verification, especially within critical areas.

We would suggest an up to date, more detailed and comprehensive topographical survey.

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DETECTION METHOD
IN ACCORDANCE WITH PAS 128: 2014 SURVEY TYPE B

DRAINAGE SURVEY
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Elec cables will have been predominantly located using EML methodology with electronically derived depths shown. GPR techniques will be employed to achieve greater quality levels as required.

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Ground Penetrating Radar
GPR methodology is used to identify and locate all non metallic, non conductible piping and cabling. We also employ GPR to obtain a greater accuracy levels on EML located services. The GPR has a greater success rate on pipe or service diameter upward of Ø63mm,C63mm, as size increments increase, so does the chance of detection. The GPR can produces varying results and as such, wouldn't be used as an independent utility surveying instrument.

Unidentified Traces
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Scarring (QL-C)
Scarring has been identified on site with a potential of an undetectable service present.

Assumed Routes & Taken from Records (QL-B4/D)
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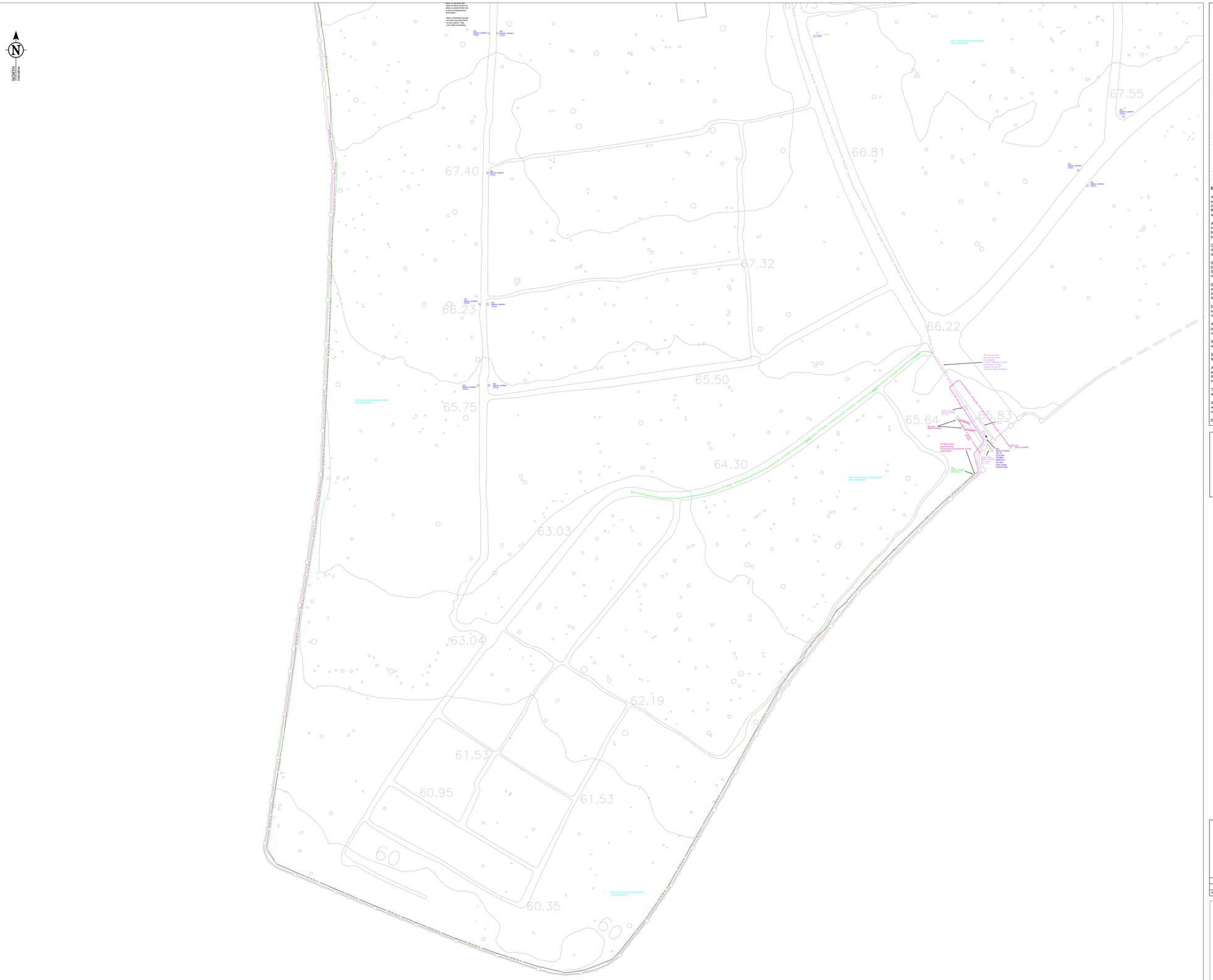
Taken from records (TFR) are service routes that are taken from STAT record plans or previous survey information and overlaid onto our drawings.



UTILITIES & UNDERGROUND INVESTIGATIONS

ABBREVIATIONS & SYMBOLS

1D 5C	1 Duct 5 Cables	DCr	Depth To Crown	RBC	Rectangular Brick Chamber
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CrL	Crown Level	PDR	Poor Depth Response	UTT	Unable To Trace
CU	Camera Under Water →	RB ●	Rest Bend	WL	Water Level

BT	BT CABLE(S)
O/BT	OVERHEAD BT CABLE(S)
COM	COMMUNICATIONS CABLE(S)
CTV	CABLE TV CABLE(S)
DUCT	EMPTY DUCT
E	ELECTRIC CABLE(S)
O/E	OVERHEAD ELECTRIC CABLE(S)
FO	FIBREOPTIC CABLE(S)
FUEL	FUEL PIPE(S)
GM	GAS MAIN
GS	GAS SERVICE
GPR	GROUND PENETRATING RADAR (GPR) TRACE
HW	HOT WATER PIPE
LC	LIGHTING CIRCUIT
OIL	OIL PIPE(S)
SCAR	VISIBLE SCARRING
SEC	SECURITY CABLING
TC	TELECOM CABLE(S)
TS	TRAFFIC SIGNAL
UIS	UNIDENTIFIED SERVICE
UIT	UNIDENTIFIED TRACE
WM	WATER MAIN
WS	WATER SERVICE
CW	COMBINED SEWER
CW RM	COMBINED WATER RISING MAIN
EW	EFFLUENT WATER
	FOUL SEWER
FW RM	FOUL WATER RISING MAIN
RM	RISING MAIN
	SURFACE WATER SEWER
SW RM	SURFACE WATER RISING MAIN
	INVESTIGATION EXTENTS

Note:	UTILITIES COMMENT BOX (GENERAL NOTES)
d0.37m	DEPTH TO SERVICE
??-AC	AUDIBLE CONNECTION
??-AG	SERVICE ABOVE GROUND
??-CU	CAMERA UNDER WATER
??-OH	SERVICE OVERHEAD

NORTH
Indicative

DRAWING NOTES

All below ground details shown have been identified from above ground without excavation. Survey Solution use electro-magnetic and/or ground penetrating radar (GPR) methods to investigate for underground utilities, services and features. Results using these methods are not infallible and we recommend trial excavations are carried out for verification of positions, depths and identification.

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Depths obtained using electro-magnetic or GPR are effected by ground conditions and should be treated as indicative only. Electro-magnetic depths to utilities and services are generally taken to the centre of a feature, GPR depths to the top of a feature and drainage depth shown to inverts, unless otherwise indicated.

Drainage pipe sizes will be obtained without entering the chamber and therefore should be treated as approximate. Pipe dimensions which have not been obtained visually will be taken from records when available.

All services, drainage and utilities routes are assumed straight between access points, unless otherwise stated. The numbers of cables in runs will not be shown unless specifically requested. All services are below ground unless indicated.

Services, utilities and features may not have been surveyed if obstructed or not reasonably visible or accessible at the time of survey.

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All critical dimensions and measurements should be checked and verified with any errors or discrepancies notified to Survey Solutions immediately. The accuracy of the digital data is the same as the plotting scale implies. All dimensions are in metres unless otherwise stated.

The contractor must check and verify all site and building dimensions, levels, utilities and drainage details and connections prior to commencing work.

Do not scale from this drawing.

DESKTOP UTILITY RECORDS (PAS 128: 2014 SURVEY TYPE D)
PREREQUISITE FOR PAS 128: 2014 SURVEY TYPE B
COMMISSIONED: NO

UTILITY	AVAILABILITY	UTILITY COMPANY PROVIDER
SEWER	NO	N/A
WATER MAIN	NO	N/A
GAS MAIN	NO	N/A
TELECOM	PUBLIC	BRITISH TELECOMS
CABLE TV	NO	N/A
ELECTRICITY	NO	N/A
OIL PIPES	NO	N/A
OTHER	NO	N/A

REV	DESCRIPTION	DRAWN	APPR	DATE

SURVEY SOLUTIONS

LAND SURVEYING
BUILDING SURVEYING
UNDERGROUND SURVEYING
SITE ENGINEERING
MONITORING

0845 040 5969
survey-solutions.co.uk

IPSWICH BEDFORD COVENTRY GLASGOW LONDON MANCHESTER NORWICH
NOTTINGHAM YEOVIL

PROJECT TITLE HIGHGATE CEMETERY, SWAINS LANE, LONDON, N6 6PJ.				
DRAWING DETAIL UTILITIES AND DRAINAGE SURVEY. SHEET 7 OF 8				
CLIENT STEENSEN VARMING				SCALE 1:250
SURVEYOR LJT	SURVEY DATE 20/10/2021	CHECKED BY JAB	APPROVED BY GSB	DWG STATUS FINAL
DRAWING NUMBER 32482BWUG-07			REVISION	ISSUE DATE 28/10/2021

RICS chartered ICES THE SURVEY ASSOCIATION ISO 9001 REGISTERED FIRM QMS ISO 14001 : 2015 REGISTERED

Original Sheet Size A0H

GENERAL SYNOPSIS

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TOPOGRAPHICAL/.DWG DRAWING INFORMATION

TOPOGRAPHICAL SURVEY DATE 04/2018

SURVEY TYPE	DESCRIPTION	EFFECT ON SURVEY RESULTS
TOPO	ATLANTIC GEOMATICS	ALL COVERS AND STREET FURNITURE ADDED
OUTDATED		BY SURVEY SOLUTIONS AS APPROXIMATE
OS		POSITION.
NTS		

GENERAL SITE CONDITIONS

BELOW AVERAGE

ADDITIONAL INFORMATION	EFFECT ON SURVEY RESULTS
GRAVESTONES AND UNEVEN GROUND.	SURVEYED WHERE POSSIBLE IN PATHS

SURVEY RECOMMENDATIONS

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DETECTION METHOD

IN ACCORDANCE WITH PAS 128: 2014 SURVEY TYPE B

DRAINAGE SURVEY

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Assumed routes (AR) are shown if there is evidence that a service exists but we are unable to trace it whilst on site. The surveyor will attempt to locate various risers/ics/valves/meters (service evidence) etc. around site area to successfully determine an assumed route between these points. If there is little evidence on site but they believe a service is still present, then a common sense approach to an assumed route shall be employed.

Taken from records (TFR) are service routes that are taken from STAT record plans or previous survey information and overlaid onto our drawings.

UTILITIES & UNDERGROUND INVESTIGATIONS

ABBREVIATIONS & SYMBOLS

1D 5C	1 Duct 5 Cables	DCr	Depth To Crown	RBC	Rectangular Brick Chamber
Ø	Diameter	DI	Depth To Invert	RCC	Rectangular Conc Chamber
AC	Audible Connection	DS	Depth To Silt	RE	Rodding Eye
AG	Above Ground	DTB	Depth To Base	SA	Survey Abandoned
AR	Assumed Route	DTW	Depth To Water	SL	Silt Level
BL	Base Level	DTS	Depth To Surcharge	SuL	Surcharge Level
CB	Concrete Benching	EBD	External Backdrop	TFR	Taken From Records
CBC	Circular Brick Chamber	EOT	End Of Trace ⟶	UTC	Unable To CCTV
CCC	Circular Conc Chamber	IBD	Internal Backdrop	UTDO	Unable To Determine Outfall
CL	Cover Level	IL	Invert Level	UTL	Unable To Lift
CPC	Circ Plastic Chamber	OH	Overhead	UTS	Unable To Survey
CrL	Crown Level	PDR	Poor Depth Response	UTT	Unable To Trace
CU	Camera Under Water ⟶	RB ●	Rest Bend	WL	Water Level

BT	BT CABLE(S)
O/BT	OVERHEAD BT CABLE(S)
COM	COMMUNICATIONS CABLE(S)
CTV	CABLE TV CABLE(S)
DUCT	EMPTY DUCT
E	ELECTRIC CABLE(S)
O/E	OVERHEAD ELECTRIC CABLE(S)
FO	FIBREOPTIC CABLE(S)
FUEL	FUEL PIPE(S)
GM	GAS MAIN
GS	GAS SERVICE
GPR	GROUND PENETRATING RADAR (GPR) TRACE
HW	HOT WATER PIPE
LC	LIGHTING CIRCUIT
OIL	OIL PIPE(S)
SCAR	VISIBLE SCARRING
SEC	SECURITY CABLING
TC	TELECOM CABLE(S)
TS	TRAFFIC SIGNAL
UIS	UNIDENTIFIED SERVICE
UIT	UNIDENTIFIED TRACE
WM	WATER MAIN
WS	WATER SERVICE
CW	COMBINED SEWER
CW RM	COMBINED WATER RISING MAIN
EW	EFFLUENT WATER
	FOUL SEWER
FW RM	FOUL WATER RISING MAIN
RM	RISING MAIN
	SURFACE WATER SEWER
SW RM	SURFACE WATER RISING MAIN
	INVESTIGATION EXTENTS

NORTH
Indicative

Note:	UTILITIES COMMENT BOX (GENERAL NOTES)
d0.37m	DEPTH TO SERVICE
??-AC	AUDIBLE CONNECTION
??-AG	SERVICE ABOVE GROUND
??-CU	CAMERA UNDER WATER
??-OH	SERVICE OVERHEAD

DRAWING NOTES

All below ground details shown have been identified from above ground without excavation. Survey Solution use electro-magnetic and/or ground penetrating radar (GPR) methods to investigate for underground utilities, services and features. Results using these methods are not infallible and we recommend trial excavations are carried out for verification of positions, depths and identification.

Any areas on the drawing where services or features have not been shown are not necessarily clear of services or features but are an indication that no items have been identified during our investigations. All reasonable care and normal good practice should still be employed during design and construction processes.

Certain types of services such as plastic or concrete pipes, some conduit and ducting where direct access can not be achieved for tracing may not be shown and alternative locating methods should be used.

Survey Solutions has used all reasonable care to research available service records but the completeness or use of the service records supplied to or by Survey Solutions cannot be guaranteed. Therefore Survey Solutions cannot be held responsible for any features annotated as 'taken from records' (TFR).

Depths obtained using electro-magnetic or GPR are effected by ground conditions and should be treated as indicative only. Electro-magnetic depths to utilities and services are generally taken to the centre of a feature, GPR depths to the top of a feature and drainage depth shown to inverts, unless otherwise indicated.

Drainage pipe sizes will be obtained without entering the chamber and therefore should be treated as approximate. Pipe dimensions which have not been obtained visually will be taken from records when available.

All services, drainage and utilities routes are assumed straight between access points, unless otherwise stated. The numbers of cables in runs will not be shown unless specifically requested. All services are below ground unless indicated.

Services, utilities and features may not have been surveyed if obstructed or not reasonably visible or accessible at the time of survey.

Survey Solutions accept no responsibility for the completeness or accuracy of either the topographical survey or base mapping on this project.

All critical dimensions and measurements should be checked and verified with any errors or discrepancies notified to Survey Solutions immediately. The accuracy of the digital data is the same as the plotting scale implies. All dimensions are in metres unless otherwise stated.

The contractor must check and verify all site and building dimensions, levels, utilities and drainage details and connections prior to commencing work.

Do not scale from this drawing.

DESKTOP UTILITY RECORDS (PAS 128: 2014 SURVEY TYPE D)
PREREQUISITE FOR PAS 128: 2014 SURVEY TYPE B
COMMISSIONED: NO

UTILITY	AVAILABILITY	UTILITY COMPANY PROVIDER
SEWER	NO	N/A
WATER MAIN	NO	N/A
GAS MAIN	NO	N/A
TELECOM	PUBLIC	BRITISH TELECOMS
CABLE TV	NO	N/A
ELECTRICITY	NO	N/A
OIL PIPES	NO	N/A
OTHER	NO	N/A

REV	DESCRIPTION	DRAWN	APPR	DATE

SURVEY
SOLUTIONS

LAND SURVEYING
BUILDING SURVEYING
UNDERGROUND SURVEYING
SITE ENGINEERING
MONITORING

0845 040 5969
survey-solutions.co.uk

IPSWICH BEDFORD COVENTRY GLASGOW LONDON MANCHESTER NORWICH
NOTTINGHAM YEOVIL

PROJECT TITLE
HIGHGATE CEMETERY, SWAINS LANE,
LONDON, N6 6PJ.

DRAWING DETAIL
UTILITIES AND DRAINAGE SURVEY.
SHEET 8 OF 8

CLIENT				SCALE
STEENSEN VARMING				1:250
SURVEYOR	SURVEY DATE	CHECKED BY	APPROVED BY	DWG STATUS
LJT	20/10/2021	JAB	GSB	FINAL
DRAWING NUMBER			REVISION	ISSUE DATE
32482BWUG-08				28/10/2021

THE GENERAL CONTRACTOR IS TO CHECK ALL DIMENSIONS AND NOTIFY THE DESIGNERS OF ANY DISCREPANCIES OR OMISSIONS.

Symbols Key	
Preview	Block Name
	Not Surveyed
	Pumped Run
	Foul Drain
	Storm/ Grey Water Drain
	Gully
	Manhole
	RWP
	Acco Drain
	SVP
SA	Survey Abandoned
	Direction of Flow
	Water Main

West Cemetery

East Cemetery

LANGBOURNE AVENUE
MAKEPEACE AVENUE
HILLWAY
SWAIN'S LANE
CHESTER ROAD
CROFTDOWN ROAD
TRAM STREET
HIGHGATE HILL

DATE REVISIONS

Drainage & Asbestos
Kent Drainage Limited Unit 10,St Laurence Avenue 20/20 Industrial Estate Maidstone,Kent.ME16 0LL
TEL. 01622 919012 :

CLIENT

PROJECT
Highgate Cemetery
Swain's Ln
London
N6 6PJ

TITLE
Drainage Survey

SCALE Indicative Only - Not To Scale

DATE 20/03/2024 DRAWN SHP

DRG No. Highate Cemetary REV. 0

1

MH23
87
86
110VC
91
92
Suspected run for
RW Gullies
MH
Buried
152 Brick
88
MH24
152 Brick
600VC
600VC
Capped
110PVC
89
90

MH11
IL 570mm
110PVC
110PVC
MH12
MH14
IL 680mm
110VC
MH13
Burried
110VC
110VC
110VC
110VC
37
36
110PVC
35
110PVC
34
110PVC
33

Trap
32
382VC
31
110PVC
MH10
IL 800mm
110VC_B
110VC
110VC
WC
C

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2

MH4
Burried

110PVC

SA

300 Brick

MH3
IL 1.0m

SA

SA

SA

150 Brick

SA

B
C
D
E

MH5
IL 1.0m

A

225

300 Concrete

26

UTL

MH6
IL 1.6m

300 Concrete

27

SA

300 Concrete

B

MHF

110PVC

A

SA

28

300 Concrete

29

30

MH8
IL 1.5m

400 Concrete

Unknown
Chamber

SWAIN'S LANE

Symbols Key

Preview	Block Name
	Not Surveyed
	Pumped Run
	Foul Drain
	Storm/ Grey Water Drain
	Gully
	Manhole
	RWP
	Acco Drain
	SVP
SA	Survey Abandoned
	Direction of Flow
	Water Main

DATE | REVISIONS

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	Gully
	Manhole
	RWP
	Acco Drain
	SVP
SA	Survey Abandoned
	Direction of Flow
	Water Main

3

2

3

110PVC

110PVC

1

MH
On Church Grounds

152Cast

MH1
IL 5.5m

B

MH2
IL 520mm

A 110PVC

4

WM

5

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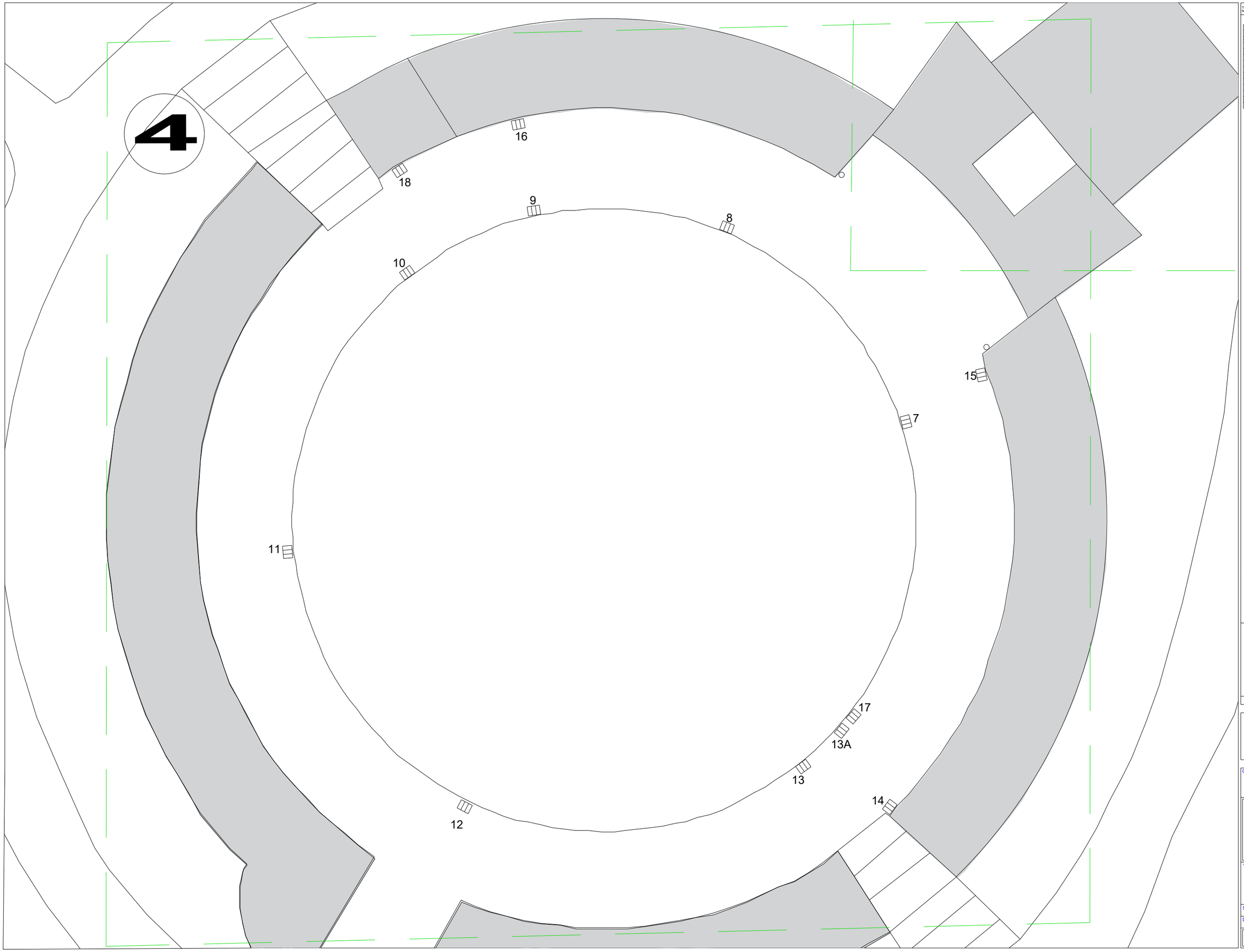

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	Gully
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	RWP
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SA	Survey Abandoned
	Direction of Flow
	Water Main

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	Gully
	Manhole
	RWP
	Acco Drain
	SVP
SA	Survey Abandoned
	Direction of Flow
	Water Main

5

110PVC

MH9
IL 600mm

SA

110PVC

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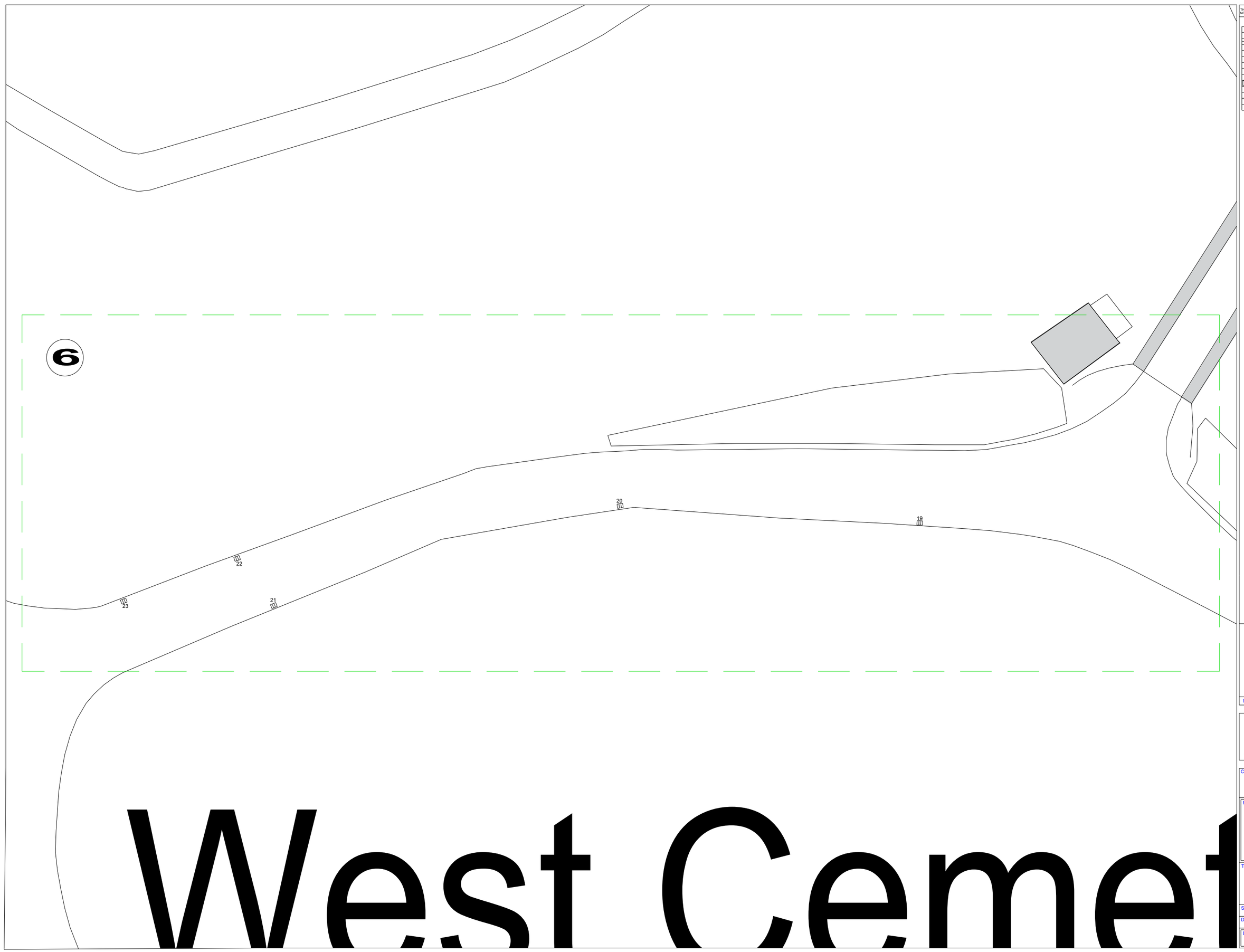
	SVP
SA	Survey Abandoned
	Direction of Flow
	Water Main



West Cemet

DATE REVISIONS

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	Gully
	Manhole
	RWP
	Acco Drain
	SVP
SA	Survey Abandoned
	Direction of Flow
(ww)	Water Main

7

MH
In Road

110PVC

MH19
IL 800mm

110PVC

Reducer

SA

110VC

110PVC

Showers

MH21

110PVC

W/C

SA

152VC

MH18
IL 420mm

W/C

110PVC

SA

110VC

110PVC

110PVC

MH17
IL 400mm

110PVC

MH18
IL 430mm

MH15

152VC

SA

38

39

40

WM

85

Unknown Chamber

SA

110VC

SA

225VC

MH20
IL 3.3m

225VC

MH
Burried

61

62

63

Drainage & Asbestos
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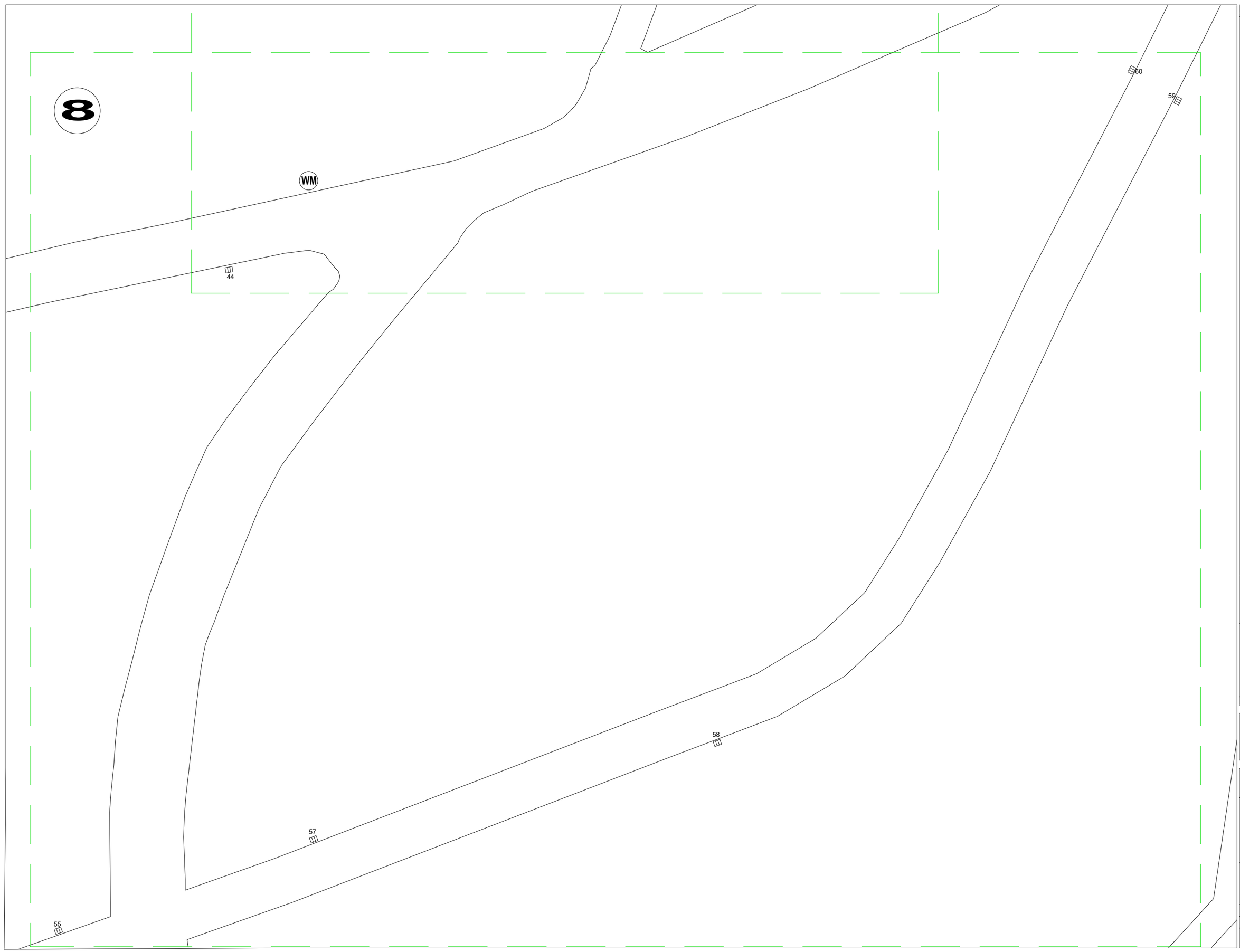

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	SVP
SA	Survey Abandoned
	Direction of Flow
WM	Water Main

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	SVP
SA	Survey Abandoned
	Direction of Flow
WM	Water Main

9

43

WM

44

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	Acco Drain
	SVP
SA	Survey Abandoned
	Direction of Flow
	Water Main

10

69

68

67

66

65

64

84

DATE REVISIONS

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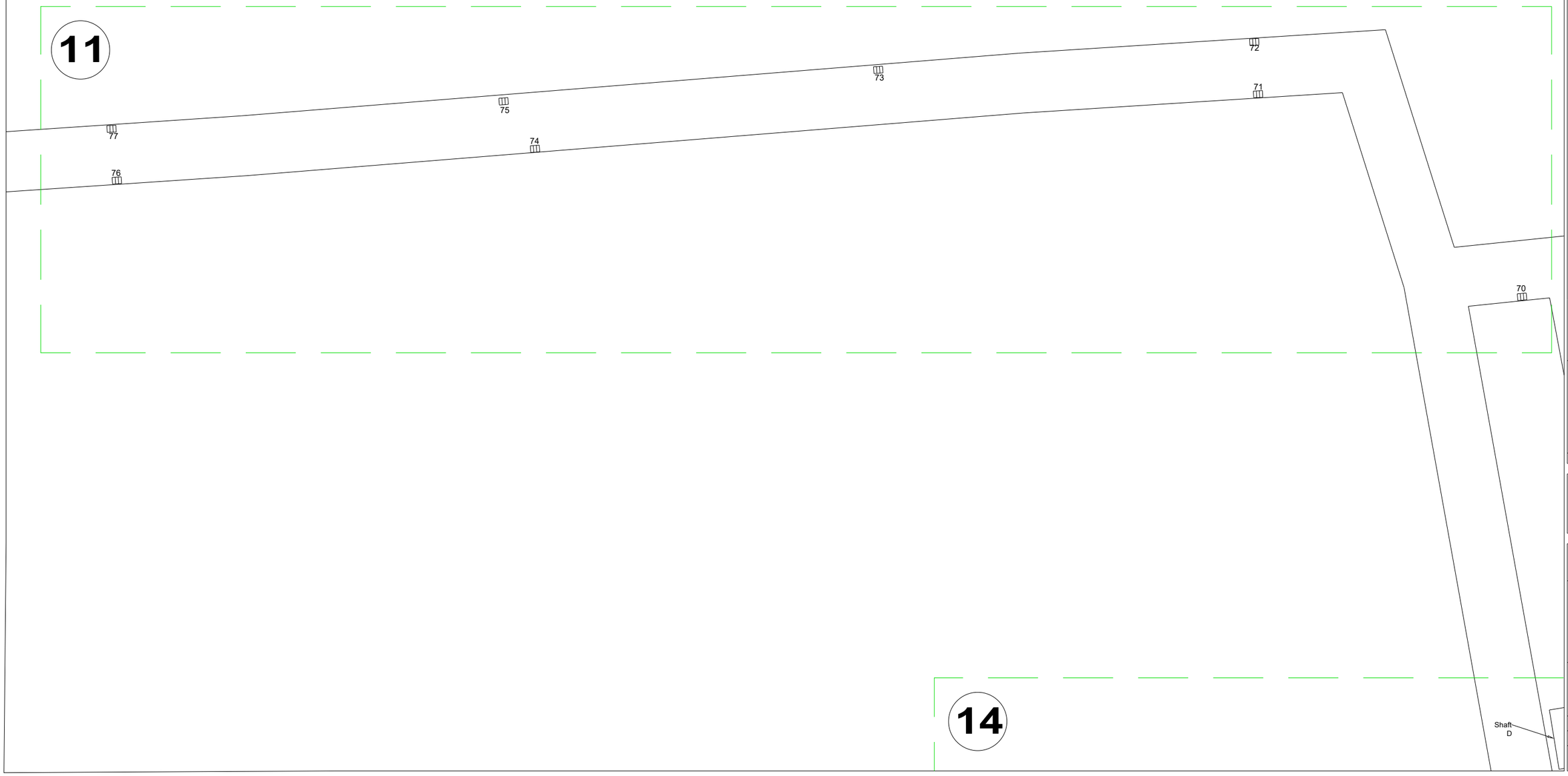
SA	Survey Abandoned
	Direction of Flow
	Water Main



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Symbols Key	
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	Acco Drain
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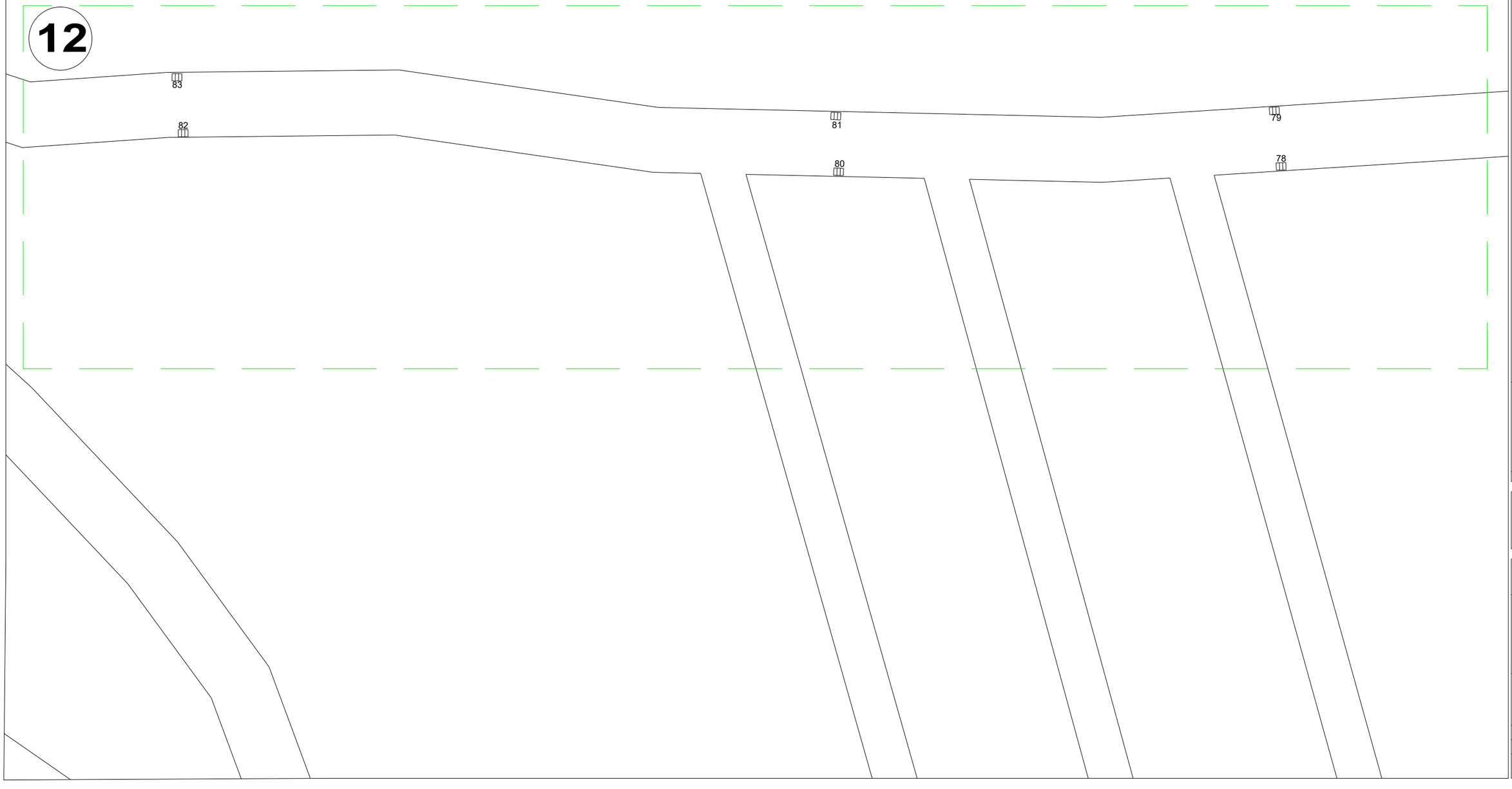
SA	Survey Abandoned
	Direction of Flow
	Water Main



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13

WM

47

48

49

50

51

52

53

SA

MH22

225mm

110VC

225mm

SA

SA

Symbols Key	
Preview	Block Name
	Not Surveyed
	Pumped Run
	Foul Drain
	Storm/ Grey Water Drain
	Gully
	Manhole
	RWP
	Acco Drain
	SVP
SA	Survey Abandoned
	Direction of Flow
WM	Water Main

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DRG No. Highate Cemetary REV. 0

14

Shaft
D

56

WM

56

54

East Cer

THE GENERAL CONTRACTOR IS TO CHECK ALL DIMENSIONS AND NOTIFY THE DESIGNERS OF ANY DISCREPANCIES OR OMISSIONS.

Symbols Key	
Preview	Block Name
	Not Surveyed
	Pumped Run
	Foul Drain
	Storm/ Grey Water Drain
	Gully
	Manhole
	RWP
	Acco Drain
	SVP
SA	Survey Abandoned
	Direction of Flow
(W)	Water Main

DATE REVISIONS

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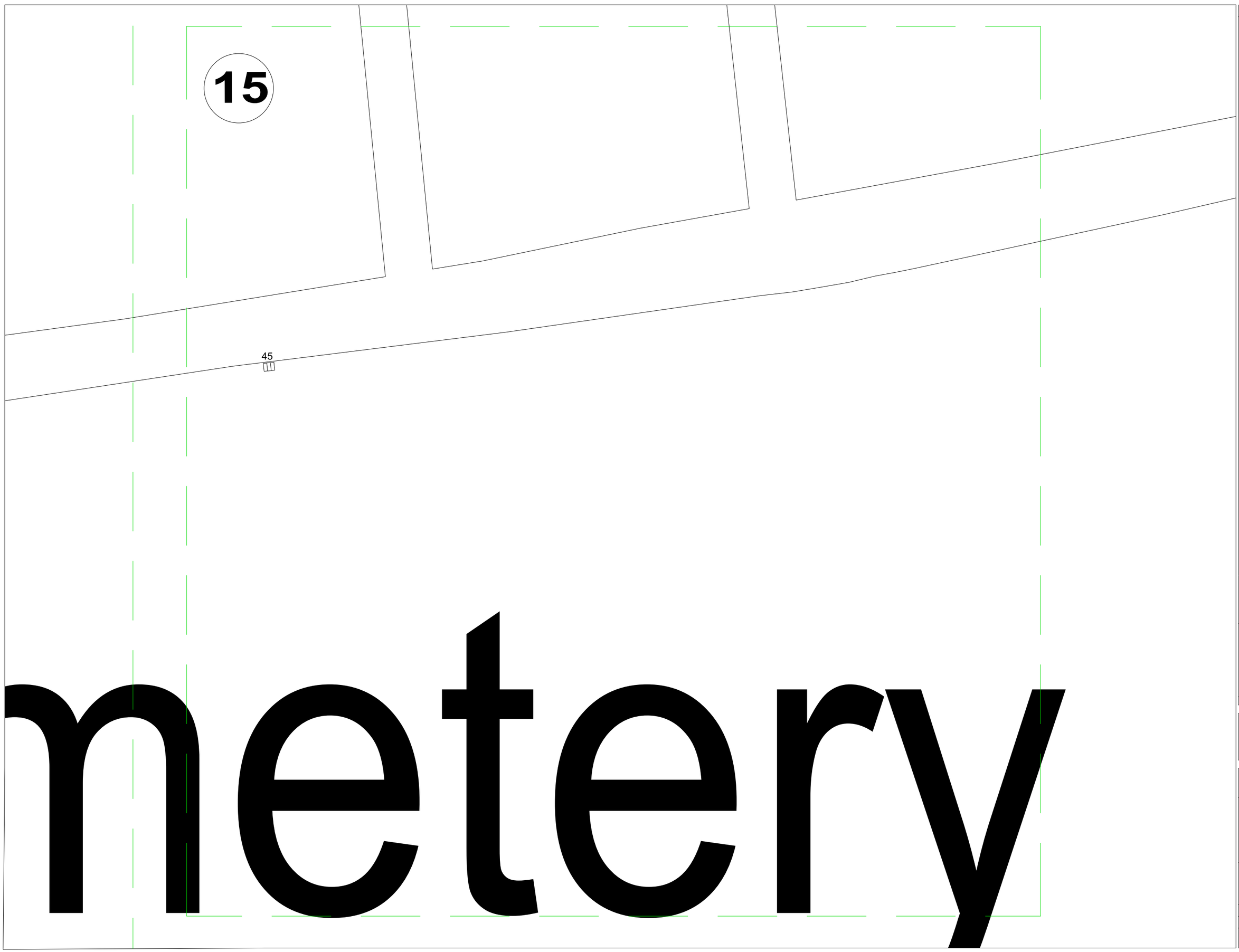

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	Water Main

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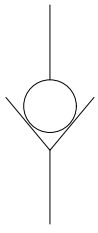
ey
Block Name
Blocked Drain
Combined Drain
Foul Drain
Storm Drain
Direction of Flow
Gully
Manhole
RWP
Road Gully
Rodding Eye

Symbols Key	
Preview	Block Name
	Blocked Drain
	Combined Drain
	Foul Drain
	Storm/ Grey Water Drain
	Gully
	Manhole
	RWP
	Road Gully
	Rodding Eye
	SVP
	Tank
	Direction of Flow



MH_Ref-FW 1
AS_IL-10.000

Key		
Manhole	Lateral No.	**Fowl (F). Storm (S)Combined (C)**

A-squared Studio

A-squared Studio Engineers Ltd
One Westminster Bridge Rd
London, SE1 7XW

020 7620 2868
contact@a2-studio.com
www.a2-studio.com