Pentavia, Mill Hill

London NW7 2ET

Utilities Assessment

Date: 22/03/19

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Site Name	Pentavia Mill
Project Number	716
Client	Long and Partners
Author	Ryan Bell
Date	30/01/15
Revision	1
PAS 128 Survey Level	M1P

Contents

Section 1: Survey Details

Site Address	Watford Way Mill Hill London			
Survey Dates	14/01/15 – 16/01/15 19/01/14 – 23/01/15			
Senior Surveyor	Ryan Bell			
Survey Team	Katherine Fawcett	Oliver Pierson		
GPR & EM Equipment Used	RD7000 and RD8000 locators with TX10 Transmitters. Tracer wires and cable clamps were used along with the EM transmitters where applicable.			
	MALA GroundExplorer GPR system			
Site Underlying Soils Type	Slightly acid loamy and clayey soils with impeded drainage			
Weather Conditions	Dry and bright			
Scope of Works	Carry out a utility survey of the excising retail park all of which will be indicated on the drawings in Appendix B both of which where agreed by the client.			

Section 2: Survey methodology

The brief was to locate and trace utilities in the required survey area shown in Appendix D of this document.

The site was surveyed using the trace and grid methods. Firstly all identifiable and visible services were traced with either electromagnetic or GPR methods as appropriate. All accessible chambers are lifted by either manual or mechanical means. Accessible ducts and pipes are located with either a sonde or tracer wire as appropriate. A collection of survey methods is used to provide the best possible result. Depths obtained using geophysical and electromagnetic techniques are affected by ground conditions therefore must be viewed as indicative only. For individual trace quality assessments refer to survey metadata in Appendix A.

The site is then divided into a grid, the transect spacings of which are identified in PAS128:2014 for the level of survey being undertaken, and a sweep is carried out with electromagnetic passive and active methods and GPR to determine the possible locations of non visible and non identifiable services. It is assumed the all services are in straight lines between the grid points.

All radargram data is either interrogated on site or taken away for post processing depending on the level of survey being undertaken and a topographical survey is undertaken for the production of the survey drawing.

Utility identification was carried out via the following methods:

Visual Inspection – Identification from existing features

Existing Utility Plans – Identification from existing service plans as tabulated on submitted service drawings as contained within Appendix B

Where a potential utility could not be identified via either of these methods then they are marked as “Unknown EM” or “Unknown GPR” on the site survey drawing.

100% site coverage is neither offered or guaranteed in carrying out a utility survey. A PAS128:2014 survey Type A – Verification, would be required to achieve this.

Section 3: Survey Results

Every effort was made whilst carrying out the survey to map all known and unknown utilities within the survey area. However we would draw your attention to the following:

- A service indicated on the drawing does not necessarily mean a single service buried.
- A GPR trace could be a non utility object or series of individual buried objects.
- Non invasive survey techniques cannot be guaranteed.
- Trial excavations must be carried out to confirm all site service identification, positions and particularly depths prior to any design or excavations are carried out.
- Accuracy decreases with depth.

General restrictions of non invasive survey techniques:

EM:

- Pot ended and balanced cables and cables to plant using little electricity cannot be traced on passive location.
- Closely coupled services may not be able to be located separately without access for clamps, tracer wires or direct connection.
- Dead cables cut off with no earths and no connection availability cannot be traced.
- Buildings , metal fences and cars cause interference up to 0.5m away
- Non metallic pipes, fibre optic cables, empty ducts and drainage cannot be traced without access for a tracer wire within the service or duct.
- Metallic pipes without access for direct connection may not be traceable

GPR:

- GPR quality and penetration depth can be greatly affected by; soil type, soil moisture content, soil salt content, made up ground, surface type, surface condition and the presence of reinforcement.
- Metal fences, cars, overhead gantries and cables cause radargram interference.
- Dispersion from the top layer of identified services may mask the signals of deeper objects.

Survey Success: GPR

Maximum Penetration Depth	Quality Scale
1.1	4
Comments	

Key – Maximum depth is the depth in metres that the radar effectively penetrated. No GPR data is available below the effective penetration depth.

Quality Scale	GPR Quality Description
1. Good GPR data availability	All utility construction materials should be visible
2. Good to Medium	Some non metallic services may not be visible to radar
3. Medium	Some smaller metallic services may not be visible. Some non metallic services may not be visible
4. Medium to Poor	Some larger metallic services may not be visible. Non metallic services of all sizes may not reflect enough to be visible.
5. High levels of distortion and interference	Information proivided by GPR made very little of any material visible.

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Survey Success: EM

Survey Success Quality	2
Comments	

Quality Scale	EM Quality Description
1. Good EM data availability	All traceable conductors should be located
2. Good to Medium	Most traceable conductors should be located. Utility density may mean some individual services cannot be isolated
3. Medium to Poor	Medium to high conductor congestion where the isolation of some closely coupled services may not be possible. It should be assumed there are untraceable dead and cut off services in the locality. Known untraceable conductors may be present.
4. High levels of distortion and interference	Heavily congested areas where individual services may not be able to be isolated due to close proximity of many other conductors. Dead and cut off services may be present and untraceable

Abbreviations Used In Documentation

EOT – Trace lost. This is not necessarily the end of the traced target and all EOT locations on the site drawing should be investigated before any design or excavation work is carried out. A target labeled EOT may continue into critical work areas.

R – Service unable to be located and taken from available records. Depths for these are usually unavailable and locations approximate. These should be investigated before any design or excavation work is carried out.

A – Assumed line of utility. Where there is evidence of a utility and two points can be observed but it is unable to be traced an assumed line may be drawn on the site drawing. Depths would be unavailable for assumed lines and they should be investigated before any design or excavation work is carried out.

UTL – Unable to lift. This is where a chamber could not be lifted using either manual or mechanical means.

UTT – Unable to trace. This is used where there is evidence of a utility but it was unable to be located. All UTT services should be investigated before any design or excavation work is carried out.

d/u – Depth Unknown. Used where depth identification was not possible or non conclusive in the survey. All targets marked with this should be investigated before any design or excavation work is carried out.

Surveyors Site Notes

•The following surveyors notes should be read in conjunction with the site drawings contained in Appendix B of this document.
•All note numbers relate to the corresponding numbers on the drawings.

1	Due to compounds being occupied with plant and various items these areas will need a re visit to undertake a full utility survey when units become unoccupied.
2	Area is restricted due to dense vegetation.
3	Chambers were in excess of five meters deep therefore services have been taken from records.
4	From this point services are visible above ground.

Surveyors Conclusions	
Signature	

Every effort should be made to ensure this information is considered in conjunction with the existing survey drawings issued and the survey drawings contained within Appendix B. 100% coverage is neither guaranteed or offered. All persons carrying out excavations or design works should satisfy themselves of all service locations prior to commencement.

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Located Utility Summary

Utility	Present	Notes
Gas	Yes	
HV Electricity	Yes	
LV Electricity	Yes	
On Site/Private Electrics, Data etc	Yes	
Unknown GPR	Yes	
Unknown EM	Yes	
Water	Yes	
CCTV	No	
BT	Yes	
Cable	No	
Drainage	Yes	
Overhead	No	

Appendix A – Metadata

Project No	716
Site	Pentavia Mill Hill
Client	Meadow Partners
Survey Dates	

Survey Element Quality Table: Data taken from PAS 128:2014

		Positional Accuracy		
Quality	**Post- processing**	**Horizontal**	**Vertical**	**Criteria**
QL-D	-	Undefined	Undefined	Taken from records
QL-C	-	Undefined	Undefined	A segment of utility whose location is demonstrated by visual reference to street furniture, topographical features or evidence of previous street works (reinstatement scar) .
QL-B4	No	Undefined	Undefined	A utility shown on the drawing as assumed
QL-B3	No	+-500mm	Undefined No reliable measurement possible	Horizontal location only of the utility detected by one of the geophysical techniques used.
QL-B3P	Yes	+-500mm	Undefined No reliable measurement possible	Horizontal location only of the utility detected by one of the geophysical techniques used.
QL-B2	No	+-250mm or 40% of depth whichever is greater	+-40% of detected depth	Horizontal location only of the utility detected by one of the geophysical techniques used.
QL-B2P	Yes	+-250mm or 40% of depth whichever is greater	+-40% of detected depth	Horizontal location only of the utility detected by one of the geophysical techniques used.
QL-B1	No	+-150mm or 15% of detected depth whichever is greater	+-15% of detected depth	Horizontal location only of the utility detected by one of the geophysical techniques used.
QL-B1P	Yes	+-150mm or 15% of detected depth whichever is greater	+-15% of detected depth	Horizontal location only of the utility detected by one of the geophysical techniques used.

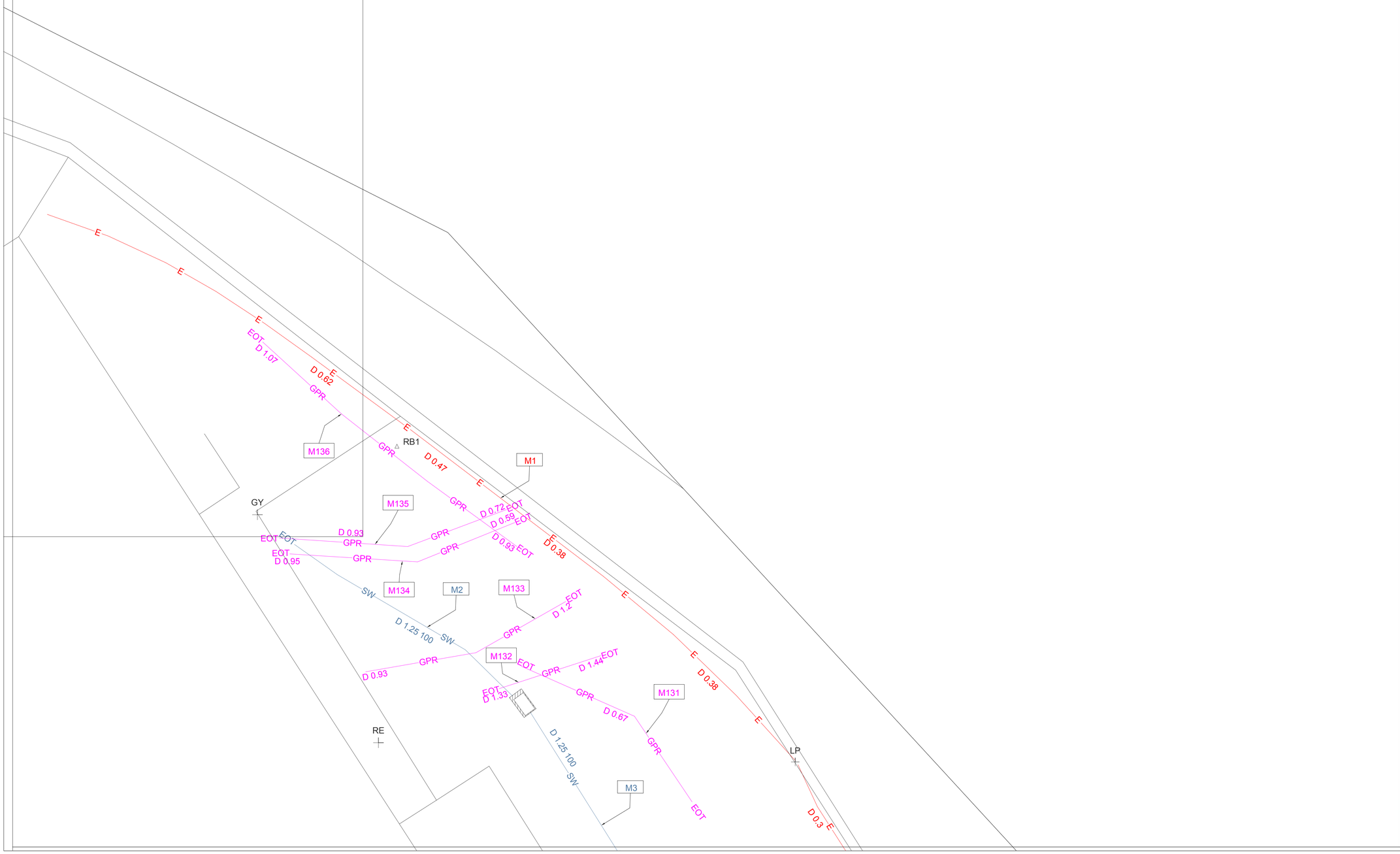
Abbreviations

HV – High Voltage	LP – Low Pressure	MP – Medium Pressure	HP – High Pressure	C – Concrete	MAT – Pipe Material	TC – Traditional Comms Cable	CATV – Cable Telecommunications
LV - Low Voltage	FO – Fibre Optic	SW – Storm Drainage	G – Gas	FP – Fuel Pipeline	CCTV – Closed Circuit Television	T –BT Telecommunications	RTD – Refer to Drawing
E – Electricity	DU – Empty Duct	FW – Foul Drainage	W – Water		GPR – Unknown GPR Trace	EM – Unknown EM Trace	CA- Compressed Air

Reference	Service	Diameter	Depth	Quality	Nature	Duct Configuration	Owner	Location Method	Records Drawing	Records Date	Notes
M1	E	-	D 0.3-0.64	QL-B2	LV		UKPN	EM			
M2	SW	100MM	D 1.25	QL-B2	CLAY	-	PRIVATE	EM			
M3	SW	100MM	D 1.25-1.82	QL-B2	CLAY	-	PRIVATE	EM			
M4	E	-	D 0.48-0.6	QL-B2	HV		UKPN	EM			
M5	E	-	D 0.69-0.9	QL-B2	LV		UKPN	EM			
M6	E	-	D 0.69	QL-B2	LV		UKPN	EM			
M7	SW	150MM	D 1.8-1.9	QL-B2	CLAY	-	PRIVATE	EM			
M8	FW	150MM	D 0.9	QL-B2	CLAY	-	PRIVATE	EM			
M9	FW	150MM	D 0.95	QL-B2	CLAY	-	PRIVATE	EM			
M10	T	100MM	D 0.6	QL-B2	TC/FO		BT	EM			
M11	T	100MM	D 0.42-0.75	QL-B2	TC/FO		BT	EM			
M12	T	100MM	D 0.55-0.7	QL-B2	TC/FO		BT	EM			
M13	T	100MM	D 0.15-0.3	QL-B2	TC/FO		BT	EM			
M14	SW	100MM	D 1.92	QL-B2	CLAY	-	PRIVATE	EM			
M15	SW	-	-		CLAY	-	PRIVATE	-			
M16	SW	100MM	-	QL-B2	CLAY	-	PRIVATE	EM			
M17	SW	-	-	QL-B4	CLAY	-	PRIVATE	-			
M18	SW	225MM	D 1.92	QL-B2	CLAY	-	PRIVATE	EM			
M19	E	-	D 0.6-0.8	QL-B2	LV		UKPN	EM			
M20	SW	-	D 0.3-1.2	QL-B2	CLAY	-	PRIVATE	EM			
M21	T	100MM	D 0.34-42	QL-B2	TC/FO		PRIVATE	EM			
M22	SW	-	D 0.8-1.2	QL-B2	CLAY	-	PRIVATE	EM			
M23	SW	-	D 0.9-1.2	QL-B2	CLAY	-	PRIVATE	EM			
M24	SW	150MM	D 1.2	QL-B2	CLAY	-	PRIVATE	EM			
M25	SW	150MM-225MM	D 1.3-2.4	QL-B2	CLAY	-	PRIVATE	EM			
M26	SW	-	-	QL-B4	CLAY	-	PRIVATE	-			
M27	SW	300MM	D 2.5	QL-B2	CLAY	-	PRIVATE	EM			
M28	T	100MM	D 0.8-2.1	QL-B2	TC/FO		PRIVATE	EM			
M29	FW	150MM	D 1.65	QL-B2	CLAY	-	PRIVATE	EM			
M30	FW	150MM	D 1.45-1.65	QL-B2	CLAY	-	PRIVATE	EM			
M31	SW	300MM	D 2.1-2.5	QL-B2	CLAY	-	PRIVATE	EM			
M32	E	-	D 0.52-0.8	QL-B2	LV		PRIVATE	EM			
M33	E	-	-		LV		PRIVATE	EM			
M34	E	-	D 0.35-0.6	QL-B2	LV		PRIVATE	EM			
M35	SW	-	-		CLAY	-	PRIVATE	-			
M36	SW	-	-		CLAY	-	PRIVATE	-			
M37	T	100MM	D 0.25	QL-B2	TC/FO		PRIVATE	EM			
M38	SW	150MM	D 1.0-1.3	QL-B2	CLAY	-	PRIVATE	EM			
M39	SW	-	D 1.05-1.3	QL-B2	CLAY	-	PRIVATE	EM			
M40	T	100MM	-		TC/FO		PRIVATE	-			
M41	SW	150MM	D 0.6	QL-B2	CLAY	-	PRIVATE	EM			
M42	SW	150MM	D 0.6	QL-B2	CLAY	-	PRIVATE	EM			
M43	SW	150MM	D 0.8	QL-B2	CLAY	-	PRIVATE	EM			
M44	SW	150MM	D 1.15	QL-B2	CLAY	-	PRIVATE	EM			
M45	SW	-	-		CLAY	-	PRIVATE	-			
M46	SW	-	-		CLAY	-	PRIVATE	-			
M47	SW	150MM-225MM	D 1.35-2.1	QL-B2	CLAY	-	PRIVATE	EM			
M48	E	-	D 0.1-0.45	QL-B2	LV		PRIVATE	EM			
M49	FW	150MM	D 0.84	QL-B2	CLAY	-	PRIVATE	EM			
M50	FW	150MM	D 0.88	QL-B2	CLAY	-	PRIVATE	EM			
M51	FW	150MM	D 1.75	QL-B2	CLAY	-	PRIVATE	EM			
M52	FW	150MM	D 0.9-1.75	QL-B2	CLAY	-	PRIVATE	EM			
M53	FW	150MM	D 0.9	QL-B2	CLAY	-	PRIVATE	EM			
M54	FW	150MM	D 2.25	QL-B2	CLAY	-	PRIVATE	EM			
M55	FW	150MM-225MM	D 1.25-2.25	QL-B2	CLAY	-	PRIVATE	EM			
M56	FW	-	D 1.15	QL-B2	CLAY	-	PRIVATE	EM			

M57	E	-	D 1.0	QL-B2	LV		UKPN	EM		
M58	FW	150MM	D 1.25	QL-B2	CLAY	-	PRIVATE	EM		
M59	SW	150MM	D 1.0	QL-B2	CLAY	-	PRIVATE	EM		
M60	SW	100MM	D 0.2	QL-B2	CLAY	-	PRIVATE	EM		
M61	E	-	D 1.0	QL-B2	LV		UKPN	EM		
M62	SW	150MM	D 1.05	QL-B2	CLAY	-	PRIVATE	EM		
M63	FW	150MM	D 1.75	QL-B2	CLAY	-	PRIVATE	EM		
M64	W	-	D 0.84	QL-B2	PIPE	-	PRIVATE	EM		
M65	E	-	-		LV		UKPN	EM		
M66	SW	100MM	D 2.0	QL-B2	CLAY	-	PRIVATE	EM		
M67	SW	600MM	D 2.1	QL-B2	CONCRETE	-	THAMES WATER	EM		
M68	SW	100MM	D 2.1	QL-B2	CLAY	-	PRIVATE	EM		
M69	SW	450MM	D 2.3	QL-B2	CONCRETE	-	THAMES WATER	EM		
M70	SW	225MM	D 2.7	QL-B2	CLAY	-	PRIVATE	EM		
M71	SW	300MM	D 2.3-2.65	QL-B2	CONCRETE	-	THAMES WATER	EM		
M72	SW	150MM	D 1.1	QL-B2	CLAY	-	PRIVATE	EM		
M73	SW	150MM	D 1.1	QL-B2	CLAY	-	PRIVATE	EM		
M74	SW	225MM	D 0.25-1.25	QL-B2	CLAY	-	PRIVATE	EM		
M75	E	-	D 0.6	QL-B2	LV		UKPN	EM		
M76	SW	-	D 1.2	QL-B2	CLAY	-	PRIVATE	EM		
M77	SW	-	-		CLAY	-	PRIVATE	-		
M78	E	-	D 0.74	QL-B2	LV		UKPN	EM		
M79	SW	300MM-750MM	D 2.0-2.3	QL-B2	CONCRETE	-	THAMES WATER	EM		
M80	SW	-	-		-	-	-	-		
M81	SW	600MM	D 1.7	QL-B2	CONCRETE	-	THAMES WATER	EM		
M82	E	-	D 0.32-0.4	QL-B2	-		UKPN	EM		
M83	FW	100MM	D 1.4	QL-B2	CLAY	-	PRIVATE	EM		
M84	FW	150MM	D 1.45-1.5	QL-B2	CLAY	-	PRIVATE	EM		
M85	FW	150MM	D 1.5	QL-B2	CLAY	-	PRIVATE	EM		
M86	E	-	D 0.15-0.6	QL-B2	LV		PRIVATE	EM		
M87	W	-	D 0.9-2.0	QL-B2	PIPE	-	THAMES WATER	EM		
M88	SW	450MM	D 1.95-2.1	QL-B2	CONCRETE	-	THAMES WATER	EM		
M89	SW	-	D 0.6	QL-B2	-	-	PRIVATE	EM		
M90	G	-	-		PIPE	-	NATIONAL GRID	EM		
M91	SW	-	D 0.86-1.65	QL-B2	-	-	PRIVATE	EM		
M92	SW	300MM	D 2.1	QL-B2	CONCRETE	-	THAMES WATER	EM		
M93	SW	-	D 0.6	QL-B2	-	-	PRIVATE	EM		
M94	FW	100MM	D 1.4	QL-B2	CLAY	-	PRIVATE	EM		
M95	FW	100MM	D 1.4	QL-B2	CLAY	-	PRIVATE	EM		
M96	FW	150MM	D 1.2	QL-B2	CLAY	-	PRIVATE	EM		
M97	SW	-	-		-	-	PRIVATE	-		
M98	SW	-	D 2.0	QL-B2	-	-	PRIVATE	EM		
M99	FW	150MM	D 1.2	QL-B2	CLAY	-	PRIVATE	EM		
M100	SW	225MM	D 2.0	QL-B2	CLAY	-	PRIVATE	EM		
M101	SW	-	D 0.5	QL-B2	CLAY	-	PRIVATE	EM		
M102	E	-	-		LV		UKPN	EM		
M103	GPR	-	D 0.7	QL-B2P	-	-	-	GPR	-	-
M104	GPR	-	D 1.5	QL-B2P	-	-	-	GPR	-	-
M105	GPR	-	D 0.97-1.1	QL-B2P	-	-	-	GPR	-	-
M106	GPR	-	D 1.09	QL-B2P	-	-	-	GPR	-	-
M107	GPR	-	D 0.25	QL-B2P	-	-	-	GPR	-	-
M108	E	-	D 0.45-0.65	QL-B2P	LV	-	-	GPR	-	-
M109	GPR	-	D 0.53-0.65	QL-B2P	-	-	-	GPR	-	-
M110	GPR	-	D 1.08-1.2	QL-B2P	-	-	-	GPR	-	-
M111	GPR	-	D 0.66-0.81	QL-B2P	-	-	-	GPR	-	-
M112	GPR	-	D 0.32-0.35	QL-B2P	-	-	-	GPR	-	-
M113	GPR	-	D 0.72-0.87	QL-B2P	-	-	-	GPR	-	-
M114	GPR	-	D 0.5-0.72	QL-B2P	-	-	-	GPR	-	-
M115	GPR	-	D 0.74-0.83	QL-B2P	-	-	-	GPR	-	-
M116	GPR	-	D 0.94-0.98	QL-B2P	-	-	-	GPR	-	-
M117	GPR	-	D 0.49-0.71	QL-B2P	-	-	-	GPR	-	-
M118	GPR	-	D 0.41-0.5	QL-B2P	-	-	-	GPR	-	-
M119	GPR	-	D 0.52-0.54	QL-B2P	-	-	-	GPR	-	-
M120	GPR	-	D 0.69-0.84	QL-B2P	-	-	-	GPR	-	-
M121	GPR	-	D 0.52-0.64	QL-B2P	-	-	-	GPR	-	-
M122	GPR	-	D 0.78	QL-B2P	-	-	-	GPR	-	-
M123	GPR	-	D 0.63-0.85	QL-B2P	-	-	-	GPR	-	-
M124	GPR	-	D 0.58-0.79	QL-B2P	-	-	-	GPR	-	-
M125	GPR	-	D 0.95-0.97	QL-B2P	-	-	-	GPR	-	-
M126	GPR	-	D 0.75	QL-B2P	-	-	-	GPR	-	-
M127	GPR	-	D 0.84-1.06	QL-B2P	-	-	-	GPR	-	-
M128	GPR	-	D 0.52-0.8	QL-B2P	-	-	-	GPR	-	-
M129	GPR	-	D 0.54-0.55	QL-B2P	-	-	-	GPR	-	-
M130	GPR	-	D 0.71-0.79	QL-B2P	-	-	-	GPR	-	-
M131	GPR	-	D 0.67	QL-B2P	-	-	-	GPR	-	-
M132	GPR	-	D 1.33-1.44	QL-B2P	-	-	-	GPR	-	-
M133	GPR	-	D 0.93-1.2	QL-B2P	-	-	-	GPR	-	-
M134	GPR	-	D 0.59-0.93	QL-B2P	-	-	-	GPR	-	-
M135	GPR	-	D 0.72-0.93	QL-B2P	-	-	-	GPR	-	-
M136	GPR	-	D 0.93-1.07	QL-B2P	-	-	-	GPR	-	-

Appendix B – Site Drawings



Notes

1. This drawing is to be read in conjunction with all relevant specifications, service providers record drawings, RICS Surveys of Land, Buildings and Utility Surveys at Scales of 1:500 and Larger and the surveyors report

2. This is a composite of two surveys. Where infomation is from a third party it is unkown which services are taken from records. This should be considered when excavating

3. Do not scale fron this drawing

4. A single line indicating a service location does not indicate the number of utilities in a location

5. Electromagnetic and Ground Penetrating Radar methods are employed to compile information on buried services. All data can be effected by external conditions such as ground conditions, interferance, soil types, moisture content and ground return currents. All depths should be viewed as indicative and all persons carrying out excavations should satisfy themselves of all service locations prior to commencing works.
EM interference occurs within 0.5m of buildings and fences, thus services within this zone may be unable to be traced. GPR is also affected in the proximity of buildings and fences.

6. Any excavations should be carried out in accordance with HSG47 by trained personnel

Availability of service records

Type	Comments	Type	Comments
Drainage	Refer to survey report appendix C	Gas	Refer to survey report appendix C
Electric	Refer to survey report appendix C	Cable	Refer to survey report appendix C
BT	Refer to survey report appendix C	Pipeline	Refer to survey report appendix C
Water	Refer to survey report appendix C	Other	Refer to survey report appendix C

(A) - Assumed Line
BH - Borehole
BO - Bollard
CBL - Concrete Block
CL - Cable Level
CTV - Cable TV Point
D 0.5 - Utility Depth
D/U - Depth Unknown
DIA - Pipe Diameter
EMP - Electricity Marker Post
EOT - End of trace
(loss of reading)
EP - Electricity Pole
FH - Fire Hydrant
GMP - Gas Marker Post
GV - Gas Valve
GY - Gulley
IB - Illuminated Bollard
IC - Inspection Chamber
IL - Invert Level
LP - Lamp Column
MH - Manhole
MW - Microwave
OH - Overhead Cable
PBC - Push Button Control
PID - Intruder Detection
PO - Post
(R) - Utility From Records
RE - Rodding Eye
RWP - Down Pipe
SP - Sign Post
SV - Stop Valve
TH - Trial Hole
TS - Traffic Signal
UTS - Unable to Survey
UTT - Unable to Trace
UTL - Unable to Lift
VP - Soil & Vent Pipe
WMP - Water Marker Post

Storm Drainage SW
Foul Drainage FW
Electricity E
Water W
Gas G
Unknown EM EM
Unknown GPR GPR
Comms T
Empty Duct DU
Earth Cable EA
Utility Survey Boundary

GPR Ineffective
Fence
Important Notes, Refer To Surveyors Report Section 3
M1 Metadata, Refer To Surveyors Report Appendix A
Extent of Chamber Walls
GPR Anomaly
EM Interference

Rev	Amendment	Date
1	For Comment	28.01.15

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Client
Meadow Partners

Project Title
Pentavia Mill Hill

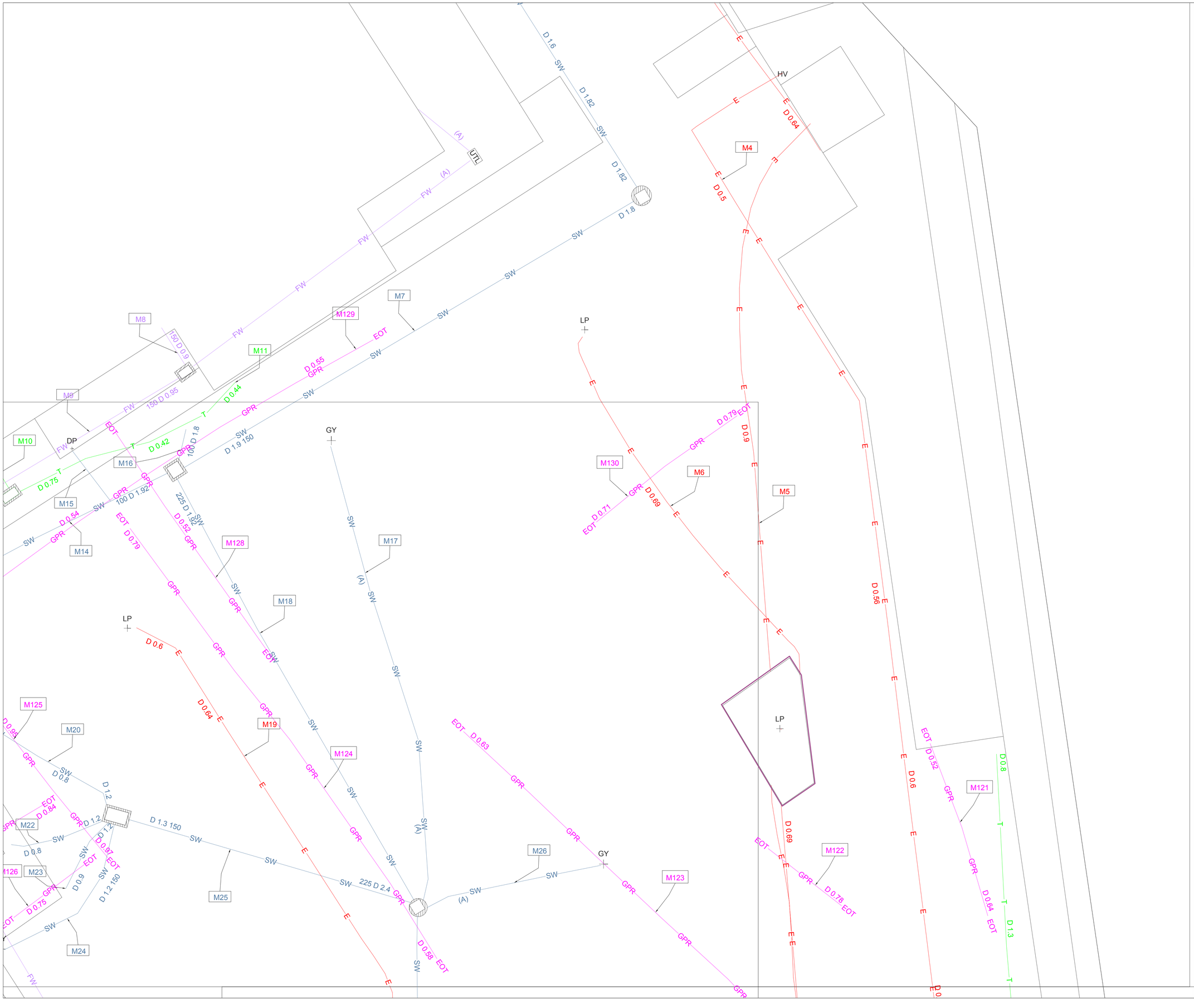
Drawing Title
Pentavia Mill Hill
Utility Survey Sheet 1

Drawn By	Checked By	Approved By
RB	KF	AB

Date	Scale
28.01.15	1:100 @ A1

Purpose
Survey

Drawing Number	Rev
716_001	1



Notes

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2. This is a composite of two surveys. Where infomation is from a third party it is unkown which services are taken from records. This should be considered when excavating

3. Do not scale fron this drawing

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6. Any excavations should be carried out in accordance with HSG47 by trained personnel

Availability of service records

Type	Comments	Type	Comments
Drainage	Refer to survey report appendix C	Gas	Refer to survey report appendix C
Electric	Refer to survey report appendix C	Cable	Refer to survey report appendix C
BT	Refer to survey report appendix C	Pipeline	Refer to survey report appendix C
Water	Refer to survey report appendix C	Other	Refer to survey report appendix C

(A) - Assumed Line
BH - Borehole
BO - Bollard
CBL - Concrete Block
CL - Cable Level
CTV - Cable TV Point
D 0.5 - Utility Depth
D/U - Depth Unknown
DIA - Pipe Diameter
EMP - Electricity Marker Post
EOT - End of trace (loss of reading)
EP - Electricity Pole
FH - Fire Hydrant
GMP - Gas Marker Post
GV - Gas Valve
GY - Gulley
IB - Illuminated Bollard
IC - Inspection Chamber
IL - Invert Level
LP - Lamp Column
MH - Manhole
MW - Microwave
OH - Overhead Cable
PBC - Push Button Control
PID - Intruder Detection
PO - Post
(R) - Utility From Records
RE - Rodding Eye
RWP - Down Pipe
SP - Sign Post
SV - Stop Valve
TH - Trial Hole
TS - Traffic Signal
UTS - Unable to Survey
UTT - Unable to Trace
UTL - Unable to Lift
VP - Soil & Vent Pipe
WMP - Water Marker Post

Storm Drainage SW
Foul Drainage FW
Electricity E
Water W
Gas G
Unknown EM EM
Unknown GPR GPR
Comms T
Empty Duct DU
Earth Cable EA
Utility Survey Boundary

GPR Ineffective
Fence
Important Notes, Refer To Surveyors Report Section 3
M1 Metadata, Refer To Surveyors Report Appendix A
Extent of Chamber Walls
GPR Anomaly
EM Interference

Rev	Amendment	Date
1	For Comment	28.01.15

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Client
Meadow Partners

Project Title
Pentavia Mill Hill

Drawing Title
Pentavia Mill Hill
Utility Survey Sheet 2

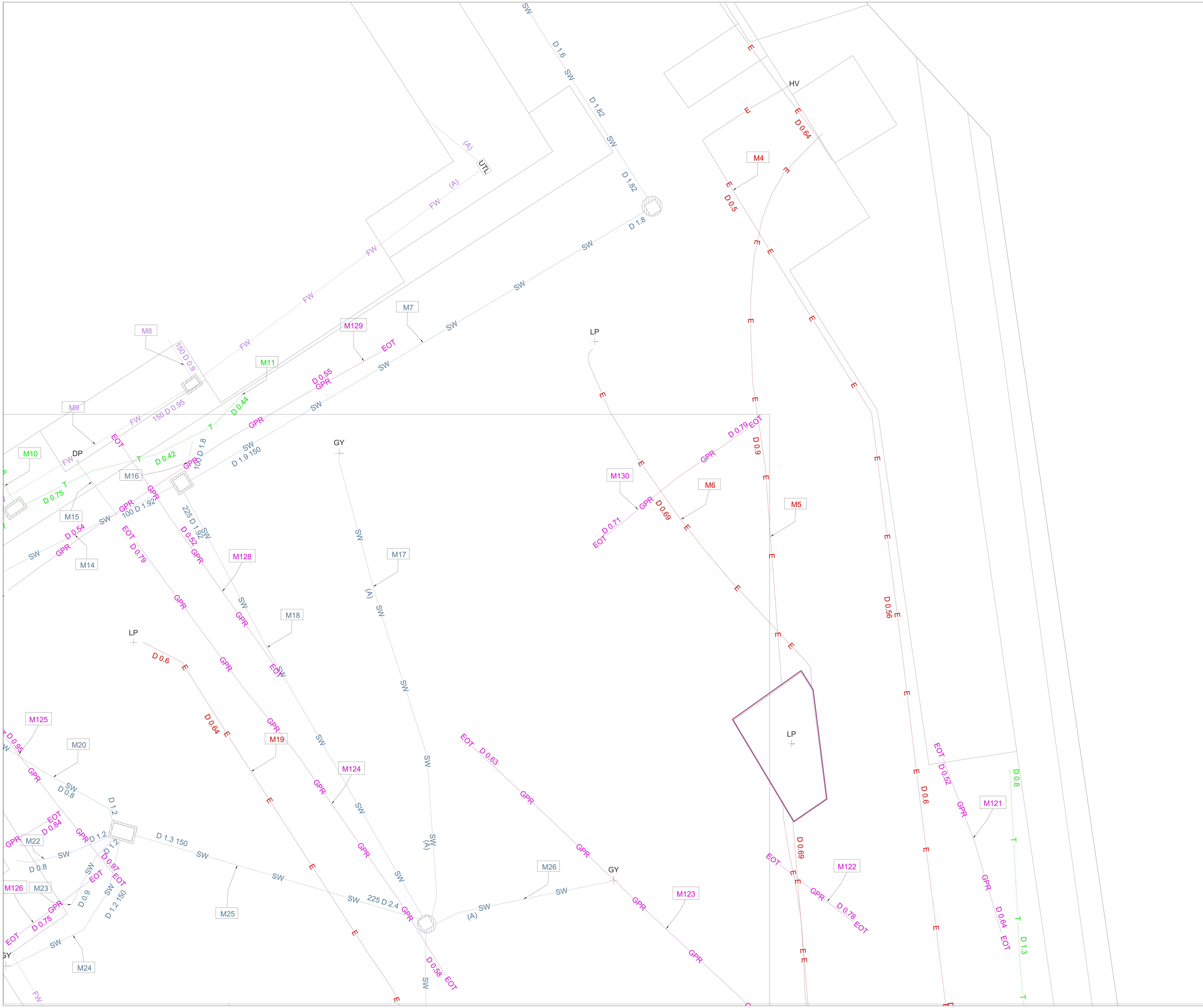
Drawn By	Checked By	Approved By
RB	KF	AB

Date	Scale
28.01.15	1:100 @ A1

Purpose
Survey

Drawing Number
716_002

Rev
1



Notes

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Availability of service records

Type	Comments	Type	Comments
Drainage	Refer to survey report appendix C	Gas	Refer to survey report appendix C
Electric	Refer to survey report appendix C	Cable	Refer to survey report appendix C
BT	Refer to survey report appendix C	Pipeline	Refer to survey report appendix C
Water	Refer to survey report appendix C	Other	Refer to survey report appendix C

(A) - Assumed Line
BH - Borehole
BO - Bollard
CBL - Concrete Block
CL - Cable Level
CTV - Cable TV Point
D 0.5 - Utility Depth
D/U - Depth Unknown
DIA - Pipe Diameter
EMP - Electricity Marker Post
EOT - End of trace
(loss of reading)
EP - Electricity Pole
FH - Fire Hydrant
GMP - Gas Marker Post
GV - Gas Valve
GY - Gulley
IB - Illuminated Bollard
IC - Inspection Chamber
IL - Invert Level

LP - Lamp Column
MH - Manhole
MW - Microwave
OH - Overhead Cable
PBC - Push Button Control
PID - Intruder Detection
PO - Post
(R) - Utility From Records
RE - Rodding Eye
RWP - Down Pipe
SP - Sign Post
SV - Stop Valve
TH - Trial Hole
TS - Traffic Signal
UTS - Unable to Survey
UTT - Unable to Trace
UTL - Unable to Lift
VP - Soil & Vent Pipe
WMP - Water Marker Post

Storm Drainage SW
Foul Drainage FW
Electricity E
Water W
Gas G
Unknown EM EM
Unknown GPR GPR
Comms T
Empty Duct DU
Earth Cable EA
Utility Survey Boundary

GPR Ineffective
Fence
Important Notes, Refer To Surveyors Report Section 3
M1 Metadata, Refer To Surveyors Report Appendix A
Extent of Chamber Walls
GPR Anomaly
EM Interference

Rev	Amendment	Date
1	For Comment	28.01.15

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Client
Meadow Partners

Project Title
Pentavia Mill Hill

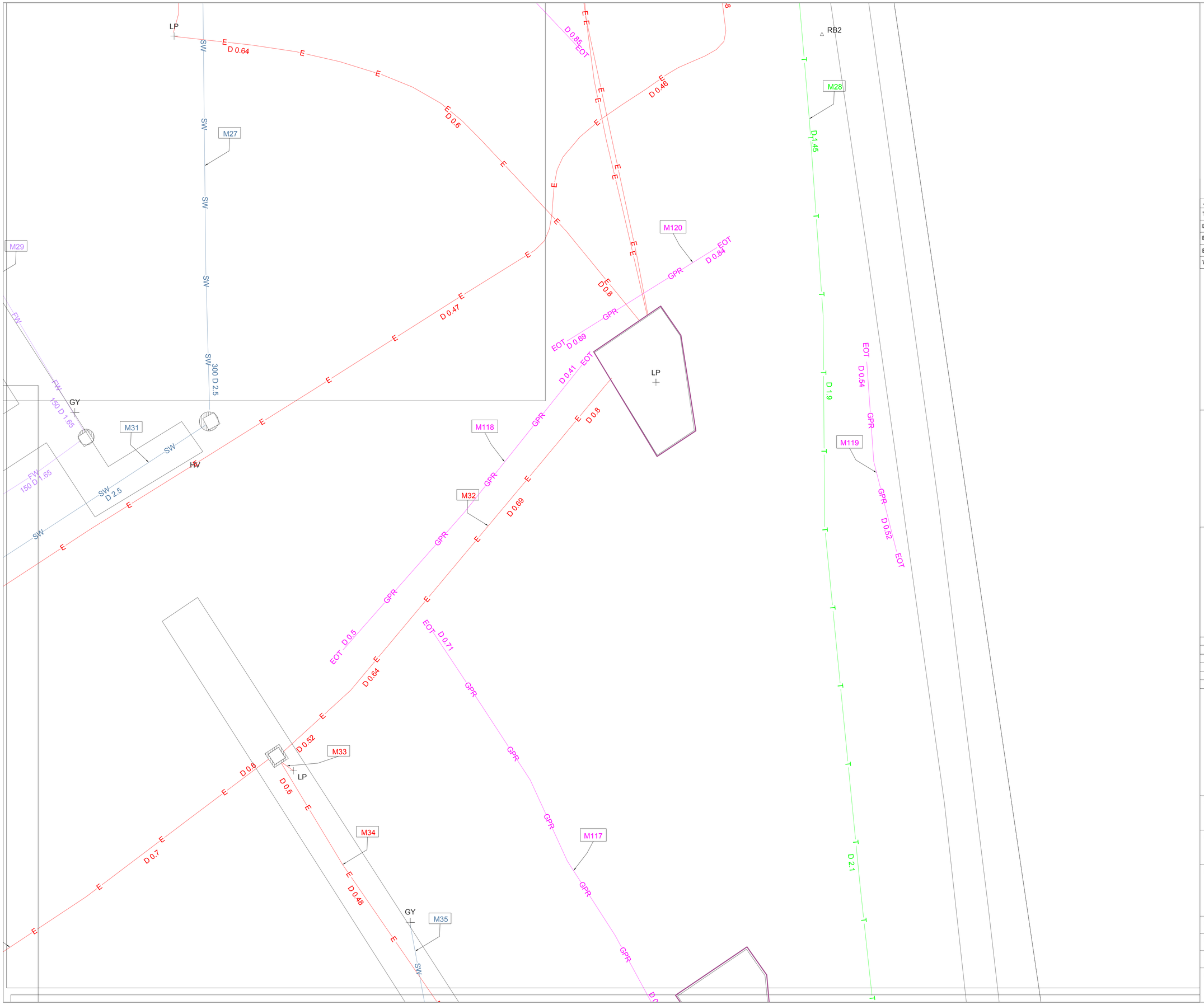
Drawing Title
Pentavia Mill Hill
Utility Survey Sheet 3

Drawn By	Checked By	Approved By
RB	KF	AB

Date	Scale
28.01.15	1:100 @ A1

Purpose
Survey

Drawing Number	Rev
716_003	1



Notes

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Availability of service records

Type	Comments	Type	Comments
Drainage	Refer to survey report appendix C	Gas	Refer to survey report appendix C
Electric	Refer to survey report appendix C	Cable	Refer to survey report appendix C
BT	Refer to survey report appendix C	Pipeline	Refer to survey report appendix C
Water	Refer to survey report appendix C	Other	Refer to survey report appendix C

(A) - Assumed Line
BH - Borehole
BO - Bollard
CBL - Concrete Block
CL - Cable Level
CTV - Cable TV Point
D 0.5 - Utility Depth
D/U - Depth Unknown
DIA - Pipe Diameter
EMP - Electricity Marker Post
EOT - End of trace (loss of reading)
EP - Electricity Pole
FH - Fire Hydrant
GMP - Gas Marker Post
GV - Gas Valve
GY - Gulley
IB - Illuminated Bollard
IC - Inspection Chamber
IL - Invert Level
LP - Lamp Column
MH - Manhole
MW - Microwave
OH - Overhead Cable
PBC - Push Button Control
PID - Intruder Detection
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(R) - Utility From Records
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SP - Sign Post
SV - Stop Valve
TH - Trial Hole
TS - Traffic Signal
UTS - Unable to Survey
UTT - Unable to Trace
UTL - Unable to Lift
VP - Soil & Vent Pipe
WMP - Water Marker Post

Storm Drainage SW
Foul Drainage FW
Electricity E
Water W
Gas G
Unknown EM EM
Unknown GPR GPR
Comms T
Empty Duct DU
Earth Cable EA
Utility Survey Boundary

GPR Ineffective
Fence
Important Notes, Refer To Surveyors Report Section 3
M1 Metadata, Refer To Surveyors Report Appendix A
Extent of Chamber Walls
GPR Anomaly
EM Interference

Rev	Amendment	Date
1	For Comment	28.01.15

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Meadow Partners

Project Title
Pentavia Mill Hill

Drawing Title
Pentavia Mill Hill
Utility Survey Sheet 4

Drawn By	Checked By	Approved By
RB	KF	AB

Date	Scale
28.01.15	1:100 @ A1

Purpose
Survey

Drawing Number	Rev
716_004	1

Notes

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Availability of service records

Type	Comments	Type	Comments
Drainage	Refer to survey report appendix C	Gas	Refer to survey report appendix C
Electric	Refer to survey report appendix C	Cable	Refer to survey report appendix C
BT	Refer to survey report appendix C	Pipeline	Refer to survey report appendix C
Water	Refer to survey report appendix C	Other	Refer to survey report appendix C

(A) - Assumed Line
BH - Borehole
BO - Bollard
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CTV - Cable TV Point
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D/U - Depth Unknown
DIA - Pipe Diameter
EMP - Electricity Marker Post
EOT - End of trace (loss of reading)
EP - Electricity Pole
FH - Fire Hydrant
GMP - Gas Marker Post
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Storm Drainage SW
Foul Drainage FW
Electricity E
Water W
Gas G
Unknown EM EM
Unknown GPR GPR
Comms T
Empty Duct DU
Earth Cable EA
Utility Survey Boundary

GPR Ineffective
Fence
Important Notes, Refer To Surveyors Report Section 3
M1 Metadata, Refer To Surveyors Report Appendix A
Extent of Chamber Walls
GPR Anomaly
EM Interference

Rev	Amendment	Date
1	For Comment	28.01.15

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Client
Meadow Partners

Project Title
Pentavia Mill Hill

Drawing Title
Pentavia Mill Hill
Utility Survey Sheet 5

Drawn By	Checked By	Approved By
RB	KF	AB

Date	Scale
28.01.15	1:100 @ A1

Purpose
Survey

Drawing Number	Rev
716_005	1

Notes

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Availability of service records

Type	Comments	Type	Comments
Drainage	Refer to survey report appendix C	Gas	Refer to survey report appendix C
Electric	Refer to survey report appendix C	Cable	Refer to survey report appendix C
BT	Refer to survey report appendix C	Pipeline	Refer to survey report appendix C
Water	Refer to survey report appendix C	Other	Refer to survey report appendix C

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RWP - Down Pipe
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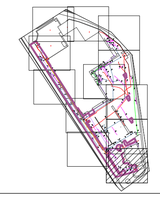
SV - Stop Valve
TH - Trial Hole
TS - Traffic Signal
UTS - Unable to Survey
UTT - Unable to Trace
UTL - Unable to Lift
VP - Soil & Vent Pipe
WMP - Water Marker Post

Storm Drainage SW
Foul Drainage FW
Electricity E
Water W
Gas G
Unknown EM EM
Unknown GPR GPR
Comms T
Empty Duct DU
Earth Cable EA
Utility Survey Boundary

GPR Ineffective
Fence
Important Notes, Refer To Surveyors Report Section 3
M1 Metadata, Refer To Surveyors Report Appendix A
Extent of Chamber Walls
GPR Anomaly
EM Interference



Rev	Amendment	Date
1	For Comment	28.01.15

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Meadow Partners

Project Title
Pentavia Mill Hill

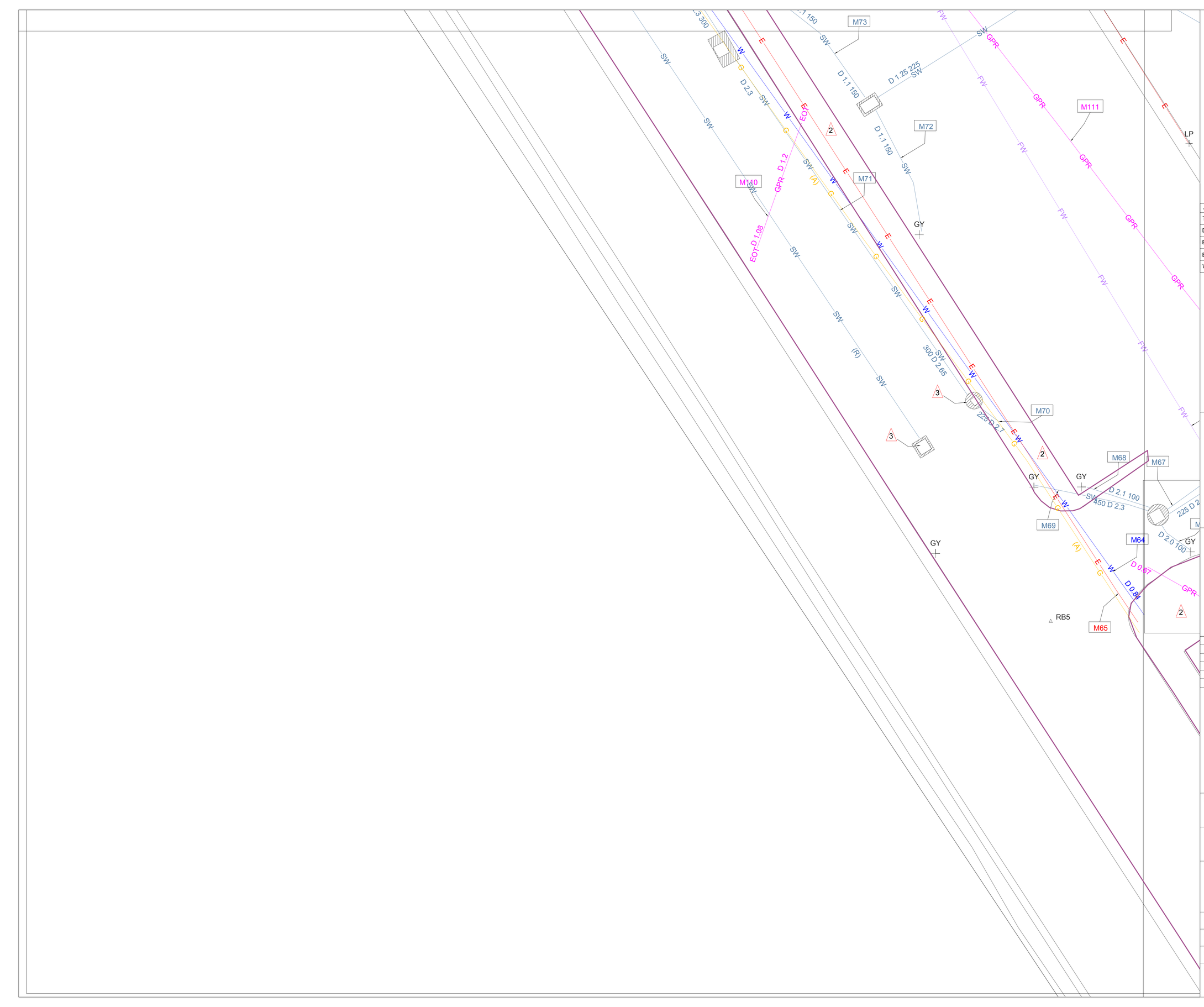
Drawing Title
Pentavia Mill Hill
Utility Survey Sheet 6

Drawn By	Checked By	Approved By
RB	KF	AB

Date	Scale
28.01.15	1:100 @ A1

Purpose
Survey

Drawing Number	Rev
716_006	1



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Availability of service records

Type	Comments	Type	Comments
Drainage	Refer to survey report appendix C	Gas	Refer to survey report appendix C
Electric	Refer to survey report appendix C	Cable	Refer to survey report appendix C
BT	Refer to survey report appendix C	Pipeline	Refer to survey report appendix C
Water	Refer to survey report appendix C	Other	Refer to survey report appendix C

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BH - Borehole
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D/U - Depth Unknown
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EOT - End of trace
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EP - Electricity Pole
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MW - Microwave
OH - Overhead Cable
PBC - Push Button Control
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Storm Drainage SW
Foul Drainage FW
Electricity E
Water W
Gas G
Unknown EM EM
Unknown GPR GPR
Comms T
Empty Duct DU
Earth Cable EA
Utility Survey Boundary

GPR Ineffective
Fence
Important Notes, Refer To Surveyors Report Section 3
M1 Metadata, Refer To Surveyors Report Appendix A
Extent of Chamber Walls
GPR Anomaly
EM Interference

Rev	Amendment	Date
1	For Comment	28.01.15

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Client
Meadow Partners

Project Title
Pentavia Mill Hill

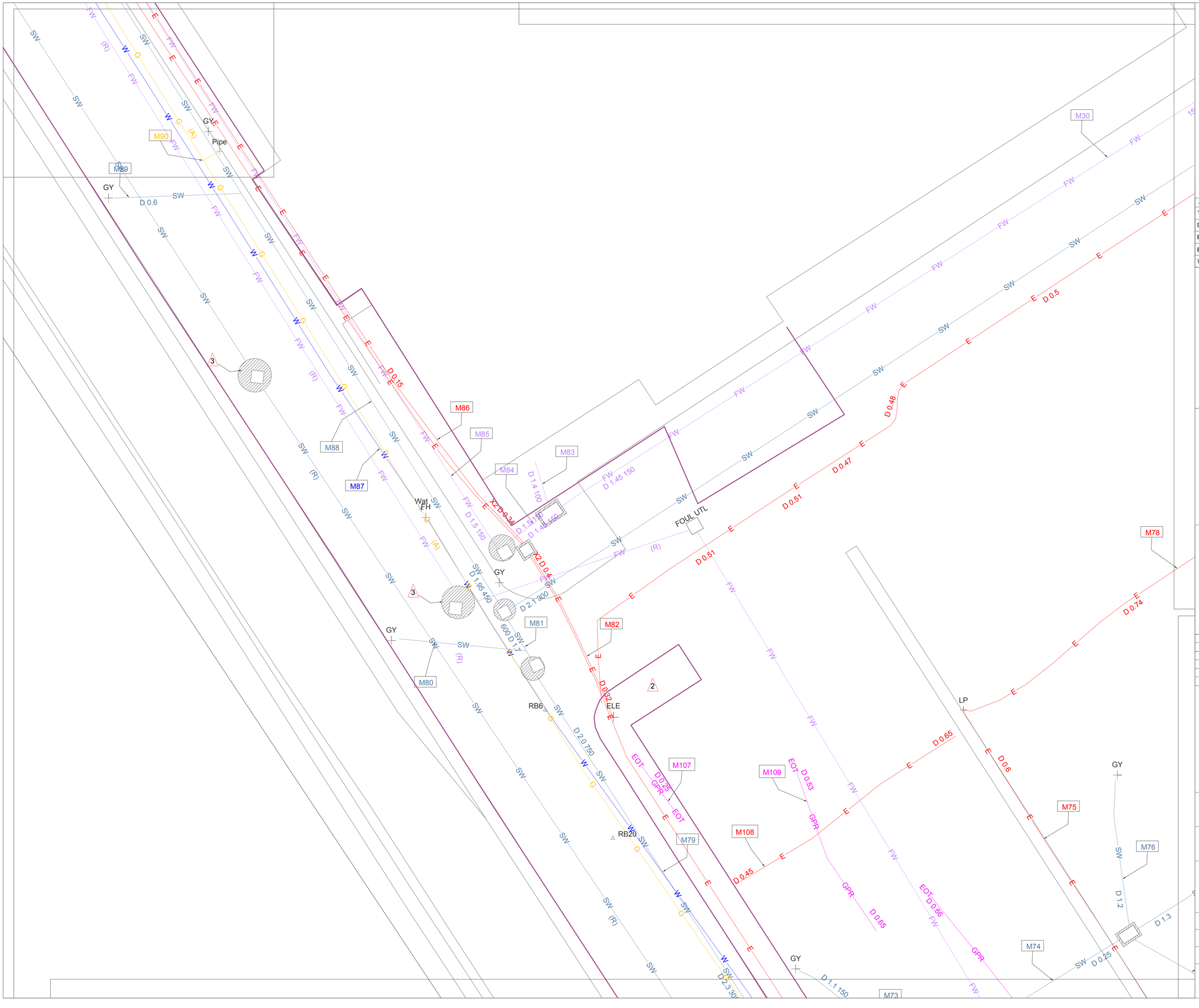
Drawing Title
Pentavia Mill Hill
Utility Survey Sheet 7

Drawn By	Checked By	Approved By
RB	KF	AB

Date	Scale
28.01.15	1:100 @ A1

Purpose
Survey

Drawing Number	Rev
716_007	1



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Availability of service records

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Drainage	Refer to survey report appendix C	Gas	Refer to survey report appendix C
Electric	Refer to survey report appendix C	Cable	Refer to survey report appendix C
BT	Refer to survey report appendix C	Pipeline	Refer to survey report appendix C
Water	Refer to survey report appendix C	Other	Refer to survey report appendix C

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CTV - Cable TV Point
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GMP - Gas Marker Post
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OH - Overhead Cable
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(R) - Utility From Records
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Storm Drainage SW
Foul Drainage FW
Electricity E
Water W
Gas G
Unknown EM EM
Unknown GPR GPR
Comms T
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Earth Cable EA
Utility Survey Boundary

GPR Ineffective
Fence
Important Notes, Refer To Surveyors Report Section 3
M1 Metadata, Refer To Surveyors Report Appendix A
Extent of Chamber Walls
GPR Anomaly
EM Interference

Rev	Amendment	Date
1	For Comment	28.01.15

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Meadow Partners

Project Title
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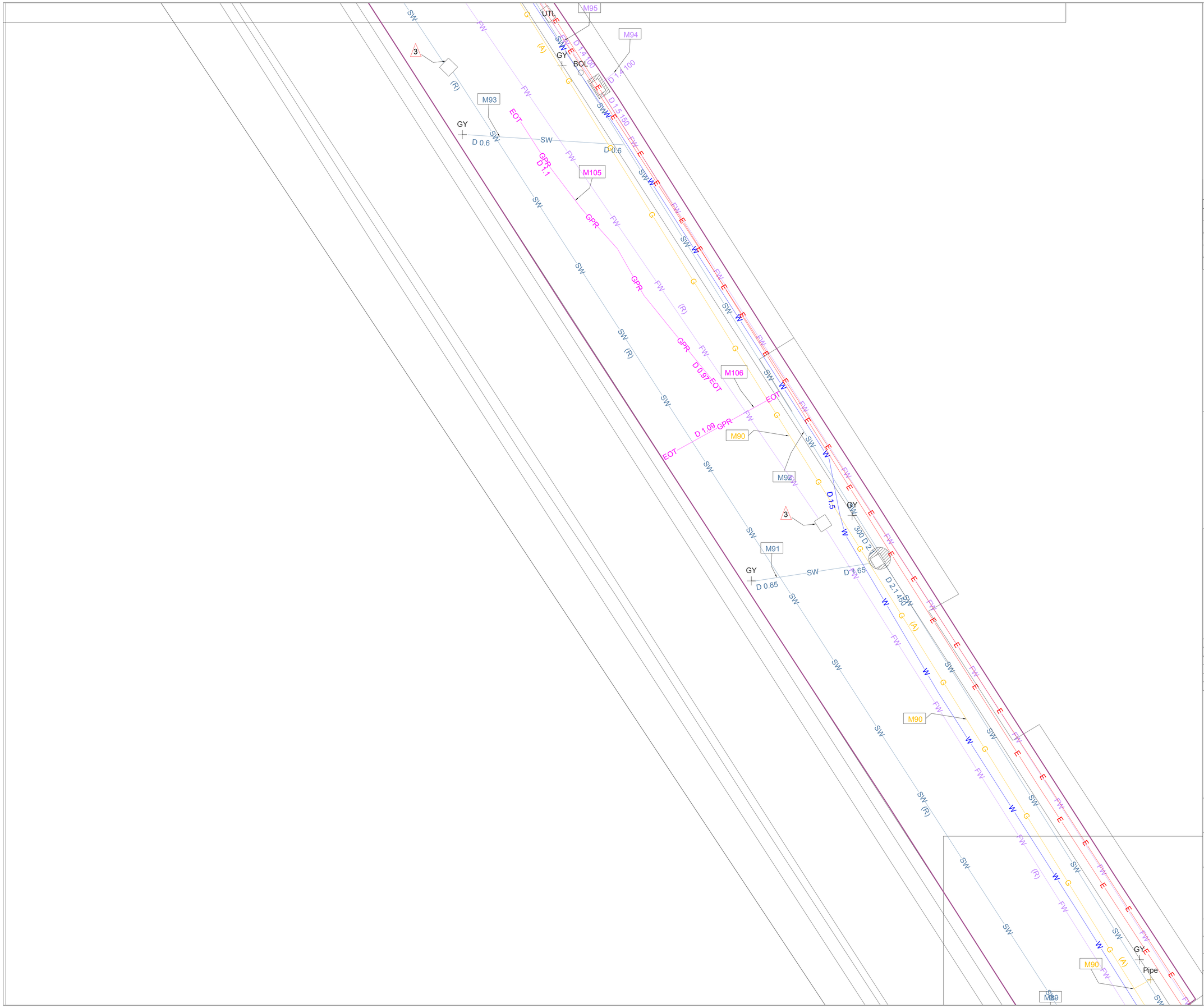
Drawing Title
Pentavia Mill Hill
Utility Survey Sheet 8

Drawn By	Checked By	Approved By
RB	KF	AB

Date	Scale
28.01.15	1:100 @ A1

Purpose
Survey

Drawing Number	Rev
716_008	1



Notes

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Availability of service records

Type	Comments	Type	Comments
Drainage	Refer to survey report appendix C	Gas	Refer to survey report appendix C
Electric	Refer to survey report appendix C	Cable	Refer to survey report appendix C
BT	Refer to survey report appendix C	Pipeline	Refer to survey report appendix C
Water	Refer to survey report appendix C	Other	Refer to survey report appendix C

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(loss of reading)
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UTT - Unable to Trace
UTL - Unable to Lift
VP - Soil & Vent Pipe
WMP - Water Marker Post

Storm Drainage SW
Foul Drainage FW
Electricity E
Water W
Gas G
Unknown EM EM
Unknown GPR GPR
Comms T
Empty Duct DU
Earth Cable EA
Utility Survey Boundary

GPR Ineffective
Fence
Important Notes, Refer To Surveyors Report Section 3
M1 Metadata, Refer To Surveyors Report Appendix A
Extent of Chamber Walls
GPR Anomaly
EM Interference

Rev	Amendment	Date
1	For Comment	28.01.15

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Project Title
Pentavia Mill Hill

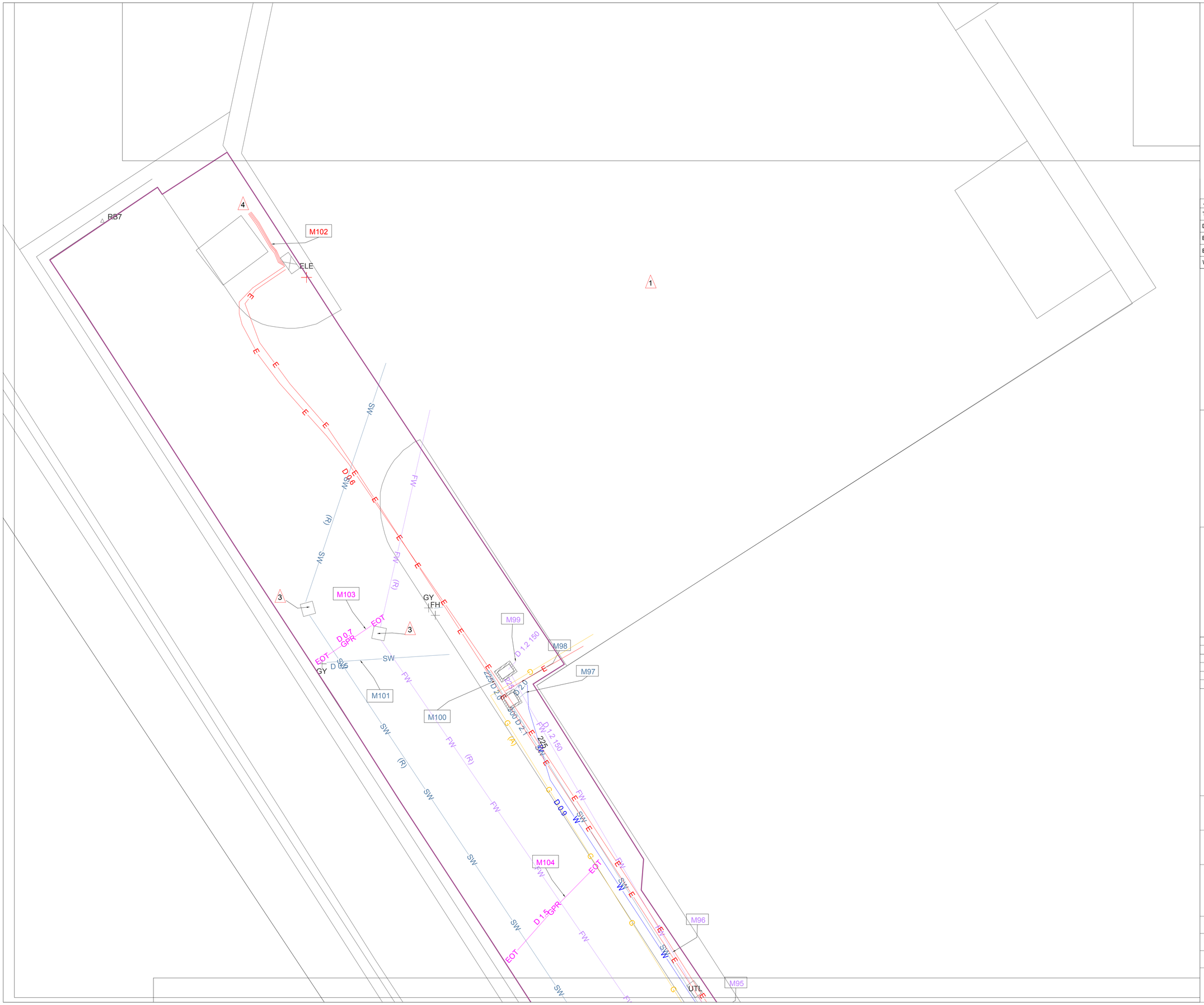
Drawing Title
Pentavia Mill Hill
Utility Survey Sheet 9

Drawn By	Checked By	Approved By
RB	KF	AB

Date	Scale
28.01.15	1:100 @ A1

Purpose
Survey

Drawing Number	Rev
716_009	**1**



Notes

1. This drawing is to be read in conjunction with all relevant specifications, service providers record drawings, RICS Surveys of Land, Buildings and Utility Surveys at Scales of 1:500 and Larger and the surveyors report

2. This is a composite of two surveys. Where infomation is from a third party it is unkown which services are taken from records. This should be considered when excavating

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EM interference occurs within 0.5m of buildings and fences, thus services within this zone may be unable to be traced. GPR is also affected in the proximity of buildings and fences.

6. Any excavations should be carried out in accordance with HSG47 by trained personnel

Availability of service records

Type	Comments	Type	Comments
Drainage	Refer to survey report appendix C	Gas	Refer to survey report appendix C
Electric	Refer to survey report appendix C	Cable	Refer to survey report appendix C
BT	Refer to survey report appendix C	Pipeline	Refer to survey report appendix C
Water	Refer to survey report appendix C	Other	Refer to survey report appendix C

(A) - Assumed Line
BH - Borehole
BO - Bollard
CBL - Concrete Block
CL - Cable Level
CTV - Cable TV Point
D 0.5 - Utility Depth
D/U - Depth Unknown
DIA - Pipe Diameter
EMP - Electricity Marker Post
EOT - End of trace (loss of reading)
EP - Electricity Pole
FH - Fire Hydrant
GMP - Gas Marker Post
GV - Gas Valve
GY - Gulley
IB - Illuminated Bollard
IC - Inspection Chamber
IL - Invert Level
LP - Lamp Column
MH - Manhole
MW - Microwave
OH - Overhead Cable
PBC - Push Button Control
PID - Intruder Detection
PO - Post
(R) - Utility From Records
RE - Rodding Eye
RWP - Down Pipe
SP - Sign Post
SV - Stop Valve
TH - Trial Hole
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Comms T
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Earth Cable EA
Utility Survey Boundary

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Fence
Important Notes, Refer To Surveyors Report Section 3
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EM Interference

Rev	Amendment	Date
1	For Comment	28.01.15

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Project Title
Pentavia Mill Hill

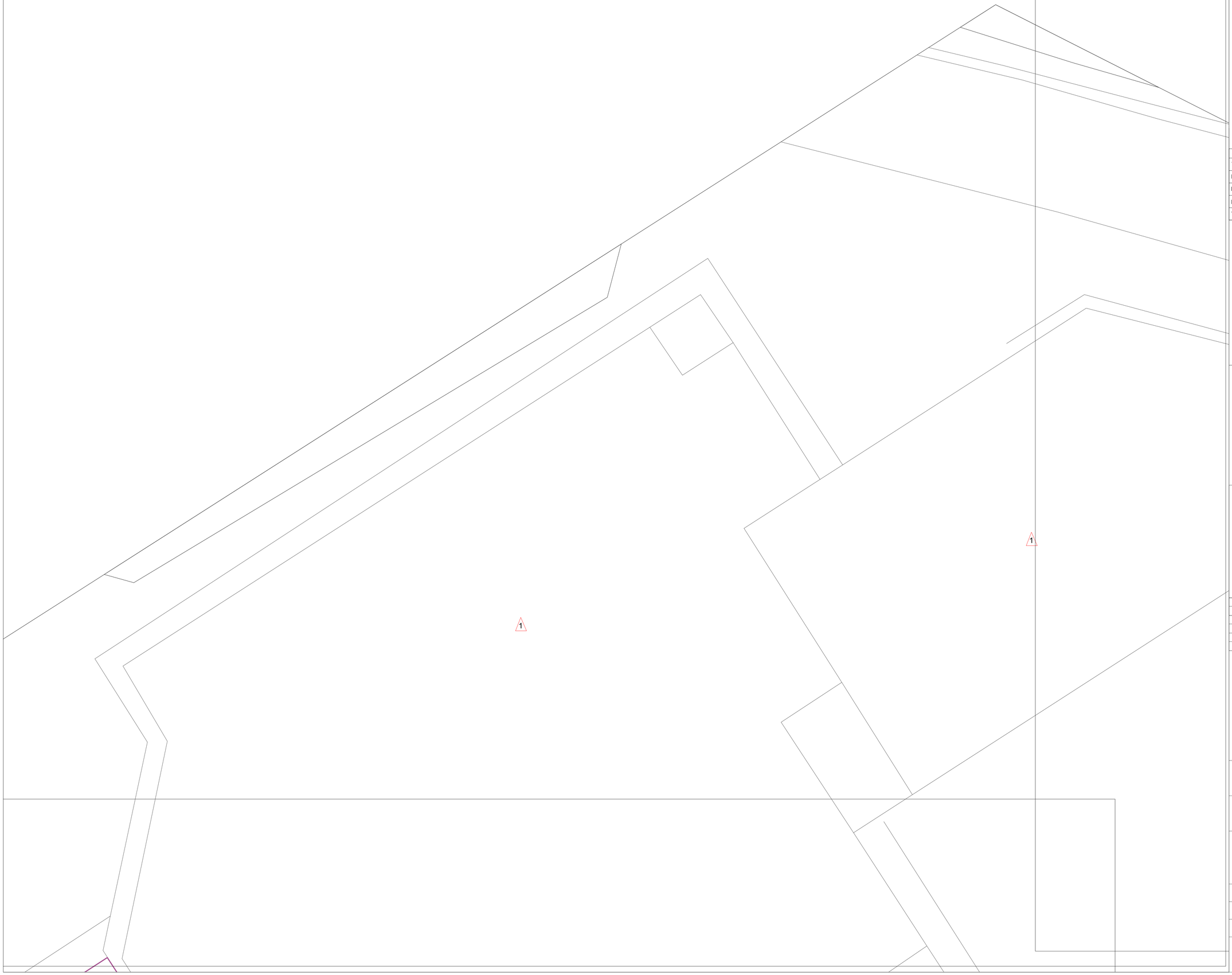
Drawing Title
Pentavia Mill Hill
Utility Survey Sheet 10

Drawn By	Checked By	Approved By
RB	KF	AB

Date	Scale
28.01.15	1:100 @ A1

Purpose
Survey

Drawing Number	Rev
716_010	1



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Availability of service records

Type	Comments	Type	Comments
Drainage	Refer to survey report appendix C	Gas	Refer to survey report appendix C
Electric	Refer to survey report appendix C	Cable	Refer to survey report appendix C
BT	Refer to survey report appendix C	Pipeline	Refer to survey report appendix C
Water	Refer to survey report appendix C	Other	Refer to survey report appendix C

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Electricity E
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Gas G
Unknown EM EM
Unknown GPR GPR
Comms T
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Earth Cable EA
Utility Survey Boundary

GPR Ineffective
Fence
Important Notes, Refer To Surveyors Report Section 3
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Extent of Chamber Walls
GPR Anomaly
EM Interference

Rev	Amendment	Date
1	For Comment	28.01.15

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Project Title
Pentavia Mill Hill

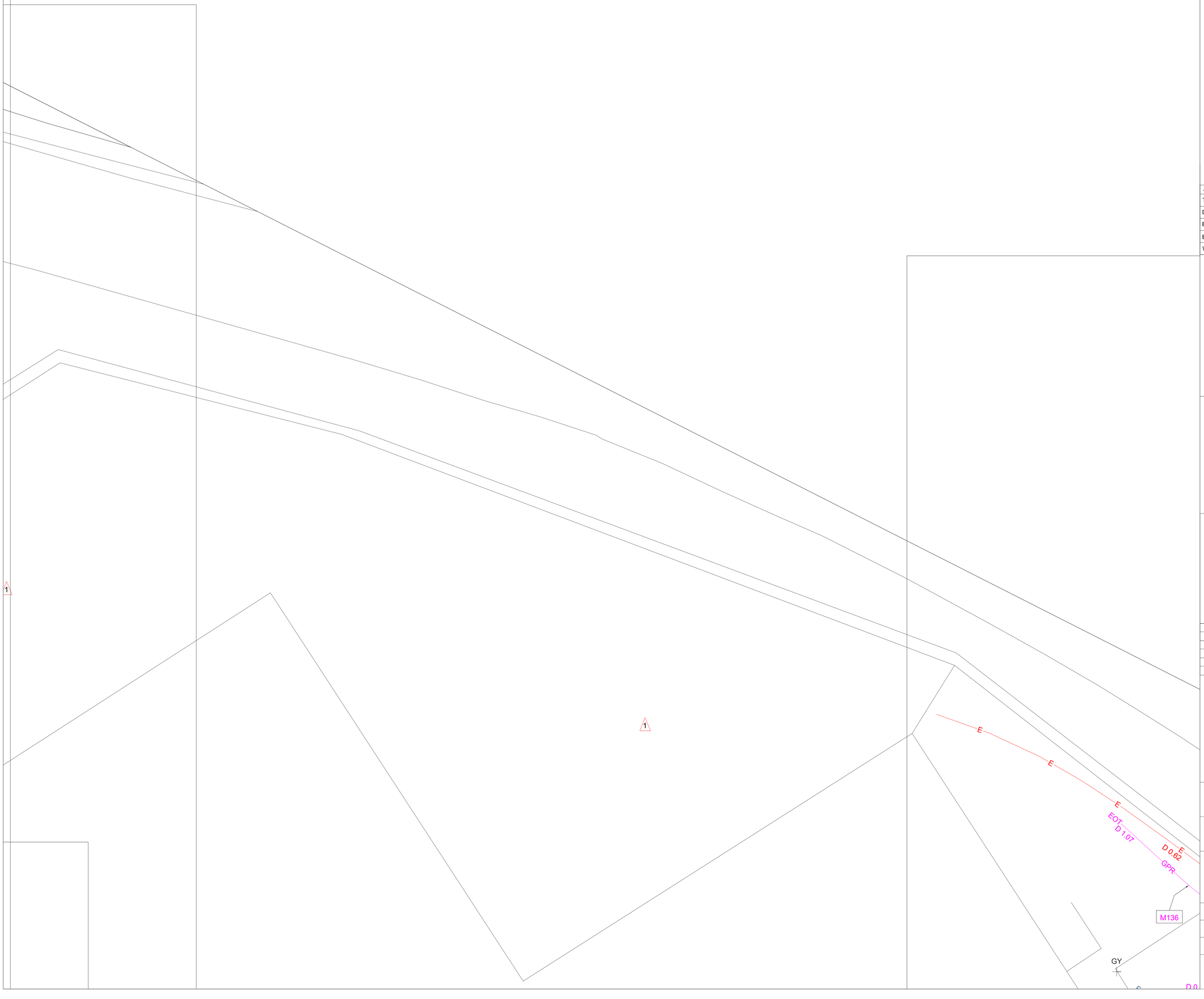
Drawing Title
Pentavia Mill Hill
Utility Survey Sheet 11

Drawn By	Checked By	Approved By
RB	KF	AB

Date	Scale
28.01.15	1:100 @ A1

Purpose
Survey

Drawing Number	Rev
716_011	1



Notes

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Drainage	Refer to survey report appendix C	Gas	Refer to survey report appendix C
Electric	Refer to survey report appendix C	Cable	Refer to survey report appendix C
BT	Refer to survey report appendix C	Pipeline	Refer to survey report appendix C
Water	Refer to survey report appendix C	Other	Refer to survey report appendix C

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EOT - End of trace
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Storm Drainage SW
Foul Drainage FW
Electricity E
Water W
Gas G
Unknown EM EM
Unknown GPR GPR
Comms T
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Earth Cable EA
Utility Survey Boundary

GPR Ineffective
Fence
Important Notes, Refer To Surveyors Report Section 3
M1 Metadata, Refer To Surveyors Report Appendix A
Extent of Chamber Walls
GPR Anomaly
EM Interference

Rev	Amendment	Date
1	For Comment	28.01.15

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Project Title
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Drawing Title
Pentavia Mill Hill
Utility Survey Sheet 12

Drawn By	Checked By	Approved By
RB	KF	AB

Date	Scale
28.01.15	1:100 @ A1

Purpose
Survey

Drawing Number
716_012

Rev
1

Appendix C – Existing Services Drawings

Refer to services table on the site drawings in Appendix B

Appendix D – Agreed Survey Area

For agreed survey area see boundary line indicated on site drawings in Appendix B