

PAS 128: 2014 (Quality of Survey Level Outputs):

DESKTOP UTILITY RECORDS SEARCH	QL-D	Drafted from utility records
SITE RECONNAISSANCE	QL-C	Location Demonstrated by visual reference to street furniture or evidence of previous streetworks, ie - reinstatement scars
DETECTION	QL-B4	A segment of utility suspected to exist but has not been detected by a geophysical technique
	QL-B3	Horizontal location only of the utility detected by one of the geophysical techniques used
	QL-B2	Horizontal and vertical location of the utility detected by one of the geophysical techniques used
	QL-B1	Horizontal and vertical location of the utility detected by multiple geophysical techniques
VERIFICATION	QL-A	Horizontal and vertical location of the top and/or bottom of the utility

Apex Surveys Ltd. Disclaimer - Utility Survey

The Survey aims to map existing utilities and sub-surface structures and provide information with respect to pipe size, material type and drainage connectivity. However utility surveying is limited by the following guidelines and it may not be possible to accurately survey, define and locate all services and sub-surface features. Please note that not all buried pipes, cables and ducts can be detected and mapped in consideration of their depth, location, material type, geology and proximity to other utilities. Even an appropriate and professionally executed survey may not be able to achieve 100% detection rate. Although all reasonable steps have been taken to locate all features, there is no guarantee that all utilities and underground structures will be located and shown on the drawing.

- The following is a non-exhaustive list of the limitations of utility surveys:
- Depth of Utility:** The depth and size of a utility affect the signal response and the degree with which a utility can be located. Due to attenuation of the radar signal with depth, resolution is restricted, hence making identification of utilities more difficult with increasing depth.
 - Size of Utility:** The smaller the diameter of a utility the more difficult it is to locate. This difficulty increases with depth.
 - Ground Conditions:** The depth penetration and quality of the data depends on the ground conditions of the site. GPR Surveying works best within high resistivity material. Clay overburden can impair GPR Surveying. Poor data may be a result of areas with high conductivity.
 - Utility Congestion:** Where different utilities converge together into a service corridor or cross paths it becomes difficult to isolate a specific utility and map its route. The reflected signal will display a single response to multiple utilities. Therefore multiple utilities may appear to be a single utility. Where similar services run on close proximity, separation may be impossible.
 - Signal Jumping:** Signal from surrounding services may 'jump' to a highly conductive line masking its true identity.
 - Shadowing:** (of deeper utilities by shallower objects) Shallow utilities will mask the existence of deeper utilities where they are in close proximity. Also, high reflective materials close to the surface i.e. rebar may hide deeper anomalies.
 - Surface Obstructions:** The GPR system relies on a relatively flat and even surface on which to perform radar passes. If ground obstructions such as vehicles, organic material (long grass, scrub) or undulating ground surface are present then the acquired data will be of lower resolution and in some cases not viable.
 - Loss of signal:** It is not always possible to trace the entire length of each underground service.
 - Connections between manholes:** Connections between manhole chambers are assumed to be straight.
 - Non-metallic objects:** Non-metallic objects are amongst the most difficult to trace therefore successful tracing of non-metallic pipes/utilities may be limited.
 - Fiber Optic Cables:** Fiber optic cables may not be possible to locate except where laid with a built in tracer wire or similar conductor system.
 - Defective/flooded manholes or pipework:** establish connections between flooded or defective manholes or pipework.
 - Acute bends in pipework:** It may not be possible to trace a pipe past an acute bend.

Accuracy estimates:

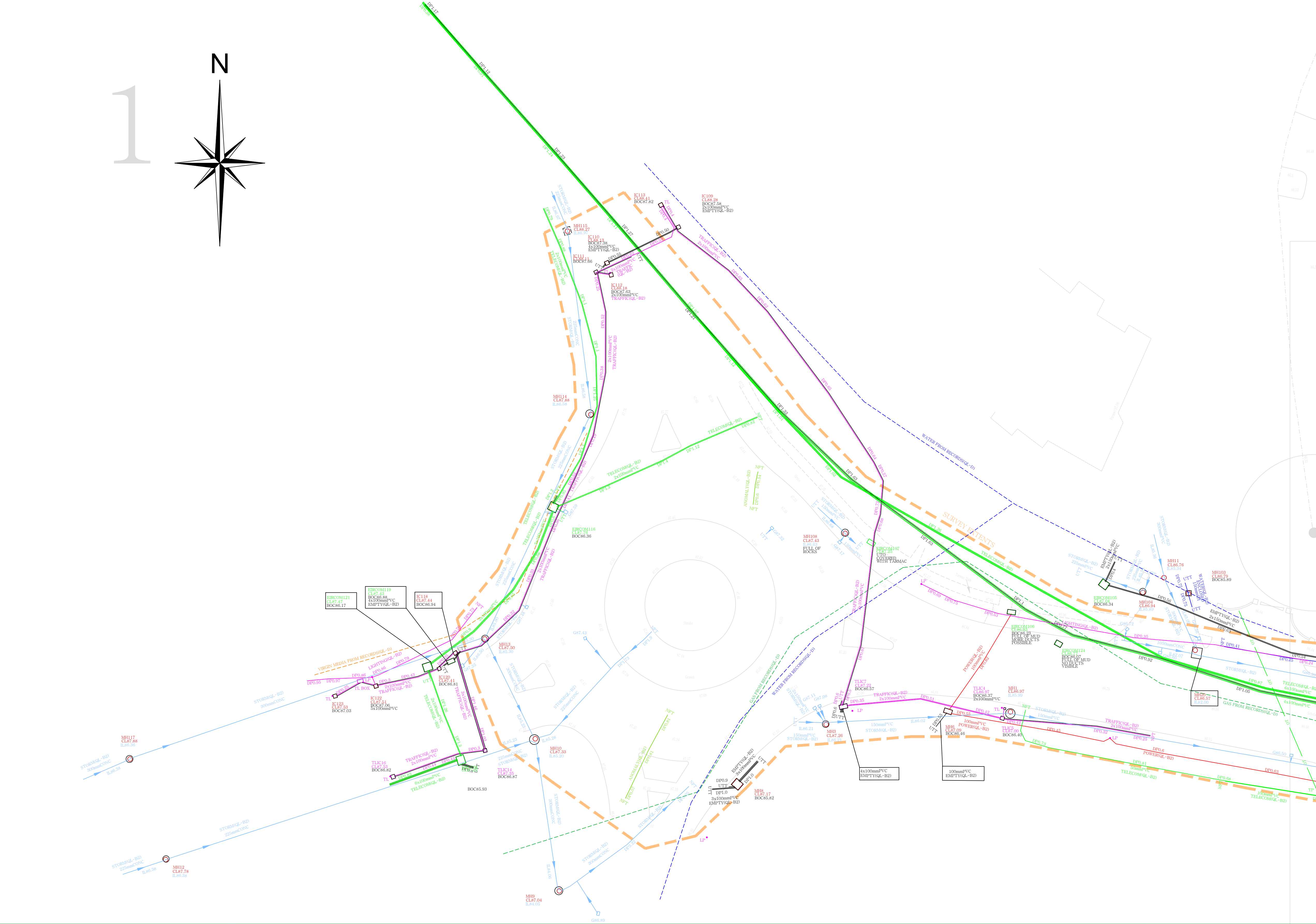
- Locational accuracy is determined by referring to the manufacturers guidelines for the detector used.
- In ideal conditions the spatial accuracies for the underground utilities may be +1-5% for Radiodetection and +1-10% of depth for the GPR to 2.5m deep. However variations within the subsurface, depth below the ground, close proximity of other services and local magnetic, atmospheric or ground conditions, bends, lateral service connections and any of the other limitations listed in this disclaimer may alter this estimated accuracy.
- Plan accuracies of + or - 150mm may be achieved but this figure will depend on the depth of service below ground level. However variations within the subsurface, depth below the ground, close proximity of other services and local magnetic, atmospheric or ground conditions, bends, lateral service connections and any of the other limitations listed in this disclaimer may alter this estimated accuracy.
- DP represents distance from the surface level to the top of the service/ target
- Where technically possible, depth indications will be given. These along with plan positions should be used for guidance only and wherever critical accuracy is required these should be confirmed by the client by undertaking trial excavations or similar.

Record Drawing Information

- Services which have been untraceable are shown from records where possible or available. These lines are annotated as "Taken From Records" or "From Records".
- Existing record information showing underground services is often incomplete and with known accuracies therefore it should be regarded as indicative only.
- Where Apex Surveys issue a utility drawing, this should be read in conjunction with all available public or private utility records.
- Apex Surveys endeavor to add relevant Public Utility record information onto the final drawing. However, we would recommend that direct contact is made with the asset owner or statutory undertaker.
- We shall not be held responsible for the accuracy, or otherwise, of the location of a service, as issued by the utility provider and therefore shown as "Taken for Records" on the drawing.

- The following have been excluded from the survey:
- Location of individual service feeds to properties or buildings as access would be required into each property to apply direct connections to inlet points and this would significantly increase the scope of works, survey cost and also cause possible disruption to occupants.
 - Pot ended or disconnected cables or terminated short lengths of pipe.
 - Internal building services.
 - Small diameter cables less than 20mm diameter or pipes less than 40mm diameter.
 - Above ground services unless specifically requested.
 - Lifting manholes which require longer than 10 minutes effort using standard heavy duty apparatus.

All works carried out by Apex Surveys conforms to the guidelines set out by The Survey Association (TSA) and PAS:128 Standard for utility mapping



APEX SURVEYS

www.apexsurveys.ie
info@apexsurveys.ie
00353 1 691 0156

STREET FURNITURE :

BOLLARDS	BD+
BUS STOP	BS+
CRASH BARRIER	CB
GATE	GA
ELECTRICITY POLE	EP+
TELEPHONE POLE	TP+
EARTHING ROD	ER+
LAMP POST	LP+
MARKER POST	MKR+
SIGN POST	SP+
TRAFFIC LIGHT	TL+
TELEPHONE BOX	TB
POST BOX	POST BOX
ROADSIGN	RS+RS
BORE HOLE	BH+
TRIAL PIT	TPIT+

SERVICES :

AIR VALVE	AV
ARMSTRONG JUNCTION	AJ
CABLE TV IC	CA TV
COVER LEVEL	CL
EIRCOM JUNCTION BOX	EIRCOM BOX
EIRCOM JUNCTION BOX	EIRCOM BOX
ELECTRICAL CABLE PIT	ECP
ESAT COVER	ESAT
ESB COVER	ESB
ESB JUNCTION BOX	ESB BOX
FIRE HYDRANT	FH
GAS VALVE	GV
GULLY	G
INSPECTION COVER	IC
MANHOLE	MH
SEPTIC TANK	SEPTIC
SLUICE VALVE	SV
STOPOCK	ST
OHEAD ELECTRICITY	OE
OHEAD TELECOM	OT

SERVICE BOX (UNKNOWN)

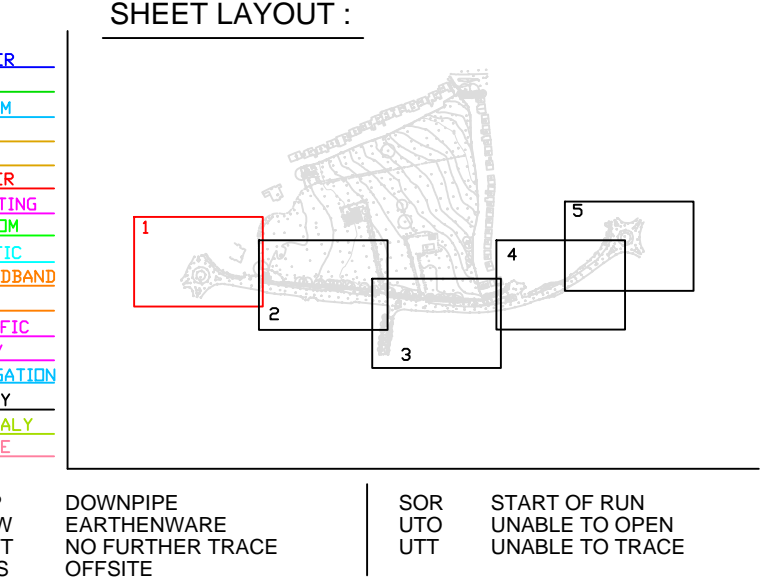
BOX	BOX
TRAFFIC COVER	TLIC
VENT	VENT+
WATER METER	WM+
UNABLE TO LIFT	UTO

LEVELS :

BED LEVEL	+BED101.50
EAVE LEVEL	+E101.50
FLOOR LEVEL	+FL101.50
SOFFIT LEVEL	+SL101.50
INVERT LEVEL	+I101.50
ROAD LEVEL	+R101.50
RIDGE LEVEL	+RL101.50
SPOT LEVEL	+S101.50
TOP OF WALL LEVEL	+TOW101.50
WATER LEVEL	+W101.50
SURVEY CONTROL STATION	SCS

UNDERGROUND LEGEND :

WATER MAIN	WATER
GAS MAIN	GAS
STORM DRAIN	STORM
COLL SEWER	COLL
COMBINED SEWER	COMB
ELECTRIC CABLE	ELECTRIC
ELECTRIC LIGHTING	ELECTRIC LIGHTING
EIRCOM	EIRCOM
FIBRE OPTIC CABLE	FIBRE OPTIC CABLE
BROADBAND	BROADBAND
CABLE TV	CABLE TV
TRAFFIC AND SIGNAL CABLE	TRAFFIC AND SIGNAL CABLE
CCTV	CCTV
IRRIGATION PIPE	IRRIGATION PIPE
EMPTY DUCT	EMPTY DUCT
GPR ANOMALY	GPR ANOMALY
UNKNOWN CABLE	UNKNOWN CABLE
BOC	DOWNPIPE
CAST-IRON	EARTHENWARE
CONC	NO FURTHER TRACE
DIA	OFFSITE
DP	SOR
EW	UTO
NFT	START OF RUN
OS	UNABLE TO OPEN
	UNABLE TO TRACE



PLAN PRODUCED BY:

APEX SURVEYS

CONTACT INFORMATION:

Apex Surveys
Unit 78 Dunboyne Business Park
Dunboyne, Co. Meath, Ireland
www.apexsurveys.ie
info@apexsurveys.ie
00353 1 691 0156

CLIENT:

D.B.F.L.

GRID SYSTEM: Irish Transverse Mercator
DATUM: Main Head (OSGM15)
NOTES: Drawing Contains Scale Factor

REVISIONS:

No.	Date	Description
001	N/A	Original Drawing

PROJECT:

Scholarstown Road, Co. Dublin

SCALE : 1/250 A1

DATE : 28/09/2018

DRG No: 3576

SHEET: 1 of 5

DESCRIPTION : 2D UG Utilities

SURVEYED BY : Ivan Josipovic

PROCESSED BY : Aliona Bauzienne

CHECKED BY : Alan Brady



PAS 128: 2014 (Quality of Survey Level Outputs):

DESKTOP UTILITY RECORDS SEARCH QL-D	Drafted from utility records
SITE RECONNAISSANCE QL-C	Location Demonstrated by visual reference to street furniture or evidence of previous streetworks, ie - reinstatement scars
DETECTION	
QL-B4	A segment of utility suspected to exist but has not been detected by a geophysical technique
QL-B3	Horizontal location only of the utility detected by one of the geophysical techniques used
QL-B2	Horizontal and vertical location of the utility detected by one of the geophysical techniques used
QL-B1	Horizontal and vertical location of the utility detected by multiple geophysical techniques
VERIFICATION	
QL-A	Horizontal and vertical location of the top and/or bottom of the utility

Apex Surveys Ltd. Disclaimer - Utility Survey

The Survey aims to map existing utilities and sub-surface structures and provide information with respect to pipe size, material type and drainage connectivity. However utility surveying is limited by the following guidelines and it may not be possible to accurately survey, define and locate all services and sub-surface features. Please note that not all buried pipes, cables and ducts can be detected and mapped in consideration of their depth, location, material type, geology and proximity to other utilities. Even an appropriate and professionally executed survey may not be able to achieve 100% detection rate.

Although all reasonable steps have been taken to locate all features, there is no guarantee that all utilities and underground structures will be located and shown on the drawing.

- The following is a non-exhaustive list of the limitations of utility surveys:
- Depth of Utility:** The depth and size of a utility affect the signal response and the degree with which a utility can be located. Due to attenuation of the radar signal with depth, resolution is restricted, hence making identification of utilities more difficult with increasing depth.
 - Size of Utility:** The smaller the diameter of a utility the more difficult it is to locate. This difficulty increases with depth.
 - Ground Conditions:** The depth penetration and quality of the data depends on the ground conditions of the site. GPR Surveying works best with high resistivity material. Clay overburden can impair GPR Surveying. Poor data may be a result of areas with high conductivity.
 - Utility Congestion:** Where different utilities converge together into a service corridor or cross paths it becomes difficult to isolate a specific utility and to map its route. The reflected signal will display a single response to multiple utilities. Therefore multiple utilities may appear to be a single utility. Where similar services run on close proximity, separation may be impossible.
 - Signal Jumping:** Signal from surrounding services may 'jump' to a highly conductive line masking its true identity.
 - Shadowing:** (of deeper utilities by shallower objects) Shallow utilities will mask the existence of deeper utilities where they are in close proximity. Also, high reflective materials close to the surface i.e rebar may hide deeper anomalies.
 - Surface Obstructions:** The GPR system relies on a relatively flat and even surface on which to perform radar passes. If ground obstructions such as vehicles, organic material (long grass, scrub) or undulating ground surface are present then the acquired data will be of lower resolution and in some cases not viable.
 - Loss of signal:** It is not always possible to trace the entire length of each underground service.
 - Connections between manholes:** Connections between manhole chambers are assumed to be straight.
 - Non-metallic objects:** Nonmetallic objects are amongst the most difficult to trace therefore successful tracing of non-metallic pipes/utilities may be limited.
 - Fiber Optic Cables:** Fiber optic cables may not be possible to locate except where laid with a built in tracer wire or similar conductor system.
 - Defective/flooded manholes or pipework:** establish connections between flooded or defective manholes or pipework.
 - Acute bends in pipework:** It may not be possible to trace a pipe past an acute bend.

Accuracy estimates:

- Locational accuracy is determined by referring to the manufacturers guidelines for the detector used.
- In ideal conditions the spatial accuracies for the underground utilities may be +/- 5% for radiolocation and +/- 10% of depth for the GPR to 2.5m deep. However variations within the subsurface, depth below the ground, close proximity of other services and local magnetic, atmospheric or ground conditions, bends, lateral service connections and any of the other limitations listed in this disclaimer may alter this estimated accuracy.
- Plan accuracies of +/- 150mm may be achieved but this figure will depend on the depth of service below ground level. However variations within the subsurface, depth below the ground, close proximity of other services and local magnetic, atmospheric or ground conditions, bends, lateral service connections and any of the other limitations listed in this disclaimer may alter this estimated accuracy.
- DP represents distance from the surface level to the top of the service/ target
- Where technically possible, depth indications will be given. These along with plan positions should be used for guidance only and where critical accuracy is required these should be confirmed by the client by undertaking trial excavations or similar.

Record Drawing Information

- Services which have been untraceable are shown from records where possible or available. These lines are annotated as "Taken From Records" or "From Records".
- Existing record information showing underground services is often incomplete and with unknown accuracies therefore it should be regarded as indicative only.
- Where Apex Surveys issue a utility drawing, this should be read in conjunction with all available public or private utility records.
- Apex Surveys endeavor to add relevant Public Utility record information onto the final drawing. However, we would recommend that direct contact is made with the asset owner or statutory undertaker.
- We shall not be held responsible for the accuracy, or otherwise, of the location of a service, as issued by the utility provider and therefore shown as "Taken for Records" on the drawing.

The following have been excluded from the survey:

- Location of individual service feeds to properties or buildings as access would be required into each property to apply direct connections to inlet points and this would significantly increase the scope of works, survey cost and also cause possible disruption to occupants.
- Pot ended or disconnected cables or terminated short lengths of pipe.
- Internal building services.
- Small diameter cables less than 20mm diameter or pipes less than 40mm diameter.
- Above ground services unless specifically requested.
- Lifting manholes which require longer than 10 minutes effort using standard heavy duty apparatus.

All works carried out by Apex Surveys conforms to the guidelines set out by The Survey Association (TSA) and PAS:128 Standard for utility mapping

APEX SURVEYS

www.apexsurveys.ie
info@apexsurveys.ie
00353 1 691 0156

STREET FURNITURE :

BOLLARDS	BD+
BUS STOP	BS+
CRASH BARRIER	CB
ELECTRICITY POLE	EP+
TELEPHONE POLE	TP+
EARTHING ROD	ER+
LAMP POST	LP+
MARKER POST	MKR+
SIGN POST	SP+
TRAFFIC LIGHT	TL+
TELEPHONE BOX	TB
POST BOX	POST BOX+
ROADSIGN	RS+RS
BORE HOLE	BH+
TRIAL PIT	TPIT+

SERVICES :

AIR VALVE	AV
ARMSTRONG JUNCTION	AJ
CABLE TV IC	CATV
COVER LEVEL	CL
EIRCOM COVER	EIRCOM
EIRCOM JUNCTION BOX	EIRCOM BOX
ELECTRICAL CABLE PIT	ECP
ESAT COVER	ESAT
ESB COVER	ESB
ESB JUNCTION BOX	ESB BOX
FIRE HYDRANT	FH+
ESAT COVER	ESAT
GAS VALVE	GV
GULLY	G
INSPECTION COVER	IC
MANHOLE	MH
SEPTIC TANK	SEPTIC
SLOUCE VALVE	SV
STOPOCK	ST
OHEAD ELECTRICITY	OE
OHEAD TELECOM	OT

SERVICE BOX (UNKNOWN)

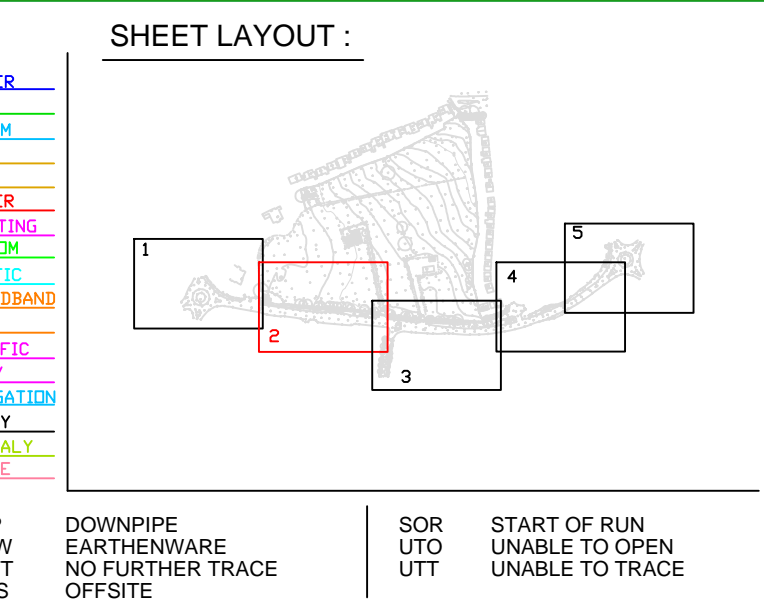
BOX	BOX
TRAFIC COVER	TLC
VENT	VENT+
WATER METER	WM+
UNABLE TO LIFT	UTO

LEVELS :

BED LEVEL	+BED101.50
EAVE LEVEL	+E101.50
FLOOR LEVEL	+FL101.50
INVERT LEVEL	+IL101.50
ROAD LEVEL	+101.50
RIDGE LEVEL	+R101.50
SOFFIT LEVEL	+SL101.50
SPOT LEVEL	+101.50
TOP OF WALL LEVEL	+TOW101.50
WATER LEVEL	+WL101.50
SURVEY CONTROL STATION	SCS

UNDERGROUND LEGEND :

WATER MAIN	WATER
GAS MAIN	GAS
STORM DRAIN	STORM
FULL SEWER	FULL
COMBINED SEWER	COMB
ELECTRIC CABLE	ELECTRIC
ELECTRIC LIGHTING	ELECTRIC LIGHTING
EIRCOM	EIRCOM
FIBRE OPTIC CABLE	FIBRE OPTIC
BROADBAND	BROADBAND
CABLE TV	CABLE TV
TRAFFIC AND SIGNAL CABLE	TRAFFIC
CCTV	CCTV
IRRIGATION PIPE	IRRIGATION
EMPTY DUCT	EMPTY
GPR ANOMALY	ANOMALY
UNKNOWN CABLE	CABLE
BOC	DOWNPIPE
BOTTOM OF CHAMBER	EARTHENWARE
CI	NO FURTHER TRACE
CAST-IRON	OFFSITE
CONC	
DIA	
	DP
	EW
	NFT
	OS
	SOR
	UTO
	START OF RUN
	UNABLE TO OPEN
	UNABLE TO TRACE



PLAN PRODUCED BY:

APEX SURVEYS

CONTACT INFORMATION:

Apex Surveys
Unit 78 Dunboyne Business Park
Dunboyne, Co. Meath, Ireland
www.apexsurveys.ie
info@apexsurveys.ie
00353 1 691 0156

CLIENT:

D.B.F.L.

GRID SYSTEM: Irish Transverse Mercator
DATUM: Main Head (OSGM15)
NOTES: Drawing Contains Scale Factor

REVISIONS:

No.	Date	Description
001	N/A	Original Drawing

PROJECT:

Scholarstown Road, Co. Dublin

SCALE : 1/250 A1

DATE : 28/09/2018

DRG No: 3576

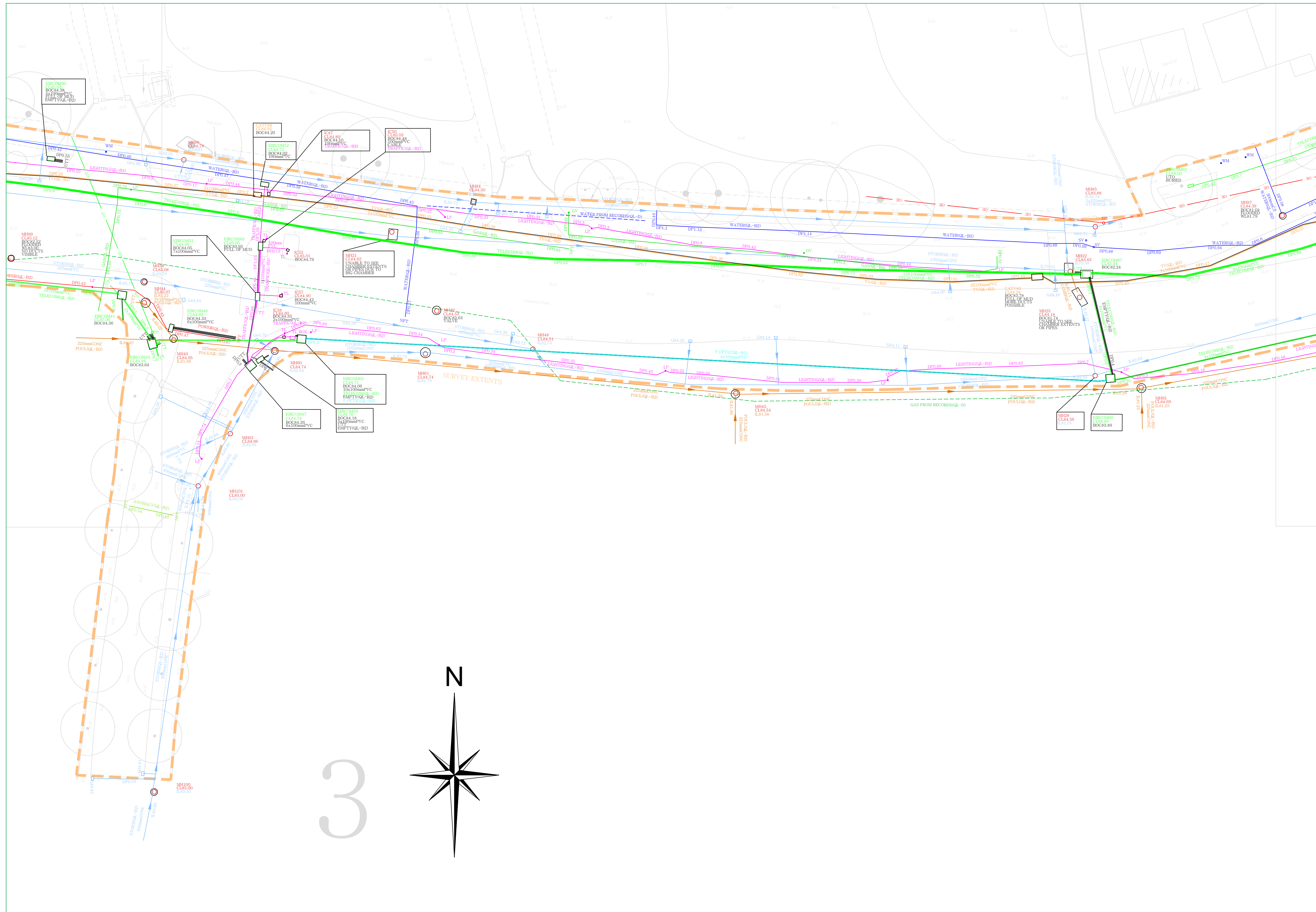
SHEET: 2 of 5

DESCRIPTION : 2D UG Utilities

SURVEYED BY : Ivan Josipovic

PROCESSED BY : Aliona Bauzienne

CHECKED BY : Alan Brady



PAS 128: 2014 (Quality of Survey Level Outputs):

DESKTOP UTILITY RECORDS SEARCH QL-D	Drafted from utility records
SITE RECONNAISSANCE QL-C	Location Demonstrated by visual reference to street furniture or evidence of previous streetworks, ie - reinstatement scars
DETECTION QL-B4	A segment of utility suspected to exist but has not been detected by a geophysical technique
QL-B3	Horizontal location only of the utility detected by one of the geophysical techniques used
QL-B2	Horizontal and vertical location of the utility detected by one of the geophysical techniques used
QL-B1	Horizontal and vertical location of the utility detected by multiple geophysical techniques
VERIFICATION QL-A	Horizontal and vertical location of the top and/or bottom of the utility

Apex Surveys Ltd. Disclaimer - Utility Survey

The Survey aims to map existing utilities and sub-surface structures and provide information with respect to pipe size, material type and drainage connectivity. However utility surveying is limited by the following guidelines and it may not be possible to accurately survey, define and locate all services and sub-surface features. Please note that not all buried pipes, cables and ducts can be detected and mapped in consideration of their depth, location, material type, geology and proximity to other utilities. Even an appropriate and professionally executed survey may not be able to achieve 100% detection rate. Although all reasonable steps have been taken to locate all features, there is no guarantee that all utilities and underground structures will be located and shown on the drawing.

The following is a non-exhaustive list of the limitations of utility surveys:

- Depth of Utility:** The depth and size of a utility affect the signal response and the degree with which a utility can be located. Due to attenuation of the radar signal with depth, resolution is restricted, hence making identification of utilities more difficult with increasing depth.
- Size of Utility:** The smaller the diameter of a utility the more difficult it is to locate. This difficulty increases with depth.
- Ground Conditions:** The depth penetration and quality of the data depends on the ground conditions of the site. GPR Surveying works best with high resistivity material. Clay overburden can impair GPR Surveying. Poor data may be a result of areas with high conductivity.
- Utility Congestion:** Where different utilities converge together into a service corridor or cross paths it becomes difficult to isolate a specific utility and map its route. The reflected signal will display a single response to multiple utilities. Therefore multiple utilities may appear to be a single utility. Where similar services run on close proximity, separation may be impossible.
- Signal Jumping:** Signal from surrounding services may 'jump' to a highly conductive line masking its true identity.
- Shadowing:** (of deeper utilities by shallower objects) Shallow utilities will mask the existence of deeper utilities where they are in close proximity. Also, high reflective materials close to the surface i.e. rebar may hide deeper anomalies.
- Surface Obstructions:** The GPR system relies on a relatively flat and even surface on which to perform radar passes. If ground obstructions such as vehicles, organic material (long grass, scrub) or undulating ground surface are present then the acquired data will be of lower resolution and in some cases not viable.
- Loss of signal:** It is not always possible to trace the entire length of each underground service.
- Connections between manholes:** Connections between manhole chambers are assumed to be straight.
- Non-metallic objects:** Non-metallic objects are amongst the most difficult to trace therefore successful tracing of non-metallic pipes/utilities may be limited.
- Fiber Optic Cables:** Fiber optic cables may not be possible to locate except where laid with a built in tracer wire or similar conductor system.
- Defective/flooded manholes or pipework:** establish connections between flooded or defective manholes or pipework.
- Acute bends in pipework:** It may not be possible to trace a pipe past an acute bend.

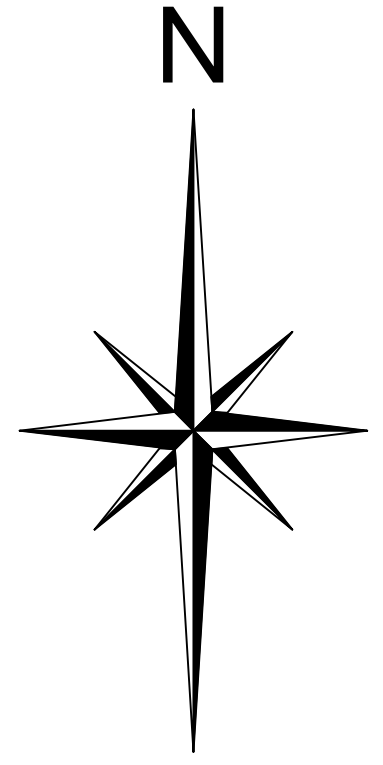
Accuracy estimates:

- Locational accuracy is determined by referring to the manufacturers guidelines for the detector used.
- In ideal conditions the spatial accuracies for the underground utilities may be +/- 5% for Radiodetection and +/- 10% of depth for the GPR to 2.5m deep. However variations within the subsurface, depth below the ground, close proximity of other services and local magnetic, atmospheric or ground conditions, bends, lateral service connections and any of the other limitations listed in this disclaimer may alter this estimated accuracy.
- Plan accuracies of + or - 150mm may be achieved but this figure will depend on the depth of service below ground level. However variations within the subsurface, depth below the ground, close proximity of other services and local magnetic, atmospheric or ground conditions, bends, lateral service connections and any of the other limitations listed in this disclaimer may alter this estimated accuracy.
- DP represents distance from the surface level to the top of the service/ target
- Where technically possible, depth indications will be given. These along with plan positions should be used for guidance only and wherever critical accuracy is required these should be confirmed by the client by undertaking trial excavations or similar.

Record Drawing Information

- Services which have been untraceable are shown from records where possible or available. These lines are annotated as "Taken From Records" or "From Records".
 - Existing record information showing underground services is often incomplete and with unknown accuracies therefore it should be regarded as indicative only.
 - Where Apex Surveys issue a utility drawing, this should be read in conjunction with all available public or private utility records.
 - Apex Surveys endeavor to add relevant Public Utility record information onto the final drawing. However, we would recommend that direct contact is made with the asset owner or statutory undertaker.
 - We shall not be held responsible for the accuracy, or otherwise, of the location of a service, as issued by the utility provider and therefore shown as "Taken for Records" on the drawing.
- The following have been excluded from the survey:
- Location of individual service feeds to properties or buildings as access would be required into each property to apply direct connections to inlet points and this would significantly increase the scope of works, survey cost and also cause possible disruption to occupants.
 - Pot ended or disconnected cables or terminated short lengths of pipe.
 - Internal building services.
 - Small diameter cables less than 20mm diameter or pipes less than 40mm diameter.
 - Above ground services unless specifically requested.
 - Lifting manholes which require longer than 10 minutes effort using standard heavy duty apparatus.
- All works carried out by Apex Surveys conforms to the guidelines set out by The Survey Association (TSA) and PAS:128 Standard for utility mapping

3



www.apexsurveys.ie
info@apexsurveys.ie
00353 1 691 0156

STREET FURNITURE :

BOLLARDS	BD+
BUS STOP	BS+
CRASH BARRIER	CB
GATE	GP
ELECTRICITY POLE	EP+
TELEPHONE POLE	TP+
EARTHING ROD	ER+
LAMP POST	LP+
MARKER POST	MKR+
SIGN POST	SPN+
TRAFFIC LIGHT	TL+
TELEPHONE BOX	TB
POST BOX	POST BOX
POST SIGN	RS-RS
BORE HOLE	BH+
TRIAL PIT	TPIT+

SERVICES :

AIR VALVE	AV
ARMSTRONG JUNCTION	AJ
CABLE TV IC	CA TV
COVER LEVEL	CL
EIRCOM COVER	EIRCOM
EIRCOM JUNCTION BOX	EIRCOM BOX
ELECTRICAL CABLE PIT	ECP
ESAT COVER	ESAT
ESB COVER	ESB
ESB JUNCTION BOX	ESB BOX
FIRE HYDRANT	FH+
ESAT COVER	ESAT
GAS VALVE	GV
GULLY	G
INSPECTION COVER	IC
MANHOLE	MH
SEPTIC TANK	SEPTIC
SLUICE VALVE	SV
STOPOCK	ST
OHEAD ELECTRICITY	OE
OHEAD TELECOM	OT

SERVICE BOX (UNKNOWN)

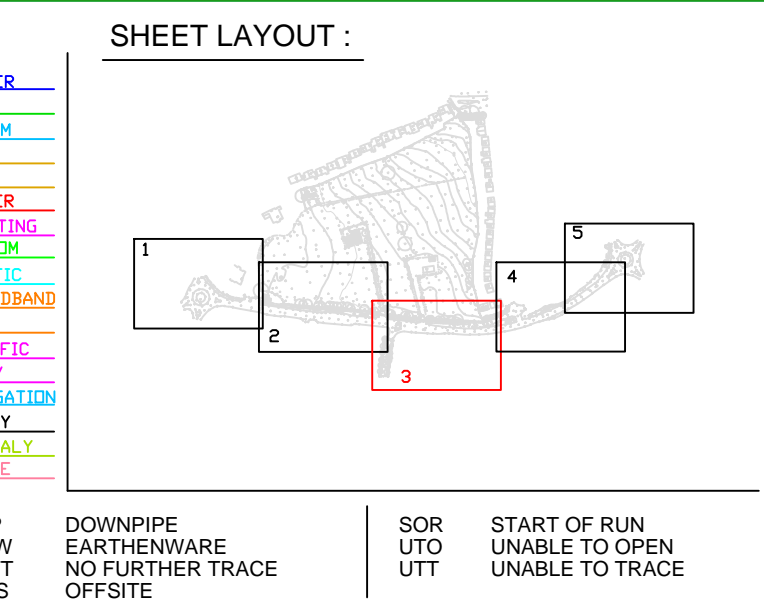
BOX	BOX
TRAFIC COVER	TLIC
VENT	VENT+
WATER METER	WM+
UNABLE TO LIFT	UTO

LEVELS :

BED LEVEL	+BED101.50
EAVE LEVEL	+E101.50
FLOOR LEVEL	+FL101.50
INVERT LEVEL	+IL101.50
ROAD LEVEL	+101.50
RIDGE LEVEL	+R101.50
SOFFIT LEVEL	+SL101.50
SPOT LEVEL	+101.50
TOP OF WALL LEVEL	+TOW101.50
WATER LEVEL	+WL101.50
SURVEY CONTROL STATION	SCS

UNDERGROUND LEGEND :

WATER MAIN	WATER
GAS MAIN	GAS
STORM DRAIN	SD
FULL SEWER	FS
COMBINED SEWER	COMB
ELECTRIC CABLE	ELECTRIC
ELECTRIC LIGHTING	ELECTRIC LIGHTING
EIRCOM	EIRCOM
FIBRE OPTIC CABLE	FIBRE OPTIC
BROADBAND	BROADBAND
CABLE TV	CABLE TV
TRAFFIC AND SIGNAL CABLE	TRAFFIC
CCTV	CCTV
IRRIGATION PIPE	IRRIGATION
EMPTY DUCT	EMPTY
GPR ANOMALY	ANOMALY
UNKNOWN CABLE	CABLE
BOC BOTTOM OF CHAMBER	BOC
CI CAST-IRON	CI
CONC CONCRETE	CONC
DIA DIAMETER	DIA
DP DOWNPIPE	DP
EW EARTHENWARE	EW
NFT NO FURTHER TRACE	NFT
OS OFFSITE	OS
SOR START OF RUN	SOR
UTO UNABLE TO OPEN	UTO
UNABLE TO TRACE	UNABLE TO TRACE



PLAN PRODUCED BY:

CONTACT INFORMATION:

Apex Surveys
Unit 78 Dunboyne Business Park
Dunboyne, Co. Meath, Ireland
www.apexsurveys.ie
info@apexsurveys.ie
00353 1 691 0156

CLIENT:

D.B.F.L.

GRID SYSTEM: Irish Transverse Mercator
DATUM: Main Head (OSGM15)
NOTES: Drawing Contains Scale Factor

REVISIONS:

No.	Date	Description
001	N/A	Original Drawing

PROJECT:

Scholarstown Road,
Co. Dublin

SCALE : 1/250 A1

DATE : 28/09/2018

DRG No: 3576

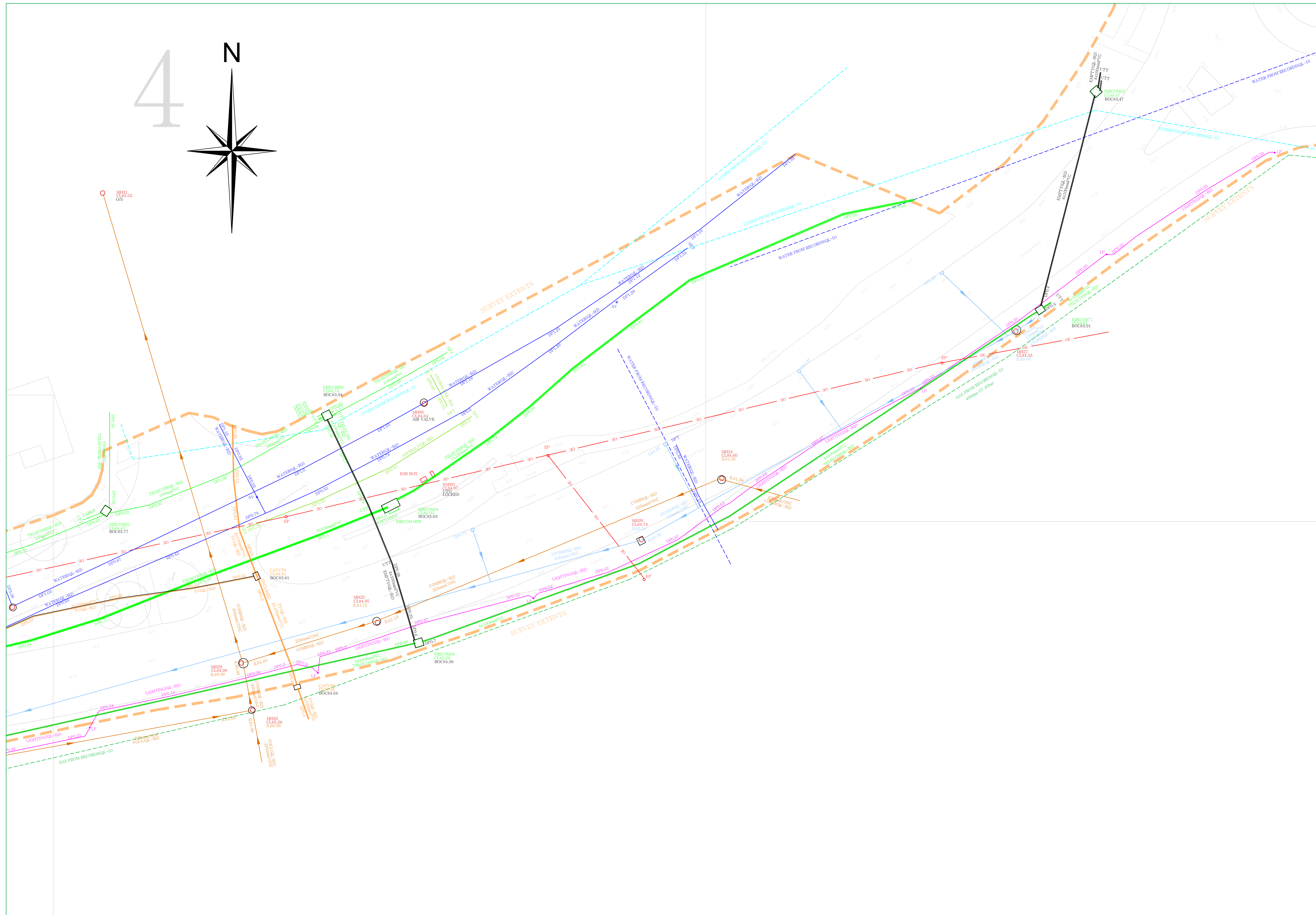
DESCRIPTION : 2D UG Utilities

SHEET: 3 of 5

SURVEYED BY : Ivan Josipovic

PROCESSED BY : Aliona Bauzienne

CHECKED BY : Alan Brady



PAS 128: 2014 (Quality of Survey Level Outputs):

DESKTOP UTILITY RECORDS SEARCH QL-D Drafted from utility records
SITE RECONNAISSANCE QL-C Location Demonstrated by visual reference to street furniture or evidence of previous streetworks, ie - reinstatement scars
DETECTION QL-B4 A segment of utility suspected to exist but has not been detected by a geophysical technique
QL-B3 Horizontal location only of the utility detected by one of the geophysical techniques used
QL-B2 Horizontal and vertical location of the utility detected by one of the geophysical techniques used
QL-B1 Horizontal and vertical location of the utility detected by multiple geophysical techniques
VERIFICATION QL-A Horizontal and vertical location of the top and/or bottom of the utility

Apex Surveys Ltd. Disclaimer - Utility Survey

The Survey aims to map existing utilities and sub-surface structures and provide information with respect to pipe size, material type and drainage connectivity. However utility surveying is limited by the following guidelines and it may not be possible to accurately survey, define and locate all services and sub-surface features. Please note that not all buried pipes, cables and ducts can be detected and mapped in consideration of their depth, location, material type, geology and proximity to other utilities. Even an appropriate and professionally executed survey may not be able to achieve 100% detection rate. Although all reasonable steps have been taken to locate all features, there is no guarantee that all utilities and underground structures will be located and shown on the drawing.

- The following is a non-exhaustive list of the limitations of utility surveys:
- Depth of Utility:** The depth and size of a utility affect the signal response and the degree with which a utility can be located. Due to attenuation of the radar signal with depth, resolution is restricted, hence making identification of utilities more difficult with increasing depth.
 - Size of Utility:** The smaller the diameter of a utility the more difficult it is to locate. This difficulty increases with depth.
 - Ground Conditions:** The depth penetration and quality of the data depends on the ground conditions of the site. GPR Surveying works best within high resistivity material. Clay overburden can impair GPR Surveying. Poor data may be a result of areas with high conductivity.
 - Utility Congestion:** Where different utilities converge together into a service corridor or cross paths it becomes difficult to isolate a specific utility and map its route. The reflected signal will display a single response to multiple utilities. Therefore multiple utilities may appear to be a single utility. Where similar services run on close proximity, separation may be impossible.
 - Signal Jumping:** Signal from surrounding services may 'jump' to a highly conductive line masking its true identity.
 - Shadowing:** (of deeper utilities by shallower objects) Shallow utilities will mask the existence of deeper utilities where they are in close proximity. Also, high reflective materials close to the surface i.e rebar may hide deeper anomalies.
 - Surface Obstructions:** The GPR system relies on a relatively flat and even surface on which to perform radar passes. If ground obstructions such as vehicles, organic material (long grass, scrub) or undulating ground surface are present then the acquired data will be of lower resolution and in some cases not viable.
 - Loss of signal:** It is not always possible to trace the entire length of each underground service.
 - Connections between manholes:** Connections between manhole chambers are assumed to be straight.
 - Non-metallic objects:** Non-metallic objects are amongst the most difficult to trace therefore successful tracing of non-metallic pipes/ utilities may be limited.
 - Fiber Optic Cables:** Fiber optic cables may not be possible to locate except where laid with a built in tracer wire or similar conductor system.
 - Defective/flooded manholes or pipework:** establish connections between flooded or defective manholes or pipework.
 - Acute bends in pipework:** It may not be possible to trace a pipe past an acute bend.

Accuracy estimates:

- Locational accuracy is determined by referring to the manufacturers guidelines for the detector used.
- In ideal conditions the spatial accuracies for the underground utilities may be +1-5% for Radiodetection and +1-10% of depth for the GPR to 2.5m deep. However variations within the subsurface, depth below the ground, close proximity of other services and local magnetic, atmospheric or ground conditions, bends, lateral service connections and any of the other limitations listed in this disclaimer may alter this estimated accuracy.
- Plan accuracies of + or - 150mm may be achieved but this figure will depend on the depth of service below ground level. However variations within the subsurface, depth below the ground, close proximity of other services and local magnetic, atmospheric or ground conditions, bends, lateral service connections and any of the other limitations listed in this disclaimer may alter this estimated accuracy.
- DP represents distance from the surface level to the top of the service/ target
- Where technically possible, depth indications will be given. These along with plan positions should be used for guidance only and wherever critical accuracy is required these should be confirmed by the client by undertaking trial excavations or similar.

Record Drawing Information

- Services which have been untraceable are shown from records where possible or available. These lines are annotated as "Taken From Records" or "From Records".
- Existing record information showing underground services is often incomplete and with unknown accuracies therefore it should be regarded as indicative only.
- Where Apex Surveys issue a utility drawing, this should be read in conjunction with all available public or private utility records.
- Apex Surveys endeavor to add relevant Public Utility record information onto the final drawing. However, we would recommend that direct contact is made with the asset owner or statutory undertaker.
- We shall not be held responsible for the accuracy, or otherwise, of the location of a service, as issued by the utility provider and therefore shown as "Taken for Records" on the drawing.

The following have been excluded from the survey:

- Location of individual service feeds to properties or buildings as access would be required into each property to apply direct connections to inlet points and this would significantly increase the scope of works, survey cost and also cause possible disruption to occupants.
- Pot ended or disconnected cables or terminated short lengths of pipe.
- Internal building services.
- Small diameter cables less than 20mm diameter or pipes less than 40mm diameter.
- Above ground services unless specifically requested.
- Lifting manholes which require longer than 10 minutes effort using standard heavy duty apparatus.

All works carried out by Apex Surveys conforms to the guidelines set out by The Survey Association (TSA) and PAS:128 Standard for utility mapping

www.apexsurveys.ie
info@apexsurveys.ie
00353 1 691 0156

STREET FURNITURE :

BOLLARDS	BD+
BUS STOP	BS+
CRASH BARRIER	CB
GATE	GT
ELECTRICITY POLE	EP+
TELEPHONE POLE	TP+
EARTHING ROD	ER+
LAMP POST	LP+
MARKER POST	MKR+
SIGN POST	SPN+
TRAFFIC LIGHT	TL+
TELEPHONE BOX	TB
POST	POST
POST BOX	POST BOX
ROADSIGN	RS-RS
BORE HOLE	BH+
TRIAL PIT	TPIT+

SERVICES :

AIR VALVE	AV
ARMSTRONG JUNCTION	AJ
CABLE TV IC	CATV
COVER LEVEL	CL
EIRCOM JUNCTION BOX	EIRCOM
ELECTRICAL CABLE PIT	EIRCOM BOX
ESAT COVER	ECP
ESB COVER	ESAT
ESB JUNCTION BOX	ESB
FIRE HYDRANT	ESB BOX
ESAT COVER	FH+
GAS VALVE	GV
GULLY	G
INSPECTION COVER	IC
MANHOLE	MH
SEPTIC TANK	SEPTIC
SLUICE VALVE	SV
STOPOCK	ST
OHEAD ELECTRICITY	OE
OHEAD TELECOM	OT

SERVICE BOX (UNKNOWN)

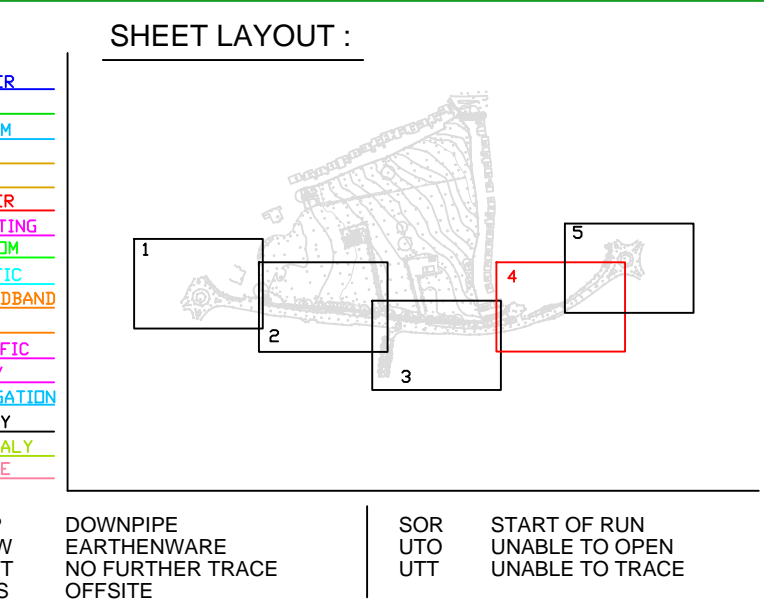
BOX	BOX
TRAFFIC COVER	TLIC
VENT	VENT*
WATER METER	WM*
UNABLE TO LIFT	UTO

LEVELS :

BED LEVEL	+BED101.50
EAVE LEVEL	+E101.50
FLOOR LEVEL	+FL101.50
INVERT LEVEL	+IL101.50
ROAD LEVEL	+101.50
RIDGE LEVEL	+R101.50
SOFFIT LEVEL	+SL101.50
SPOT LEVEL	+101.50
TOP OF WALL LEVEL	+TOW101.50
WATER LEVEL	+W101.50
SURVEY CONTROL STATION	SCS

UNDERGROUND LEGEND :

WATER MAIN	WATER
GAS MAIN	GAS
STORM DRAIN	STORM
FULL SEWER	FULL
COMBINED SEWER	COMB
ELECTRIC CABLE	ELECTR
ELECTRIC LIGHTING	EIRCOM
EIRCOM	EIRCOM
FIBRE OPTIC CABLE	F OPTIC
BROADBAND	BROADBAND
CABLE TV	TV
TRAFFIC AND SIGNAL CABLE	TRAFFIC
CCTV	CCTV
IRRIGATION PIPE	IRRIGATION
EMPTY DUCT	EMPTY
GPR ANOMALY	ANOMALY
UNKNOWN CABLE	CABLE
BOC BOTTOM OF CHAMBER	DP
CI CAST-IRON	E/W
CONC CONCRETE	NFT
DIA DIAMETER	OS
DOWNPIPE	DP
EARTHENWARE	E/W
NO FURTHER TRACE	NFT
OFFSITE	OS
START OF RUN	SOR
UNABLE TO OPEN	UTO
UNABLE TO TRACE	UTT



PLAN PRODUCED BY:

CONTACT INFORMATION:

Apex Surveys
Unit 78 Dunboyne Business Park
Dunboyne, Co. Meath, Ireland
www.apexsurveys.ie
info@apexsurveys.ie
00353 1 691 0156

CLIENT:

D.B.F.L.

GRID SYSTEM: Irish Transverse Mercator
DATUM: Main Head (OSGM15)
NOTES: Drawing Contains Scale Factor

REVISIONS:

No.	Date	Description
001	N/A	Original Drawing

PROJECT:

Scholarstown Road, Co. Dublin

SCALE : 1/250 A1

DATE : 28/09/2018

DRG No: 3576

DESCRIPTION : 2D UG Utilities

SURVEYED BY : Ivan Josipovic

SHEET: 4 of 5

PROCESSED BY : Aliona Bauzienne

CHECKED BY : Alan Brady

PAS 128: 2014 (Quality of Survey Level Outputs):

DESKTOP UTILITY RECORDS SEARCH	QL-D	Drafted from utility records
SITE RECONNAISSANCE	QL-C	Location Demonstrated by visual reference to street furniture or evidence of previous streetworks, ie - reinstatement scars
DETECTION	QL-B4	A segment of utility suspected to exist but has not been detected by a geophysical technique
	QL-B3	Horizontal location only of the utility detected by one of the geophysical techniques used
	QL-B2	Horizontal and vertical location of the utility detected by one of the geophysical techniques used
	QL-B1	Horizontal and vertical location of the utility detected by multiple geophysical techniques
VERIFICATION	QL-A	Horizontal and vertical location of the top and/or bottom of the utility

Apex Surveys Ltd. Disclaimer - Utility Survey

The Survey aims to map existing utilities and sub-surface structures and provide information with respect to pipe size, material type and drainage connectivity. However utility surveying is limited by the following guidelines and it may not be possible to accurately survey, define and locate all services and sub-surface features. Please note that not all buried pipes, cables and ducts can be detected and mapped in consideration of their depth, location, material type, geology and proximity to other utilities. Even an appropriate and professionally executed survey may not be able to achieve 100% detection rate. Although all reasonable steps have been taken to locate all features, there is no guarantee that all utilities and underground structures will be located and shown on the drawing.

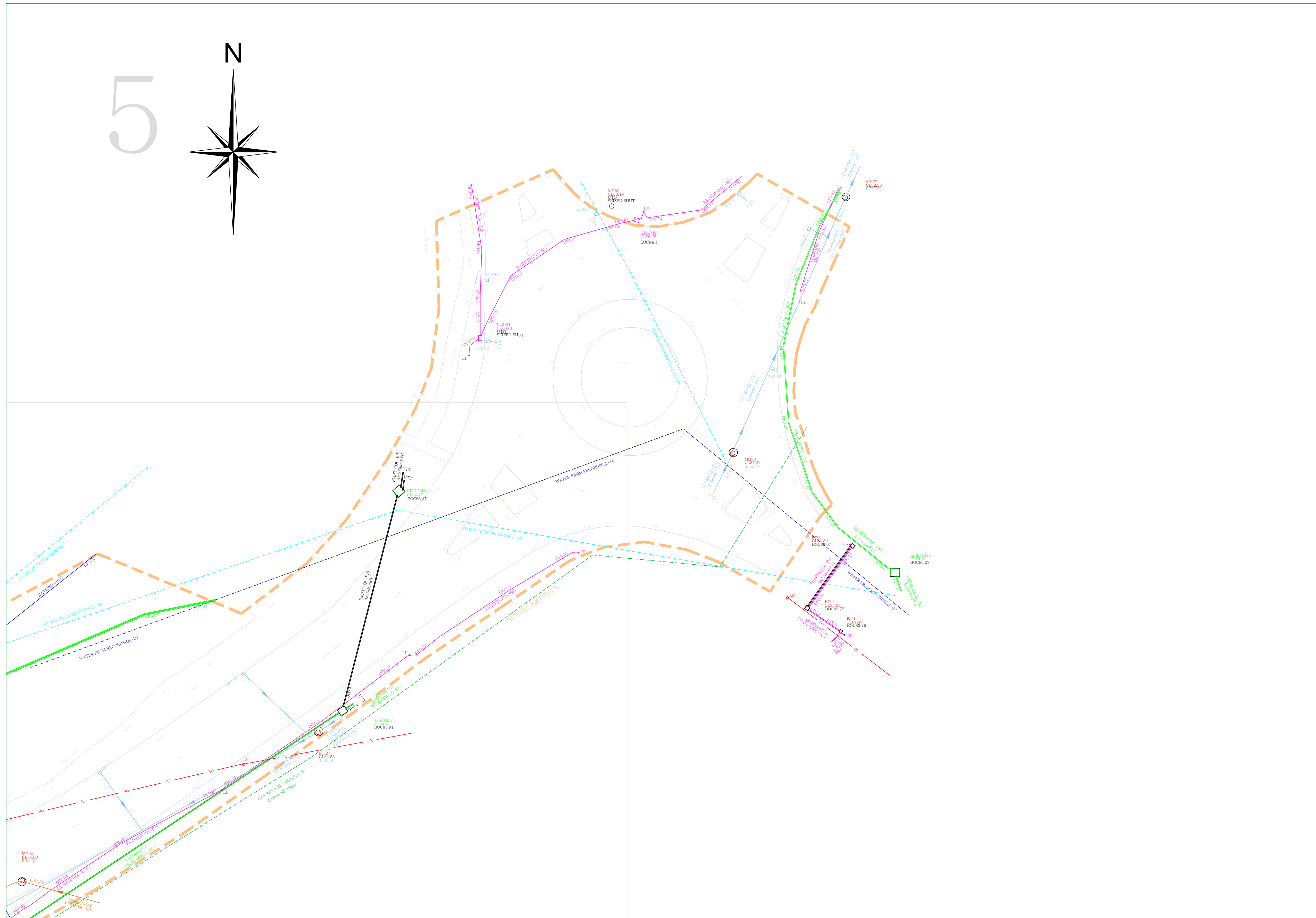
- The following is a non-exhaustive list of the limitations of utility surveys:
- Depth of Utility:** The depth and size of a utility affect the signal response and the degree with which a utility can be located. Due to attenuation of the radar signal with depth, resolution is restricted, hence making identification of utilities more difficult with increasing depth.
 - Size of Utility:** The smaller the diameter of a utility the more difficult it is to locate. This difficulty increases with depth.
 - Ground Conditions:** The depth penetration and quality of the data depends on the ground conditions of the site. GPR Surveying works best within high resistivity material. Clay overburden can impair GPR Surveying. Poor data may be a result of areas with high conductivity.
 - Utility Congestion:** Where different utilities converge together into a service corridor or cross paths it becomes difficult to isolate a specific utility and to map its route. The reflected signal will display a single response to multiple utilities. Therefore multiple utilities may appear to be a single utility. Where similar services run on close proximity, separation may be impossible.
 - Signal Jumping:** Signal from surrounding services may 'jump' to a highly conductive line masking its true identity.
 - Shadowing:** (of deeper utilities by shallower objects) Shallow utilities will mask the existence of deeper utilities where they are in close proximity. Also, high reflective materials close to the surface i.e rebar may hide deeper anomalies.
 - Surface Obstructions:** The GPR system relies on a relatively flat and even surface on which to perform radar passes. If ground obstructions such as vehicles, organic material (long grass, scrub) or undulating ground surface are present then the acquired data will be of lower resolution and in some cases not viable.
 - Loss of signal:** It is not always possible to trace the entire length of each underground service.
 - Connections between manholes:** Connections between manhole chambers are assumed to be straight.
 - Non-metallic objects:** Non-metallic objects are amongst the most difficult to trace therefore successful tracing of non-metallic pipes/ utilities may be limited.
 - Fiber Optic Cables:** Fiber optic cables may not be possible to locate except where laid with a built in tracer wire or similar conductor system.
 - Defective/ flooded manholes or pipework:** establish connections between flooded or defective manholes or pipework.
 - Acute bends in pipework:** It may not be possible to trace a pipe past an acute bend.

- Accuracy estimates:
- Locational accuracy is determined by referring to the manufacturers guidelines for the detector used.
 - In ideal conditions the spatial accuracies for the underground utilities may be +1-5% for Radiodetection and +1-10% of depth for the GPR to 2.5m deep. However variations within the subsurface, depth below the ground, close proximity of other services and local magnetic, atmospheric or ground conditions, bends, lateral service connections and any of the other limitations listed in this disclaimer may alter this estimated accuracy.
 - Plan accuracies of + or - 150mm may be achieved but this figure will depend on the depth of services below ground level. However variations within the subsurface, depth below the ground, close proximity of other services and local magnetic, atmospheric or ground conditions, bends, lateral service connections and any of the other limitations listed in this disclaimer may alter this estimated accuracy.
 - DP represents distance from the surface level to the top of the service/ target
 - Where technically possible, depth indications will be given. These along with plan positions should be used for guidance only and wherever critical accuracy is required these should be confirmed by the client by undertaking trial excavations or similar.

- Record Drawing Information
- Services which have been untraceable are shown from records where possible or available. These lines are annotated as "Taken From Records" or "From Records".
 - Existing record information showing underground services is often incomplete and with unknown accuracies therefore it should be regarded as indicative only.
 - Where Apex Surveys issue a utility drawing, this should be read in conjunction with all available public or private utility records.
 - Apex Surveys endeavor to add relevant Public Utility record information onto the final drawing. However, we would recommend that direct contact is made with the asset owner or statutory undertaker.
 - We shall not be held responsible for the accuracy, or otherwise, of the location of a service, as issued by the utility provider and therefore shown as "Taken for Records" on the drawing.

- The following have been excluded from the survey:
- Location of individual service feeds to properties or buildings as access would be required into each property to apply direct connections to inlet points and this would significantly increase the scope of works, survey cost and also cause possible disruption to occupants.
 - Pot ended or disconnected cables or terminated short lengths of pipe.
 - Internal building services.
 - Small diameter cables less than 20mm diameter or pipes less than 40mm diameter.
 - Above ground services unless specifically requested.
 - Lifting manholes which require longer than 10 minutes effort using standard heavy duty apparatus.

All works carried out by Apex Surveys conforms to the guidelines set out by The Survey Association (TSA) and PAS:128 Standard for utility mapping



APEX SURVEYS

www.apexsurveys.ie
info@apexsurveys.ie
00353 1 691 0156

STREET FURNITURE :

BOLLARDS	BD+
BUS STOP	BS+
CRASH BARRIER	CB
GATE	GA
ELECTRICITY POLE	EP+
TELEPHONE POLE	TP+
EARTHING ROD	ER+
LAMP POST	LP+
MARKER POST	MKR+
SIGN POST	SPN+
TRAFFIC LIGHT	TL+
TELEPHONE BOX	TB
POST	POST+
POST BOX	POST BOX+
ROADSIGN	RS+RS
BORE HOLE	BH+
TRIAL PIT	TPIT+

SERVICES :

AIR VALVE	AV
ARMSTRONG JUNCTION	AJ
CABLE TV IC	CATV
COVER LEVEL	CL
EIRCOM COVER	EIRCOM
EIRCOM JUNCTION BOX	EIRCOM BOX
ELECTRICAL CABLE PIT	ECP
ESAT COVER	ESAT
ESB COVER	ESB
ESB JUNCTION BOX	ESB BOX
FIRE HYDRANT	FH+
GAS VALVE	GV
GULLY	G
INSPECTION COVER	IC
MANHOLE	MH
SEPTIC TANK	ST
SLUICE VALVE	SV
STOPOCK	ST
OHEAD ELECTRICITY	OE
OHEAD TELECOM	OT

SERVICE BOX (UNKNOWN)

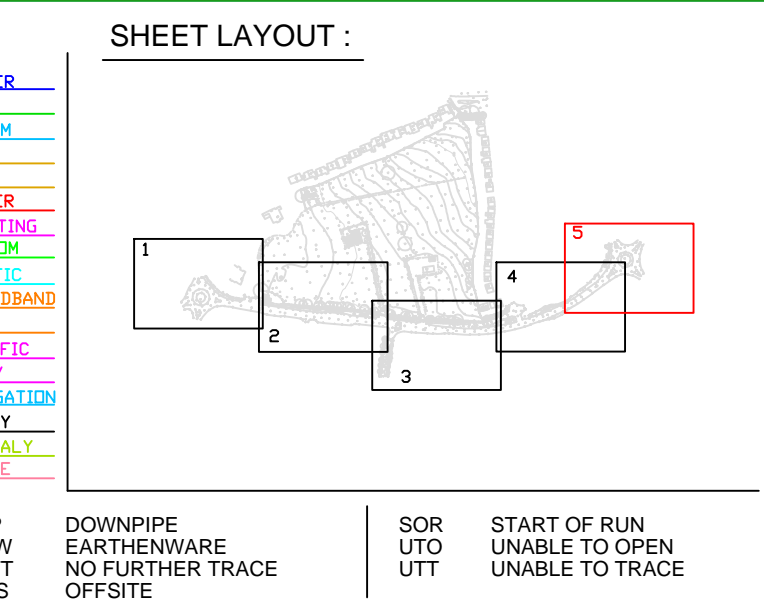
BOX	BOX
TLIC	TLIC
VENT	VENT
WATER METER	WM+
UNABLE TO LIFT	UTO

LEVELS :

BED LEVEL	+BED101.50
EAVE LEVEL	+E101.50
FLOOR LEVEL	+FL101.50
SOFFIT LEVEL	+SL101.50
INVERT LEVEL	+I101.50
ROAD LEVEL	+R101.50
RIDGE LEVEL	+RL101.50
SPOT LEVEL	+SL101.50
TOP OF WALL LEVEL	+TOW101.50
WATER LEVEL	+WL101.50

UNDERGROUND LEGEND :

WATER MAIN	WATER
GAS MAIN	GAS
STORM DRAIN	STORM
FULL SEWER	FULL
COMBINED SEWER	COMB
ELECTRIC CABLE	ELECTRIC
ELECTRIC LIGHTING	ELECTRIC LIGHTING
EIRCOM	EIRCOM
FIBRE OPTIC CABLE	FIBRE OPTIC
BROADBAND	BROADBAND
CABLE TV	CABLE TV
TRAFFIC AND SIGNAL CABLE	TRAFFIC
CCTV	CCTV
IRRIGATION PIPE	IRRIGATION
EMPTY DUCT	EMPTY
GPR ANOMALY	ANOMALY
UNKNOWN CABLE	CABLE
BOC	BOC
BOTTOM OF CHAMBER	DP
CAST-IRON	E/W
CONC	NFT
DIA	OS
DOWNPIPE	DOWNPIPE
EARTHENWARE	EARTHENWARE
NO FURTHER TRACE	NO FURTHER TRACE
OFFSITE	OFFSITE
SOR	SOR
UTO	UTO
START OF RUN	START OF RUN
UNABLE TO OPEN	UNABLE TO OPEN
UNABLE TO TRACE	UNABLE TO TRACE



PLAN PRODUCED BY:

APEX SURVEYS

CONTACT INFORMATION:

Apex Surveys
Unit 78 Dunboyne Business Park
Dunboyne, Co. Meath, Ireland
www.apexsurveys.ie
info@apexsurveys.ie
00353 1 691 0156

CLIENT:

D.B.F.L.

GRID SYSTEM: Irish Transverse Mercator
DATUM: Main Head (OSGM15)
NOTES: Drawing Contains Scale Factor

REVISIONS:

No.	Date	Description
001	N/A	Original Drawing

PROJECT:

Scholarstown Road, Co. Dublin

SCALE : 1/250 A1

DATE : 28/09/2018

DRG No: 3576

SHEET: 5 of 5

DESCRIPTION : 2D UG Utilities

SURVEYED BY : Ivan Josipovic

PROCESSED BY : Aliona Bauzienne

CHECKED BY : Alan Brady