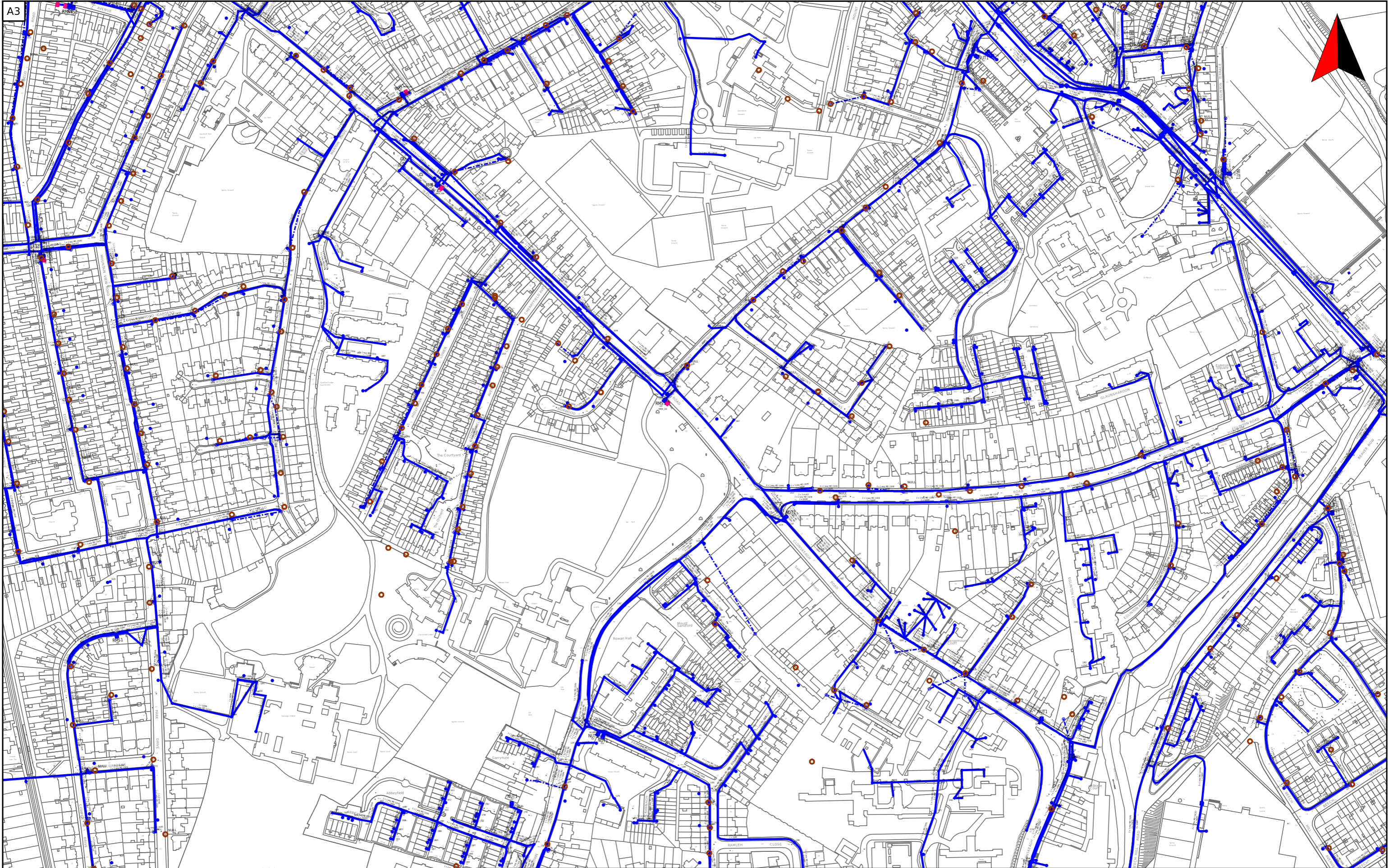
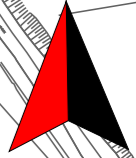


## **Appendix 16.1**

# **ESB Networks Utility Plans**



open eir Civil Engineering Infrastructure Service

Scale: 1:3500	Irish National Grid Centre XY: 717088 N, 731259 m
Date 07/10/2025	Smallworld Powered by GE

THE INFORMATION IN THIS DRAWING IS CONFIDENTIAL AND SHOULD NOT BE DISCLOSED TO ANY THIRD PARTY WITHOUT THE EXPRESS WRITTEN CONSENT OF open eir. THE DRAWING MAY NOT BE PHOTOCOPIED OR REPRODUCED IN ANY WAY.

THE INFORMATION GIVEN IS COMPILED FROM PASSIVE ACCESS RECORDS AND IS BELIEVED TO BE CORRECT. THERE MAY, HOWEVER, BE DEPARTURES FROM THE COURSE(S) AND DEPTH(S) SHOWN OR INDICATED. THERE MAY ALSO BE ITEMS OF open eir INFRASTRUCTURE OF WHICH NO RECORDS IS HELD. THE INFORMATION IS GIVEN WITHOUT PREJUDICE TO THE LEGAL RIGHTS OF open eir TO COMPENSATION SHOULD open eir INFRASTRUCTURE BE DAMAGED.





TITLE: 20200217-018\_A3

COLOUR CODE:

- BLACK - 38KV & HIGHER VOLTAGE OVERHEAD LINES
- GREEN - MV(10KV/20KV) OVERHEAD LINES
- BLUE - LV (400V/230V) OVERHEAD LINES
- CYAN - 38KV & HIGHER VOLTAGE UNDERGROUND CABLE ROUTES
- RED - MV/LV (10KV/20KV/400V/230V) UNDERGROUND CABLE ROUTES

DATE: 17-Feb-2020

\*\* SCALE: 1:2000

\*\* SCALE WHEN PRINTED ON AN A3 PAGE  
XY COORDINATES DISPLAYED IN IRISH GRID COORDINATE SYSTEM

### WARNING

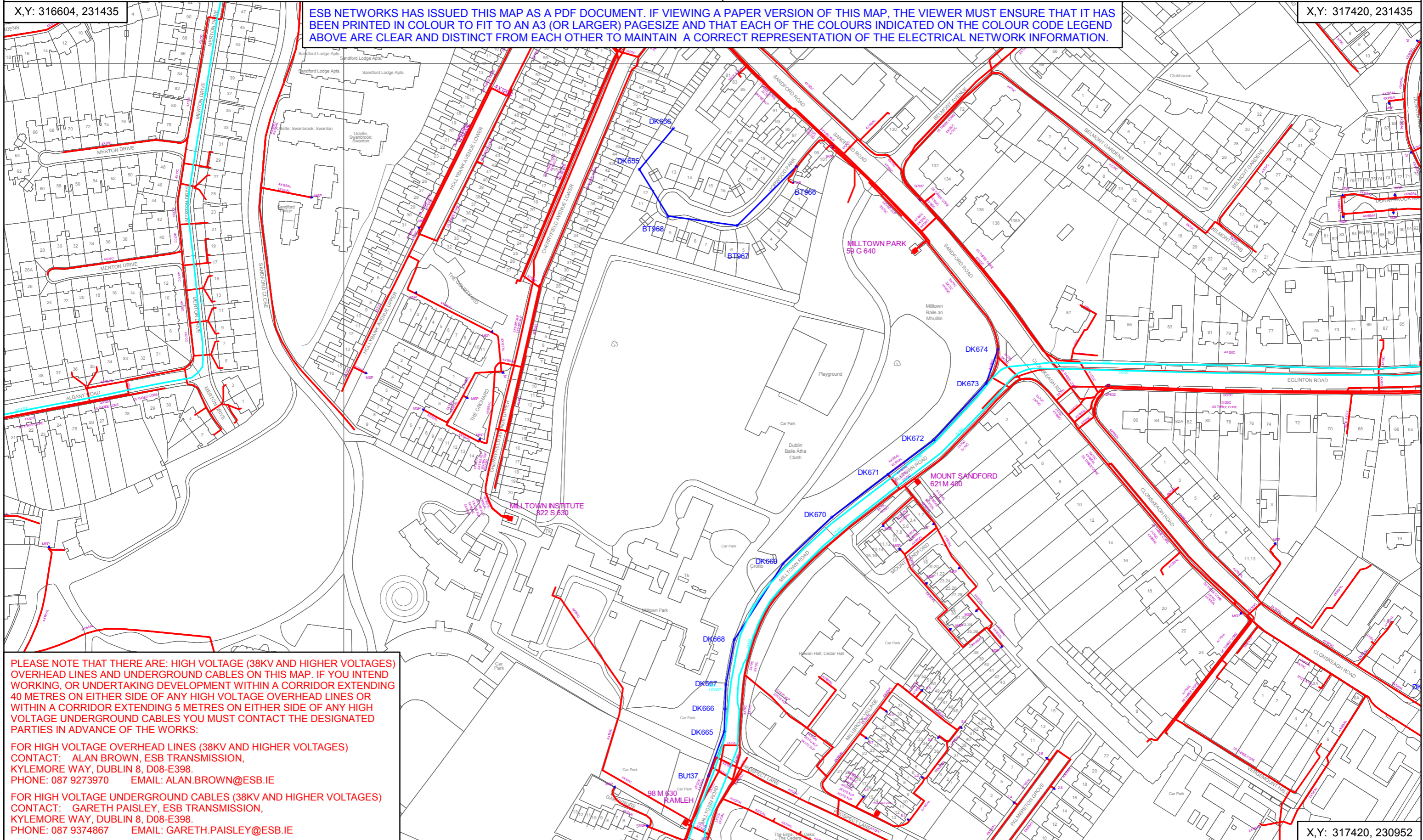
THIS MAP INDICATES THE APPROXIMATE LOCATION OF ESB TRANSMISSION (400KV, 220KV, 110KV, 38KV) AND DISTRIBUTION (20KV, 10KV, 230V/400V) UNDERGROUND CABLES AND OVERHEAD LINES IN THE GENERAL AREA OF THE PROPOSED WORKS. ESB NETWORKS TAKES NO RESPONSIBILITY FOR THE ACCURACY OR COMPLETENESS OF THE MAP. IT IS THE USER'S RESPONSIBILITY TO INDEPENDENTLY VERIFY THE INFORMATION AND THE LOCATION OF UNDERGROUND CABLES AND OVERHEAD LINES. LOW VOLTAGE (230V/400V) SERVICE CABLES (E.G. HOUSE SERVICES, FACTORY/SHOP SERVICES, PUBLIC LIGHTING LAMP SERVICES, ETC) ARE NOT INCLUDED BUT THEIR PRESENCE SHOULD BE ANTICIPATED. THE DEPTHS OF UNDERGROUND CABLES MUST NEVER BE ASSUMED. ADDITIONAL MORE DETAILED INFORMATION IS AVAILABLE FOR HIGH VOLTAGE TRANSMISSION UNDERGROUND CABLES (38KV, 110KV, 220KV, 400KV) FROM THE LOCAL ESB NETWORKS TRANSMISSION REPRESENTATIVE - SEE ATTACHED LIST FOR CONTACT DETAILS OR CALL 1850 372 757. NO WORK SHOULD BE CARRIED OUT IN THE VICINITY OF 38KV OR HIGHER VOLTAGE UNDERGROUND CABLES WITHOUT PRIOR CONSULTATION WITH ESB NETWORKS. BEFORE ANY MECHANICAL EXCAVATION IS UNDERTAKEN, THE ACTUAL LOCATION OF ALL UNDERGROUND ELECTRICITY CABLES MUST BE ESTABLISHED AND VERIFIED ON THE SITE USING: (A) UP-TO-DATE MAP RECORDS; (B) CABLE LOCATER EQUIPMENT OPERATED IN BOTH POWER AND RADIO MODES; (C) CAREFUL HAND DIGGING OF TRIAL HOLES USING 'SAFE DIGGING PRACTICE'. REFER ALSO TO 'HSA CODE OF PRACTICE FOR AVOIDING DANGER FROM UNDERGROUND SERVICES'. ESB TAKES NO RESPONSIBILITY FOR AND SHALL BEAR NO LIABILITY, HOWSOEVER ARISING, IN RELATION TO ANY DAMAGE, INJURY/DEATH OR LOSS OF SUPPLY AS A RESULT OF DAMAGE OR INTERFERENCE WITH ITS NETWORKS.

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X,Y: 316604, 231435

ESB NETWORKS HAS ISSUED THIS MAP AS A PDF DOCUMENT. IF VIEWING A PAPER VERSION OF THIS MAP, THE VIEWER MUST ENSURE THAT IT HAS BEEN PRINTED IN COLOUR TO FIT TO AN A3 (OR LARGER) PAGESIZE AND THAT EACH OF THE COLOURS INDICATED ON THE COLOUR CODE LEGEND ABOVE ARE CLEAR AND DISTINCT FROM EACH OTHER TO MAINTAIN A CORRECT REPRESENTATION OF THE ELECTRICAL NETWORK INFORMATION.

X,Y: 317420, 231435

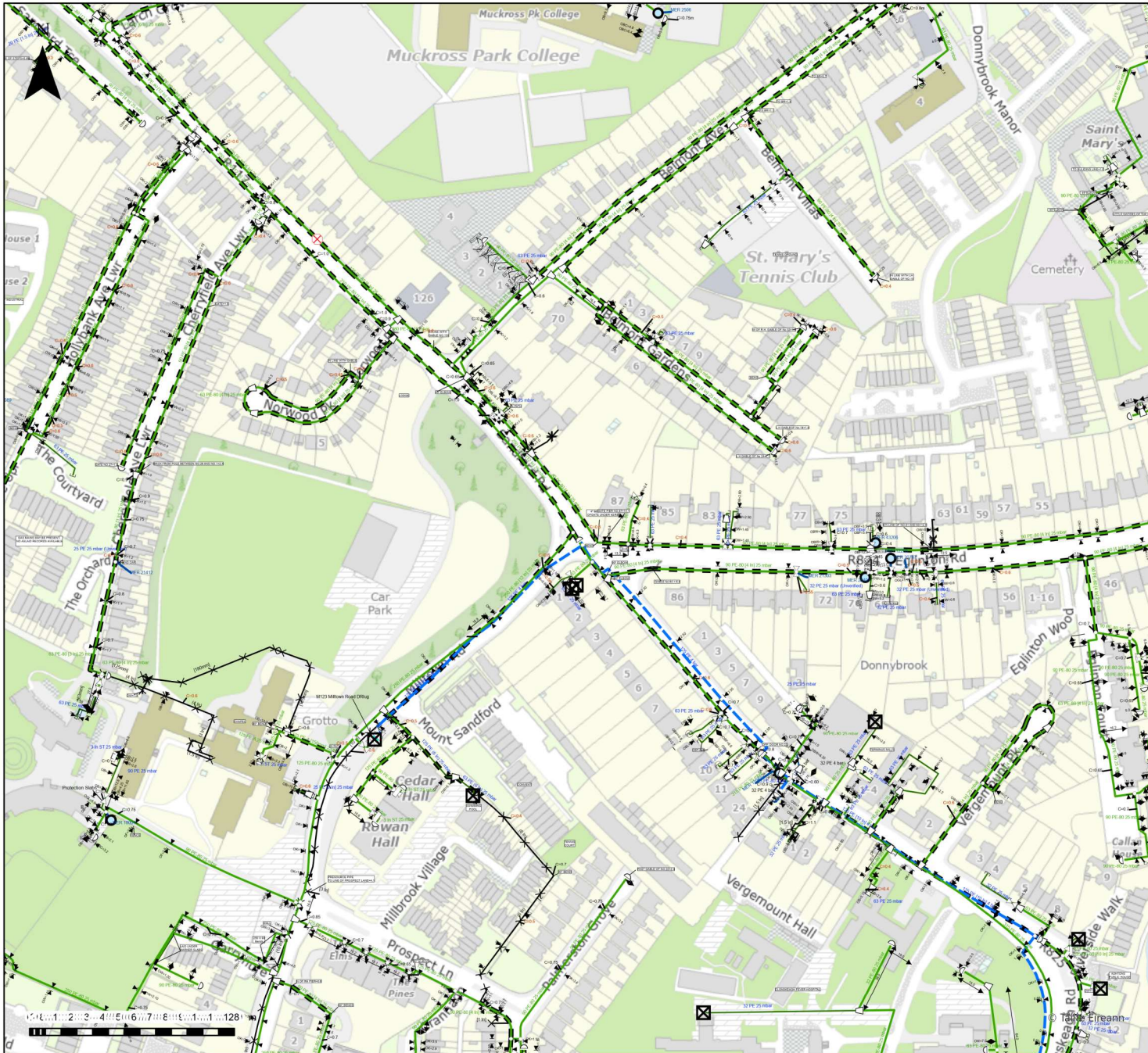


PLEASE NOTE THAT THERE ARE: HIGH VOLTAGE (38KV AND HIGHER VOLTAGES) OVERHEAD LINES AND UNDERGROUND CABLES ON THIS MAP. IF YOU INTEND WORKING, OR UNDERTAKING DEVELOPMENT WITHIN A CORRIDOR EXTENDING 40 METRES ON EITHER SIDE OF ANY HIGH VOLTAGE OVERHEAD LINES OR WITHIN A CORRIDOR EXTENDING 5 METRES ON EITHER SIDE OF ANY HIGH VOLTAGE UNDERGROUND CABLES YOU MUST CONTACT THE DESIGNATED PARTIES IN ADVANCE OF THE WORKS:

FOR HIGH VOLTAGE OVERHEAD LINES (38KV AND HIGHER VOLTAGES)  
CONTACT: ALAN BROWN, ESB TRANSMISSION,  
KYLEMORE WAY, DUBLIN 8, D08-E398.  
PHONE: 087 9273970 EMAIL: ALAN.BROWN@ESB.IE

FOR HIGH VOLTAGE UNDERGROUND CABLES (38KV AND HIGHER VOLTAGES)  
CONTACT: GARETH PAISLEY, ESB TRANSMISSION,  
KYLEMORE WAY, DUBLIN 8, D08-E398.  
PHONE: 087 9374867 EMAIL: GARETH.PAISLEY@ESB.IE

X,Y: 317420, 230952



**Important Safety Notice:** Damage to gas pipelines can result in serious injury or death. Gas network information is provided as a general guide. The exact location and depth of medium or low pressure distribution gas pipes must be verified on site by carrying out necessary investigations, including, for example, hand digging trial holes along the route of the pipe. Service pipes are not generally shown but their presence should always be anticipated.

High pressure transmission pipelines are shown in red. If a transmission pipeline is identified within 10m of any intended excavations then work must not proceed before GNI has been consulted. The true location and depth of a transmission pipeline must be verified on site by a representative of GNI. Contact can be made through 1800 427 747.

All work in the vicinity of the gas network must be completed in accordance with the current edition of the Health and Safety Authority publication, 'Code of Practice For Avoiding Danger From Underground Services' which is available from the Health and Safety Authority (0818 289 389) or can be downloaded at [www.hsa.ie](http://www.hsa.ie).

**Legal Notice:** Gas Networks Ireland (GNI) and its affiliates, accept no responsibility for the accuracy of any information contained in this document including data concerning location and technical designation of the gas distribution and transmission network (the "Information"). The Information should not be relied on for accurate distance or depth of cover measurements.

Any representations and warranties, express or implied, are excluded to the fullest extent permitted by law. No liability shall be accepted for any loss or damage including, without limitation, direct, indirect or consequential loss, arising out of or in connection with the use or re-use of the Information.

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	Aurora Telecom Duct	
	Aurora Telecom Sub Duct	
	Aurora Telecom Inserted Gas Pipe	

Aurora Telecom Queries - 01-8926166 (Office Hours)  
 Aurora\_Network\_Queries@gasnetworks.ie  
 Aurora Telecom Emergency Only 1800 427399 / 01 2030120

	Transmission Pipe (High Pressure)
	Transmission Pipe (Construction Issue)
	Distribution Pipe (Medium Pressure)
	Distribution Pipe (Low Pressure)
	Service Pipe (Medium Pressure)
	Service Pipe (Low Pressure)
	Strategic Pipe (Medium Pressure)
	Strategic Pipe (Low Pressure)
	Inserted
	Abandoned Pipe

C=?	Cover (depth in metres)		Pressure Monitor
	CP Test Point		Protection (Slabbing)
	End Cap		Protection (Sleeve)
	Hot Tap		Reducer
	Installation		Service Terminator
	Valve		Tee
	Mains Verification**		Transition

\*\* Please contact GNI on 1800-427747 for specific information

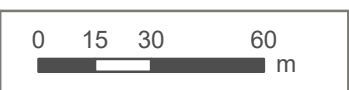
	<b>1800 42 77 47</b> In Emergency call 1800 20 50 50	
--	---	--

## GAS NETWORK INFORMATION

Description: test	
Location: 717120.731265	
Plot Date: 07/10/2025 12:18	Scale: 2500 @ A3
Plotted By: 1022	Ref ID: 1022_07102025121813



- Legend**
- Location
  - Sewer Manholes**
    - Standard
    - Backdrop
  - Sewer Inlets**
    - CP Catchpit
    - Other; Unknown
  - Sewer Mains (Irish Water)**
    - Gravity - Combined
    - Gravity - Foul
  - Sewer Lateral Lines**
    - Sewer Lateral Lines



Coordinate System: TM65 Irish Grid  
Projection: Transverse Mercator

Scale @ A3: 1:2,016  
Drawing No.: IW-AGG-2018-000

Drawn By:	Mo Ismail
Checked By:	<Add Name>
Approved By:	<Add Name>
Drawn Date:	24/11/2025
Checked Date:	<dd/mm/yyyy>
Approved Date:	<dd/mm/yyyy>

## Sewer Network Sandford Road, Ranelagh, Co. Dublin

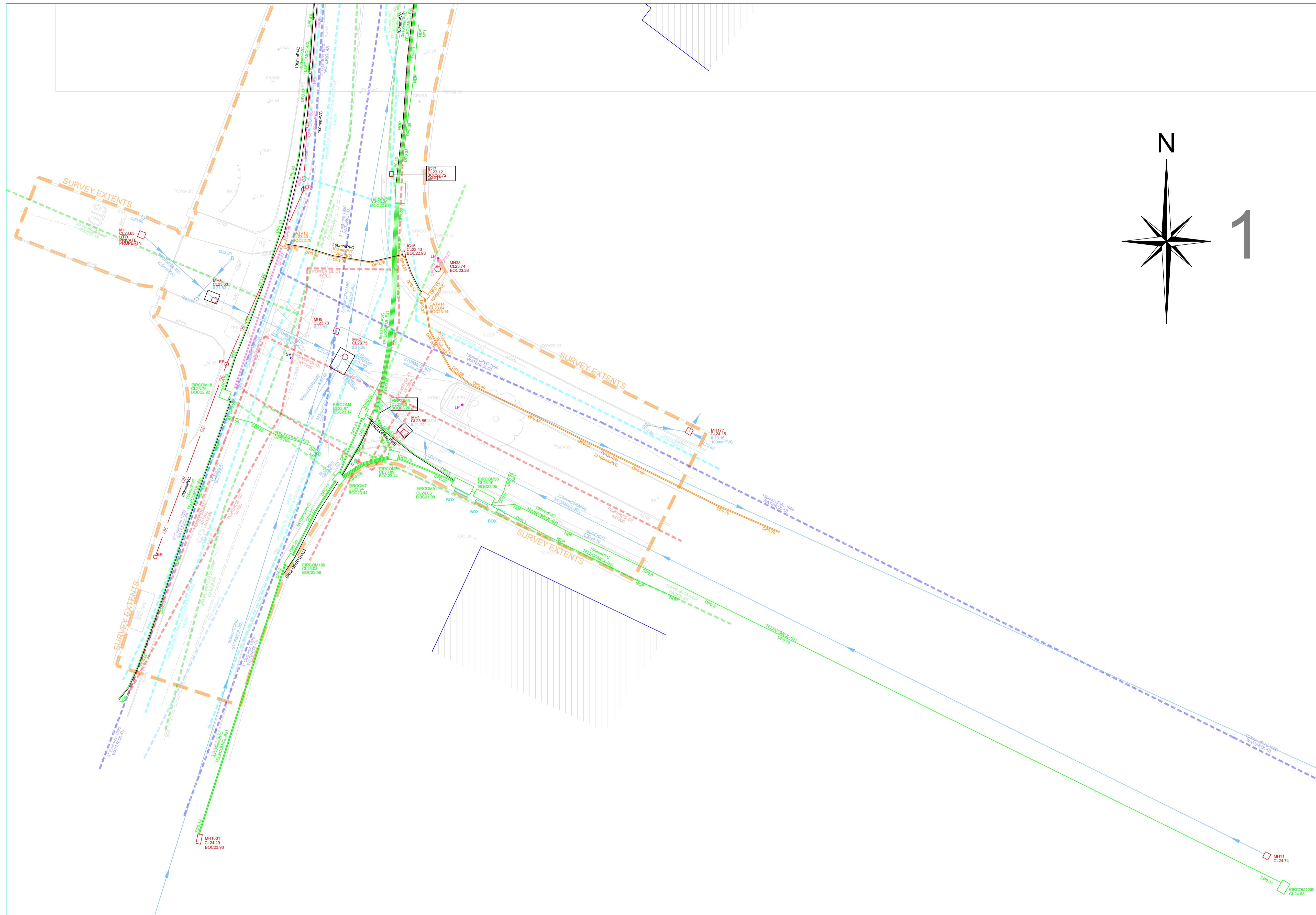
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2. Whilst every care has been taken in its compilation, Irish Water gives this information as to the position of its underground network as a general guide only on the strict understanding that it is based on the best available information provided by each Local Authority in Ireland to Irish Water. Irish Water can assume no responsibility for and give no guarantees, undertakings or warranties concerning the accuracy, completeness or up to date nature of the information provided and does not accept any liability whatsoever arising from any errors or omissions. This information should not be relied upon in the event of excavations or any other works being carried out in the vicinity of the Irish Water underground network. The onus is on the parties carrying out excavations or any other works to ensure the exact location of the Irish Water underground network is identified prior to excavations or any other works being carried out. Service connection pipes are not generally shown but their presence should be anticipated.



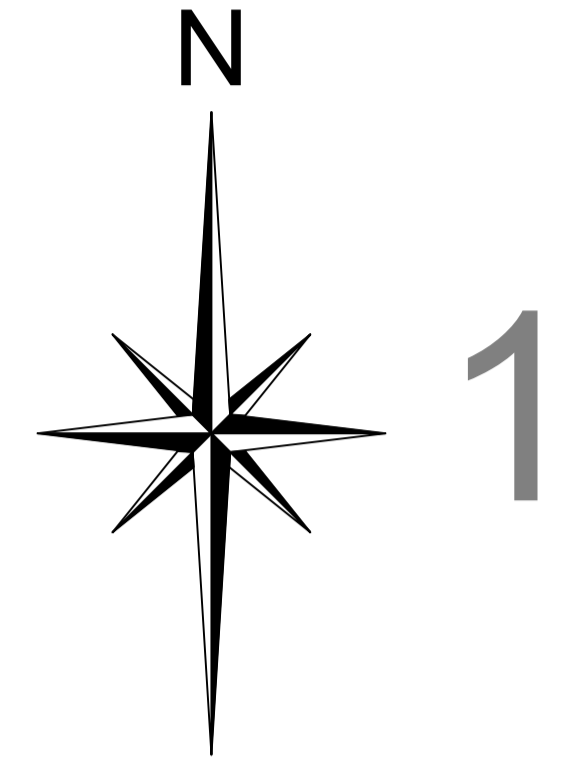
## **Appendix 16.2**

# **GPR Utility Survey**



**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:** 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:** It may not be possible to 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 from Records" on the drawing.

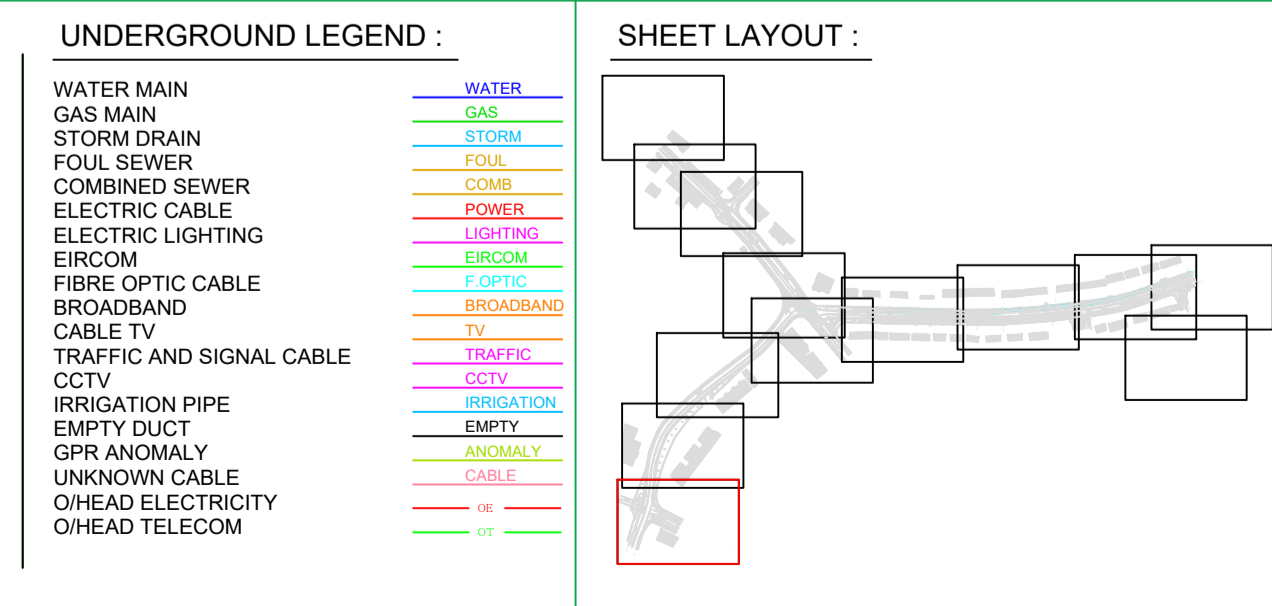
The following have been excluded from the survey:

- 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

<b>STREET FURNITURE :</b>	<b>SERVICES :</b>	<b>UNDERGROUND LEGEND :</b>
<ul style="list-style-type: none"> <li>BOLLARDS</li> <li>BUS STOP</li> <li>CRASH BARRIER</li> <li>GATE</li> <li>ELECTRICITY POLE</li> <li>TELEPHONE POLE</li> <li>EARTHING ROD</li> <li>LAMP POST</li> <li>MARKER POST</li> <li>SIGN POST</li> <li>TRAFFIC LIGHT</li> <li>TELEPHONE BOX</li> <li>POST</li> <li>POST BOX</li> <li>RS-RS</li> <li>BORE HOLE</li> <li>TRIAL PIT</li> <li>BOTTOM OF CHAMBER</li> <li>CAST-IRON</li> <li>CONCRETE</li> <li>DIAMETER</li> </ul>	<ul style="list-style-type: none"> <li>AIR VALVE</li> <li>ARMSTRONG JUNCTION</li> <li>CABLE TV IC</li> <li>COVER LEVEL</li> <li>EIRCOM COVER</li> <li>EIRCOM JUNCTION BOX</li> <li>ELECTRICAL CABLE PIT</li> <li>ESAT COVER</li> <li>ESB COVER</li> <li>ESB JUNCTION BOX</li> <li>FIRE HYDRANT</li> <li>GAS VALVE</li> <li>GULLY</li> <li>INSPECTION COVER</li> <li>MANHOLE</li> <li>SEPTIC TANK</li> <li>SLUICE VALVE</li> <li>DOWNPIPE</li> <li>EARTHENWARE</li> <li>NO FURTHER TRACE</li> <li>OFFSITE</li> </ul>	<ul style="list-style-type: none"> <li>WATER MAIN</li> <li>GAS MAIN</li> <li>STORM DRAIN</li> <li>FULL SEWER</li> <li>COMBINED SEWER</li> <li>ELECTRIC CABLE</li> <li>ELECTRIC LIGHTING</li> <li>EIRCOM</li> <li>FIBRE OPTIC CABLE</li> <li>BROADBAND</li> <li>CABLE TV</li> <li>TRAFFIC AND SIGNAL CABLE</li> <li>CCTV</li> <li>IRRIGATION PIPE</li> <li>EMPTY DUCT</li> <li>GPR ANOMALY</li> <li>UNKNOWN CABLE</li> <li>O'HEAD ELECTRICITY</li> <li>O'HEAD TELECOM</li> </ul>



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	04/03/20	Original Drawing
002	06/11/20	Additional Information Added

PROJECT:

**Sandford Park, Miltown**

SCALE :	1/200 A1	DATE :	04/03/2020
DRG No:	4234	DESCRIPTION :	2D Utilities
SHEET:	1 of 10	SURVEYED BY :	Mario Gaspar
		PROCESSED BY :	Apex Surveys
		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
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QL-B4 A segment of utility suspected to exist but has not been detected by a geophysical technique
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- 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



**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	POST
POST BOX	POST BOX
ROAD SIGN	RS - RS
BORE HOLE	BH +
TRIAL PIT	TPIT +
BOTTOM OF CHAMBER	BOC
CAST-IRON	CI
CONCRETE	CONC
DIAMETER	DIA

**SERVICES :**

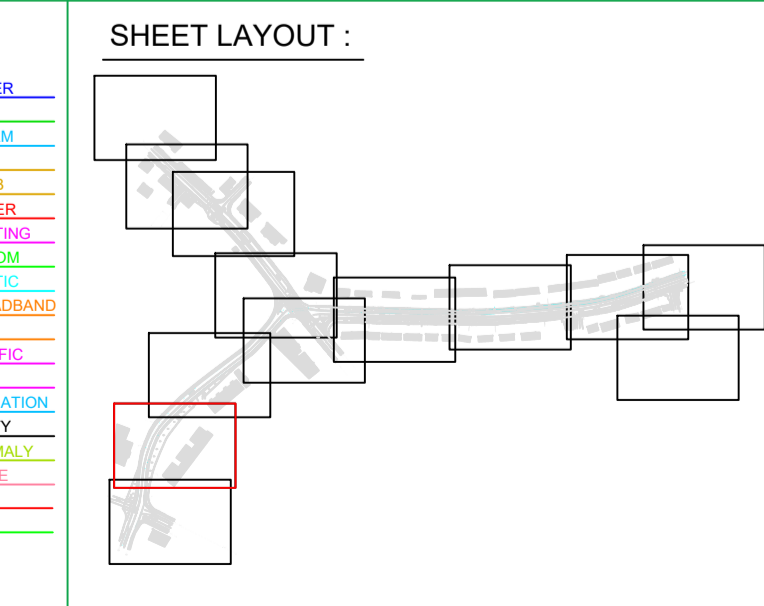
AIR VALVE	AV
ARMSTRONGS JUNCTION	AJ
CABLE TV IC	CATV
COVER LEVEL	CL
EIRCOM COVER	EIRCOM
EIRCOM JUNCTION BOX	EIRCOM BOX
ELECTRICAL CABLE PIT	ECP
ESAT COVER	ESAT
ESB COVER	ESB
ESB JUNCTION BOX	ESB BOX
FIRE HYDRANT	FH
GAS VALVE	GV
INSPECTION COVER	IC
MANHOLE	MH
SEPTIC TANK	SEPTIC
SLUICE VALVE	SV
DOWNPIPE	DP
EARTHENWARE	EW
NO FURTHER TRACE	NFT
OFFSITE	O/S

**LEVELS :**

BED LEVEL	+BED101.50
FLOOR LEVEL	+FL101.50
INVERT LEVEL	+I101.50
ROAD LEVEL	+101.50
SOFFIT LEVEL	+SL101.50
SPT LEVEL	+101.50
TOP OF WALL LEVEL	+TOW101.50
WATER LEVEL	+WL101.50
SURVEY CONTROL STATION	SCS
START OF RUN	SOR
UNABLE TO OPEN	UTO
UNABLE TO TRACE	UTT

**UNDERGROUND LEGEND :**

WATER MAIN	WATER
GAS MAIN	GAS
STORM DRAIN	STORM
FULL SEWER	FULL
COMBINED SEWER	COMB
ELECTRIC CABLE	POWER
ELECTRIC LIGHTING	LIGHTING
EIRCOM	EIRCOM
FIBRE OPTIC CABLE	F.OPTIC
BROADBAND	BROADBAND
CABLE TV	TRAFFIC
TRAFFIC AND SIGNAL CABLE	CCTV
IRRIGATION PIPE	IRRIGATION
EMPTY DUCT	EMPTY
GPR ANOMALY	ANOMALY
UNKNOWN CABLE	CABLE
O'HEAD ELECTRICITY	HE
O'HEAD TELECOM	HT



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	04/03/20	Original Drawing
002	06/11/20	Additional Information Added

PROJECT:

**Sandford Park, Milltown**

SCALE : 1/200 A1

DATE : 04/03/2020

DRG No: 4234

SHEET: 2 of 10

DESCRIPTION : 2D Utilities

SURVEYED BY : Mario Gaspar

PROCESSED BY : Apex Surveys

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
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VERIFICATION	QL-A	Horizontal and vertical location of the top and/or bottom of the utility

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  - 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.
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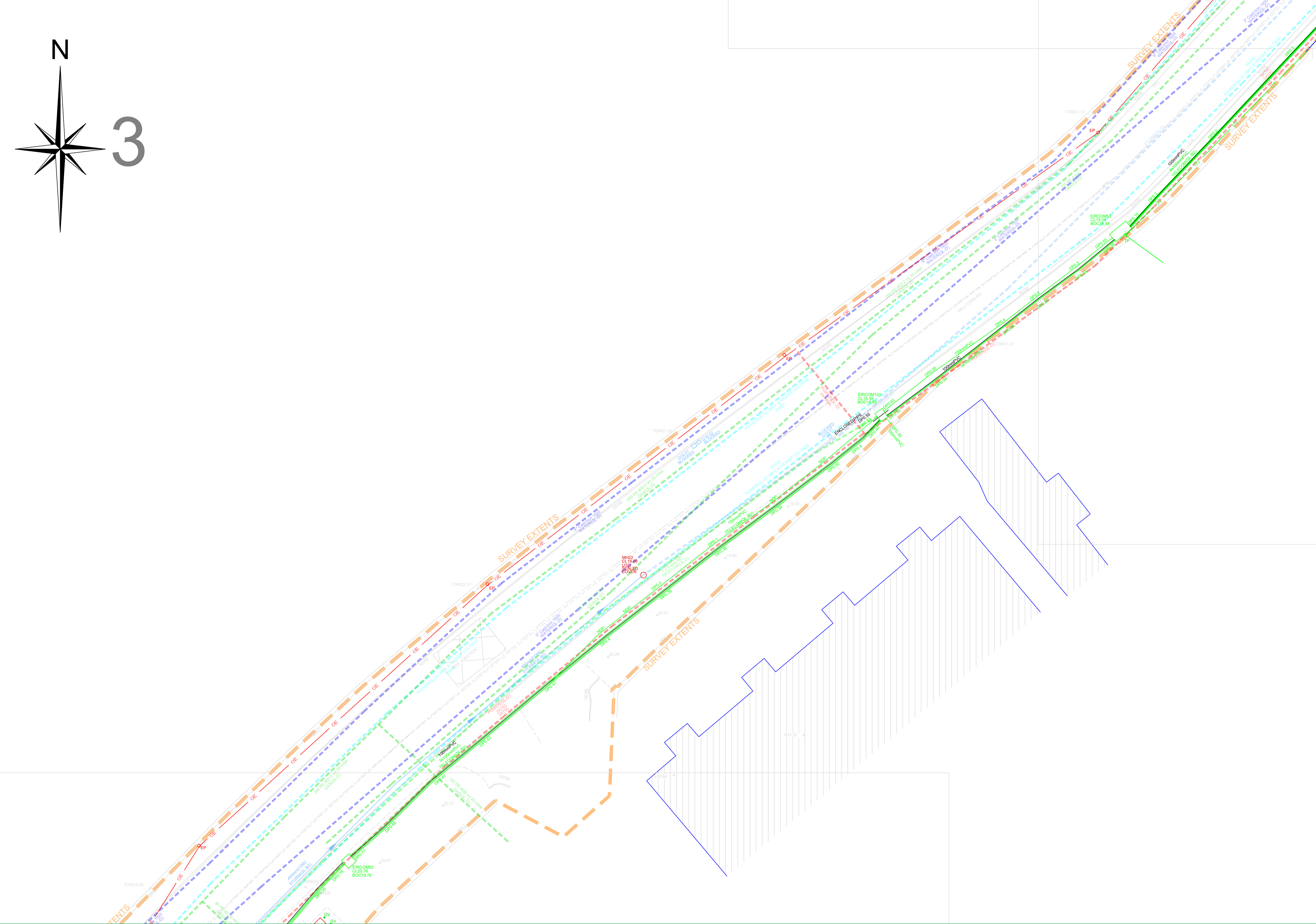
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**STREET FURNITURE :**

BOLLARDS	BD +
BUS STOP	BS +
CRASH BARRIER	CB
GATE	EP +
ELECTRICITY POLE	EP +
TELEPHONE POLE	EP +
EARTHING ROD	ER +
LAMP POST	LP +
MARKER POST	MKR +
SIGN POST	SP +
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BORE HOLE	BH +
TRIAL PIT	TPIT +
BOTTOM OF CHAMBER	BOC
CAST-IRON	CI
CONCRETE	CONC
DIAMETER	DIA

**SERVICES :**

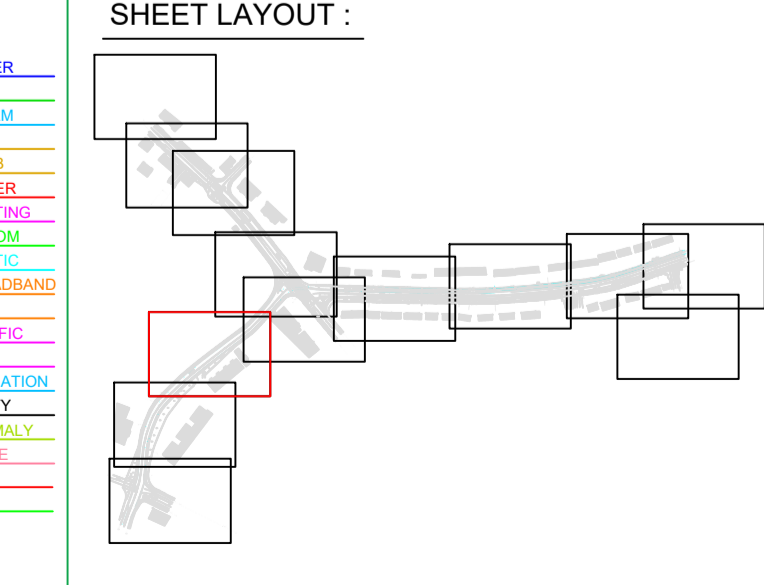
AIR VALVE	AV
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GATE	EP
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MANHOLE	MH
SEPTIC TANK	SEPTIC
SLUICE VALVE	SV
DOWNSPIRE	DP
EARTHENWARE	EW
NO FURTHER TRACE	NFT
OFFSITE	O/S

**LEVELS :**

BED LEVEL	+BED101.50
FLOOR LEVEL	+FL101.50
INVERT LEVEL	+IL101.50
ROAD LEVEL	+SL101.50
SOFFIT LEVEL	+101.50
SPOT LEVEL	+101.50
TOP OF WALL LEVEL	+TOW101.50
WATER LEVEL	+WL101.50
SURVEY CONTROL STATION	SOR
UNABLE TO OPEN	UTO
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CLIENT:

**D.B.F.L.**

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

REVISIONS:

No.	Date	Description
001	04/03/20	Original Drawing
002	06/11/20	Additional Information Added

PROJECT:

**Sandford Park, Miltown**

SCALE : 1/200 A1

DATE : 04/03/2020

DRG No: 4234

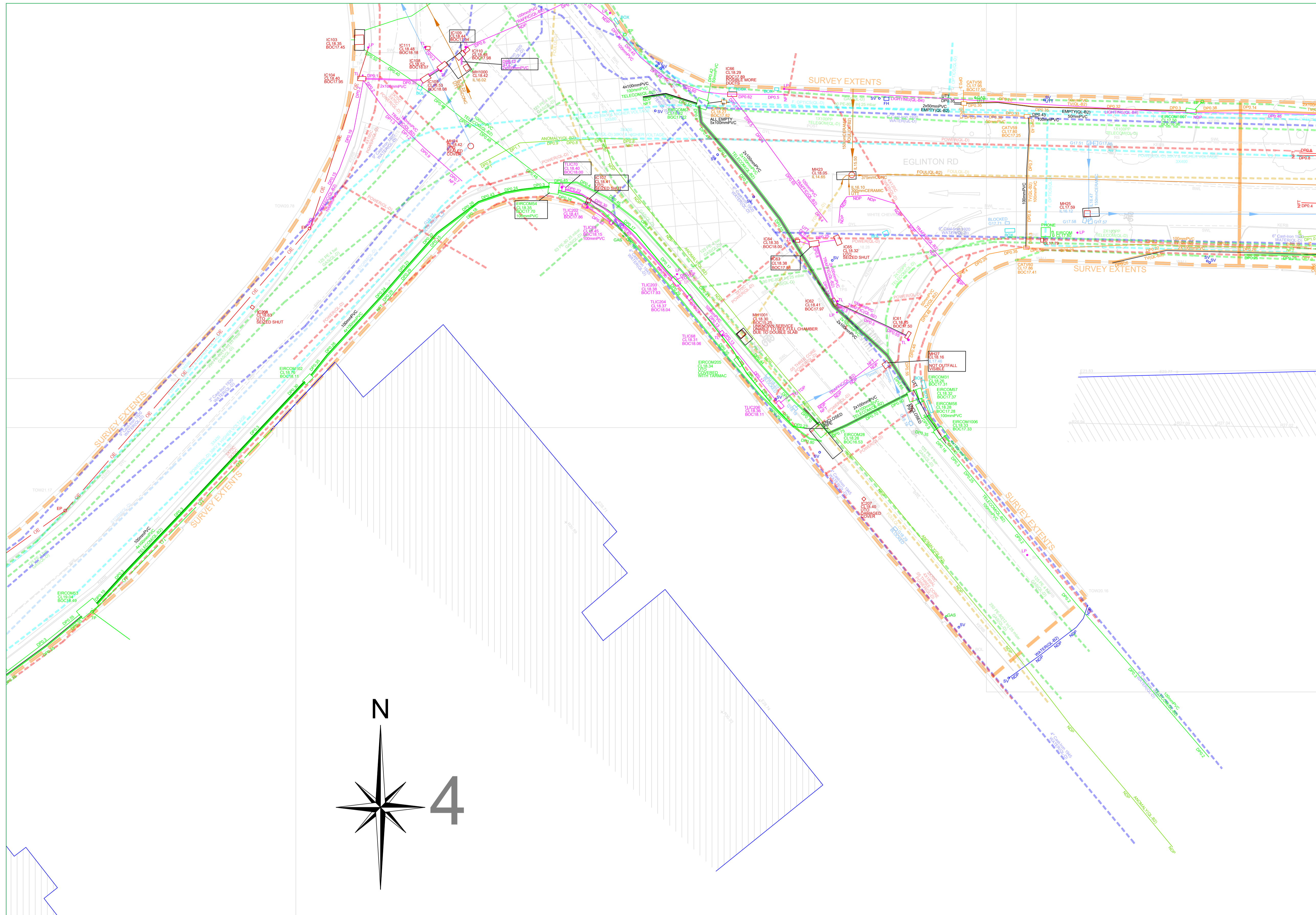
SHEET: 3 of 10

DESCRIPTION : 2D Utilities

SURVEYED BY : Mario Gaspar

PROCESSED BY : Apex Surveys

CHECKED BY : Alan Brady



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BOLLARDS	BD+
BUS STOP	BS+
CRASH BARRIER	CB
GATE	GP
ELECTRICITY POLE	EP+
TELEPHONE POLE	TP+
EARTHING ROD	ER+
LAMP POST	LP+
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BOTTOM OF CHAMBER	BOC
CAST-IRON	CI
CONCRETE	CONC
DIAMETER	DIA

**SERVICES :**

AIR VALVE	AV
ARMSTRONGS JUNCTION	AJ
CABLE TV IC	CATV
COVER LEVEL	CL
EIRCOM COVER	EIRCOM
EIRCOM JUNCTION BOX	EIRCOM BOX
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SEPTIC TANK	SEPTIC
SLUICE VALVE	SV
DOWNPPIPE	DP
EARTHENWARE	EW
NO FURTHER TRACE	NFT
OFFSITE	O/S

**STOPCOCK**

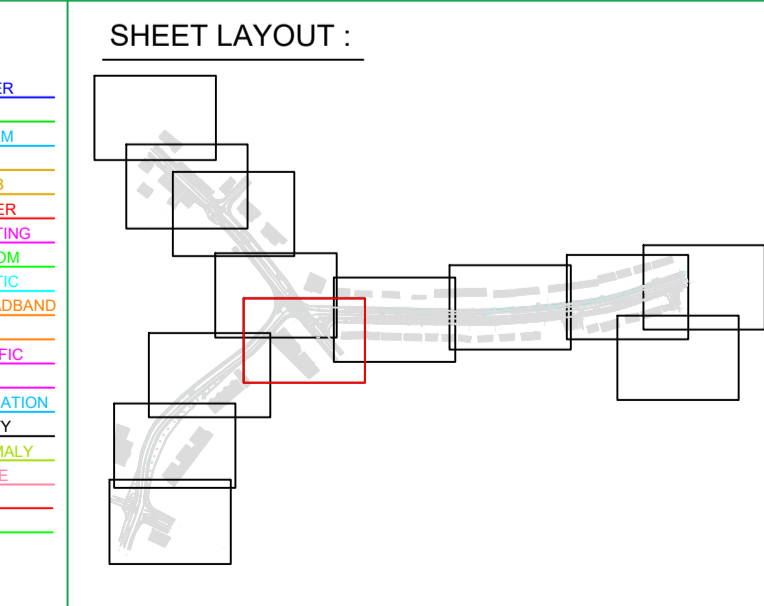
STOPCOCK	ST
SERVICE BOX (UNKNOWN)	BOX
TRAFFIC COVER	TLIC
VENT	VENT
WATER METER	WM+

**LEVELS :**

BED LEVEL	+BED101.50
FLOOR LEVEL	+FL101.50
INVERT LEVEL	+IL101.50
ROAD LEVEL	+101.50
SOFFIT LEVEL	+SL101.50
SPOT LEVEL	+101.50
TOP OF WALL LEVEL	+TOW101.50
WATER LEVEL	+WL101.50
SURVEY CONTROL STATION	SOR
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REVISIONS:

No.	Date	Description
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PROJECT:

**Sandford Park, Miltown**

SCALE : 1/200 A1

DATE : 04/03/2020

DRG No: 4234

SHEET: 4 of 10

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SURVEYED BY : Mario Gaspar

PROCESSED BY : Apex Surveys

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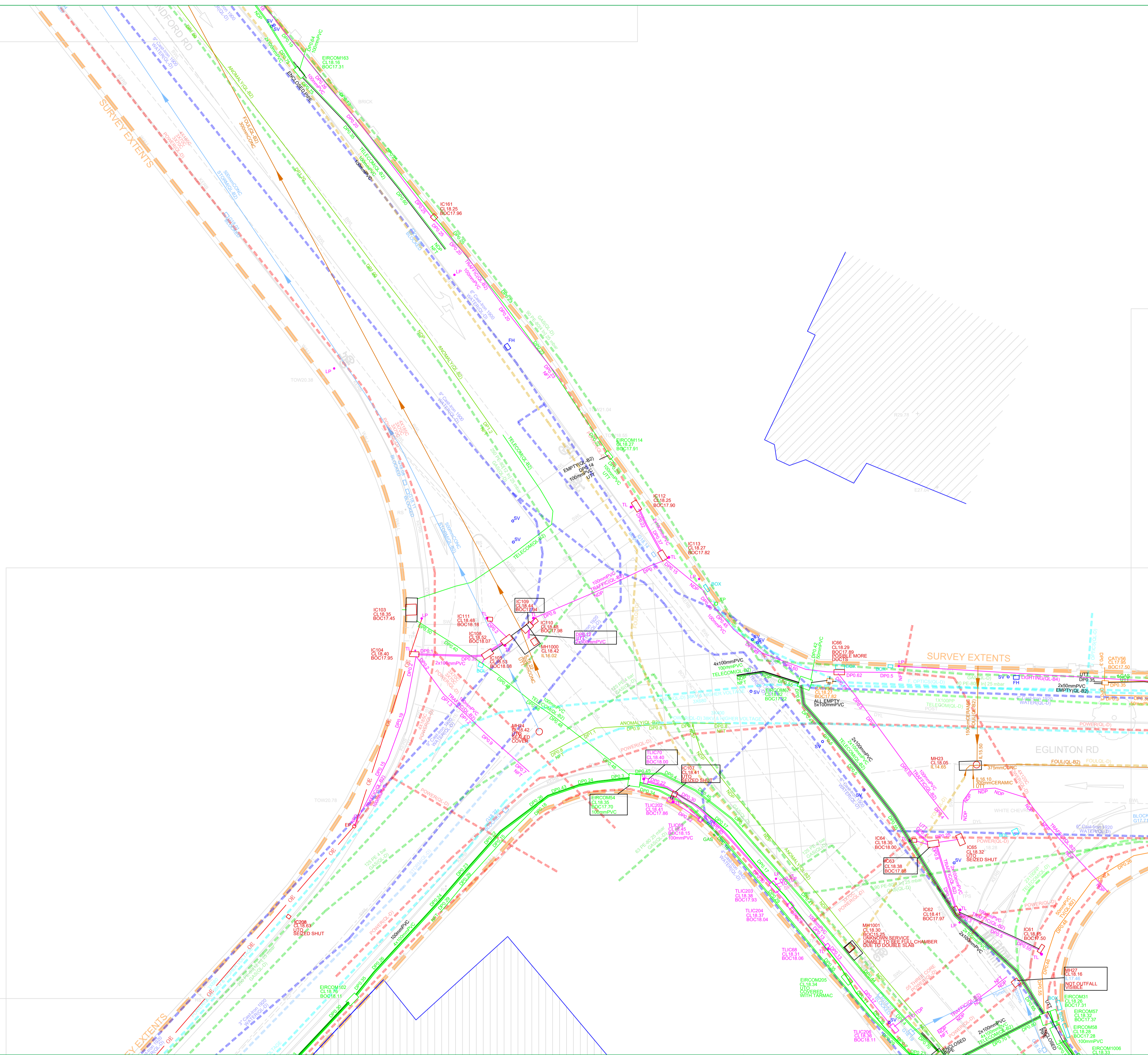
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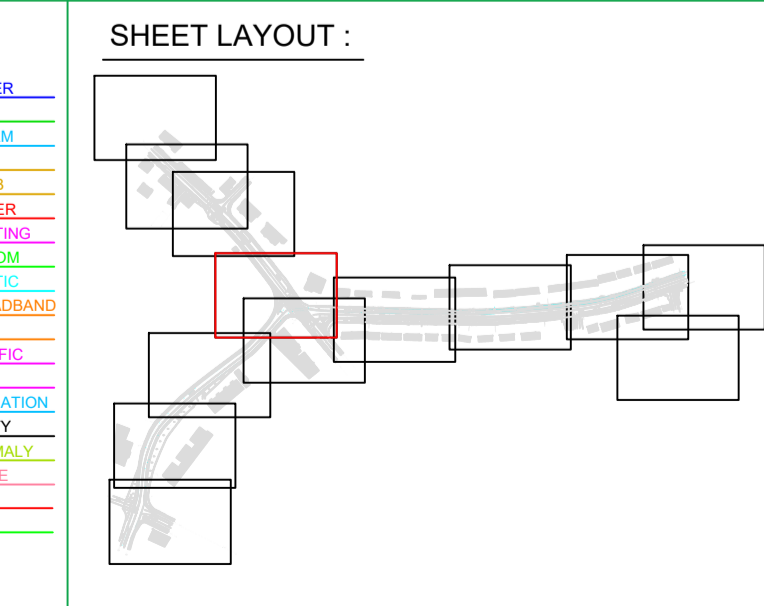
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TOP OF WALL LEVEL	+TOW101.50
WATER LEVEL	+WL101.50
SURVEY CONTROL STATION	SOR
START OF RUN	EW
UNABLE TO OPEN	UTO
UNABLE TO TRACE	UTT

**UNDERGROUND LEGEND :**

WATER MAIN	WATER
GAS MAIN	GAS
STORM DRAIN	STORM
POUL SEWER	POUL
COMBINED SEWER	COMB
ELECTRIC CABLE	POWER
ELECTRIC LIGHTING	LIGHTING
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
OHEAD ELECTRICITY	HE
OHEAD TELECOM	HT



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	04/03/20	Original Drawing
002	06/11/20	Additional Information Added

PROJECT:

**Sandford Park, Miltown**

SCALE : 1/200 A1

DATE : 04/03/2020

DRG No: 4234

SHEET: 5 of 10

DESCRIPTION : 2D Utilities

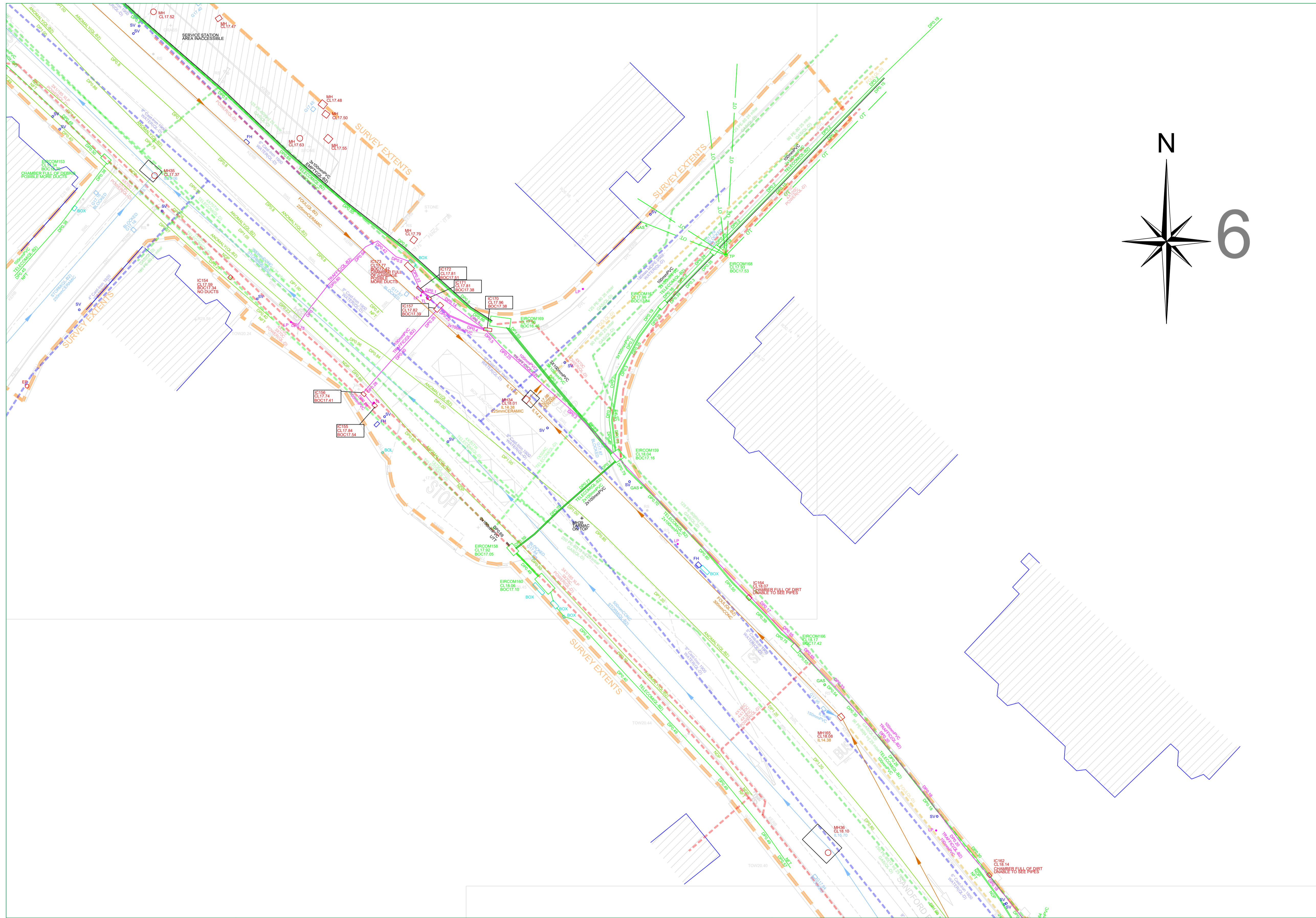
SURVEYED BY : Mario Gaspar

PROCESSED BY : Apex Surveys

CHECKED BY : Alan Brady

**APEX SURVEYS**

www.apexsurveys.ie  
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**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	
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VERIFICATION QL-A	Horizontal and vertical location of the top and/or bottom of the utility

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www.apexsurveys.ie  
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00353 1 691 0156

<b>STREET FURNITURE :</b>	<b>SERVICES :</b>	<b>UNDERGROUND LEGEND :</b>
<ul style="list-style-type: none"> <li>BOLLARDS BS+</li> <li>BUS STOP CB</li> <li>GATE EP+</li> <li>ELECTRICITY POLE ER+</li> <li>TELEPHONE POLE LP+</li> <li>EARTHING ROD MKR+</li> <li>LAMP POST SIGN</li> <li>MARKER POST TB</li> <li>TELEPHONE BOX POST</li> <li>POST BOX RS-RS</li> <li>ROADSIGN BH+</li> <li>BORE HOLE TPIT+</li> <li>TRIAL PIT</li> <li>BOTTOM OF CHAMBER BOC</li> <li>CAST-IRON CI</li> <li>CONCRETE CONC</li> <li>DIAMETER DIA</li> </ul>	<ul style="list-style-type: none"> <li>AIR VALVE AV</li> <li>ARMSTRONG JUNCTION AJ</li> <li>CABLE TV IC</li> <li>COVER LEVEL CATV</li> <li>EIRCOM COVER EIRCOM</li> <li>EIRCOM JUNCTION BOX EIRCOM BOX</li> <li>ELECTRICAL CABLE PIT ECP</li> <li>ESAT COVER ESB</li> <li>ESB COVER ESB BOX</li> <li>ESB JUNCTION BOX ESB</li> <li>FIRE HYDRANT FH</li> <li>GAS VALVE G</li> <li>INSPECTION COVER IC</li> <li>MANHOLE MH</li> <li>SEPTIC TANK SEPTIC</li> <li>SLUICE VALVE SV</li> <li>DOWNPPIPE DP</li> <li>EARTHENWARE E/W</li> <li>NO FURTHER TRACE N/FT</li> <li>OFFSITE O/S</li> </ul>	<ul style="list-style-type: none"> <li>WATER MAIN WATER</li> <li>GAS MAIN GAS</li> <li>STORM DRAIN STORM</li> <li>FOUL SEWER FOUL</li> <li>COMBINED SEWER COMB</li> <li>ELECTRIC CABLE POWER</li> <li>ELECTRIC LIGHTING LIGHTING</li> <li>EIRCOM EIRCOM</li> <li>FIBRE OPTIC CABLE F.OPTIC</li> <li>BROADBAND BROADBAND</li> <li>CCTV CCTV</li> <li>CABLE TV CABLE TV</li> <li>EMPTY EMPTY</li> <li>GPR ANOMALY ANOMALY</li> <li>UNKNOWN CABLE CABLE</li> <li>O'HEAD ELECTRICITY O'HEAD</li> <li>O'HEAD TELECOM TELECOM</li> </ul>

**SHEET LAYOUT :**

PLAN PRODUCED BY:

CONTACT INFORMATION:

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Unit 78 Dunboyne Business Park  
Dunboyne, Co. Meath, Ireland  
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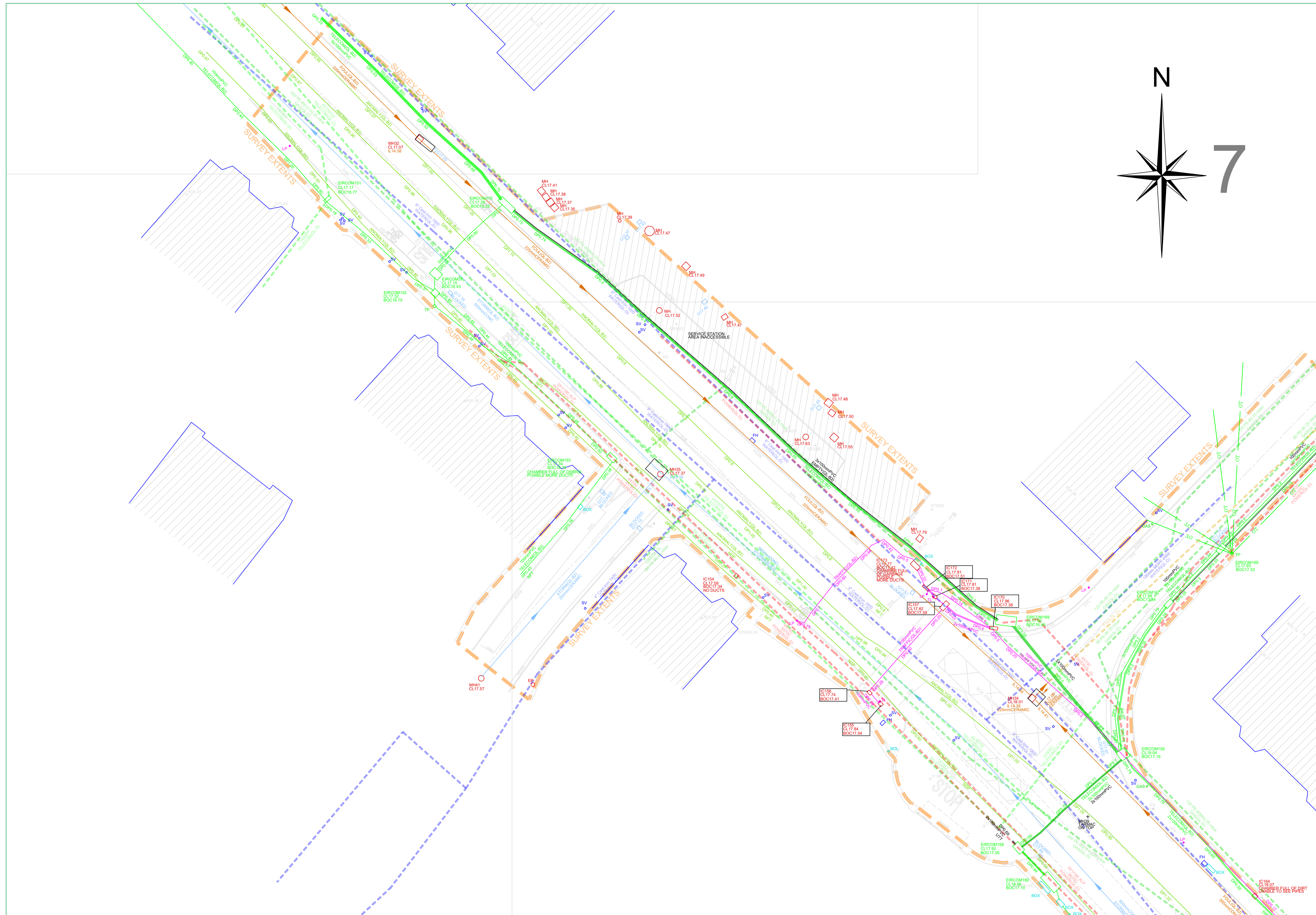
CLIENT: D.B.F.L.

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

REVISIONS:		
No.	Date	Description
001	04/03/20	Original Drawing
002	06/11/20	Additional Information Added

PROJECT: Sandford Park, Miltown

SCALE :	1/200 A1	DATE :	04/03/2020
DRG No:	4234	DESCRIPTION :	2D Utilities
SHEET:	6 of 10	SURVEYED BY :	Mario Gaspar
		PROCESSED BY :	Apex Surveys
		CHECKED BY :	Alan Brady



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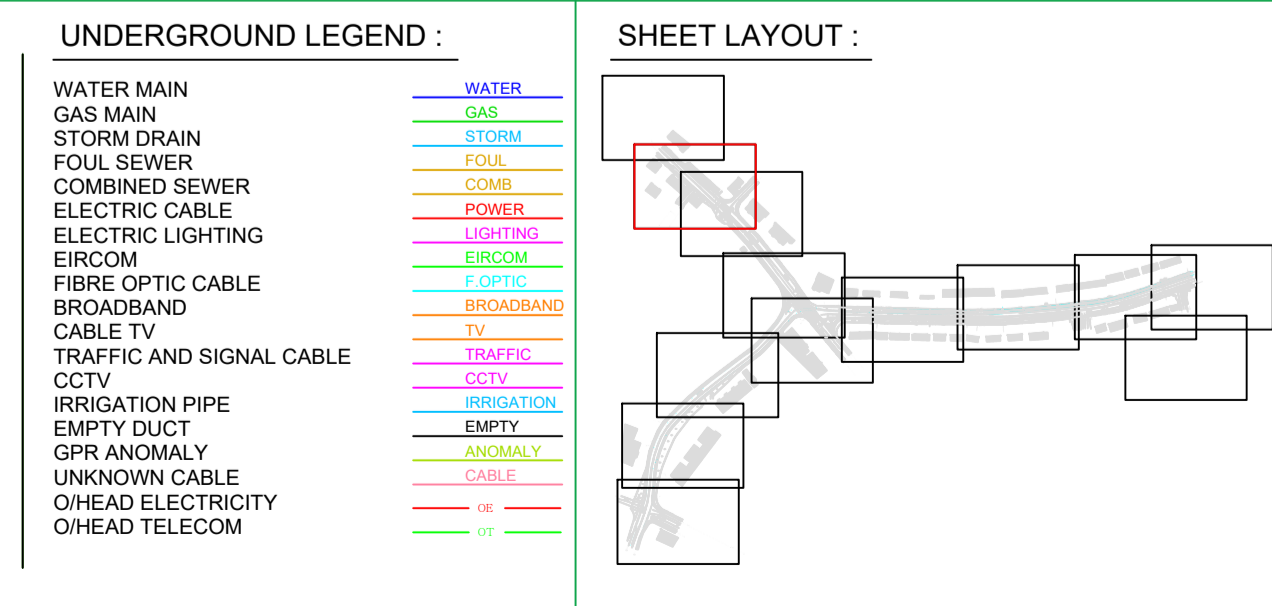
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BOLLARDS BUS STOP CRASH BARRIER GATE ELECTRICITY POLE TELEPHONE POLE EARTHING ROD LAMP POST MARKER POST SIGN POST TRAFFIC LIGHT TELEPHONE BOX POST POST BOX RS-RIS BORE HOLE TRIAL PIT BOTTOM OF CHAMBER CAST-IRON CONCRETE DIAMETER	AIR VALVE ARMSTRONG JUNCTION CABLE TV IC COVER LEVEL EIRCOM COVER EIRCOM JUNCTION BOX ELECTRICAL CABLE PIT ESAT COVER ESB COVER ESB JUNCTION BOX FIRE HYDRANT GAS VALVE GULLY INSPECTION COVER MANHOLE SEPTIC TANK SLUICE VALVE DOWNPIPE EARTHENWARE NO FURTHER TRACE OFFSITE	WATER MAIN GAS MAIN STORM DRAIN FOU L SEWER COMBINED SEWER ELECTRIC CABLE ELECTRIC LIGHTING EIRCOM FIBRE OPTIC CABLE BROADBAND CABLE TV TRAFFIC AND SIGNAL CABLE CCTV IRRIGATION PIPE EMPTY DUCT GPR ANOMALY UNKNOWN CABLE OHEAD ELECTRICITY OHEAD TELECOM



PLAN PRODUCED BY:

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GRID SYSTEM: Irish Transverse Mercator  
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NOTES: Drawing Contains Scale Factor

REVISIONS:

No.	Date	Description
001	04/03/20	Original Drawing
002	06/11/20	Additional Information Added

PROJECT:

**Sandford Park, Miltown**

SCALE : 1/200 A1

DATE : 04/03/2020

DRG No: 4234

SHEET: 7 of 10

DESCRIPTION : 2D Utilities

SURVEYED BY : Mario Gaspar

PROCESSED BY : Apex Surveys

CHECKED BY : Alan Brady

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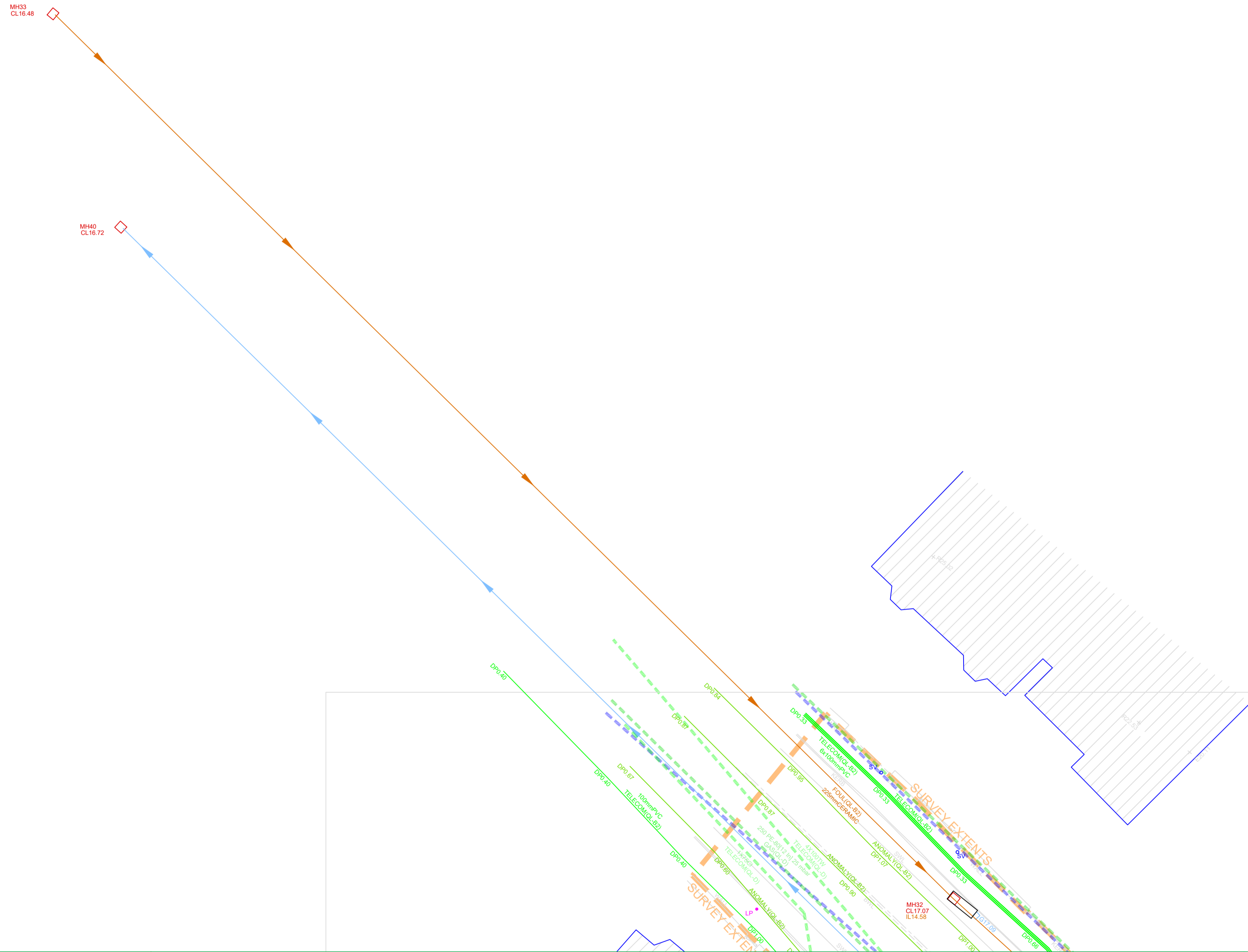
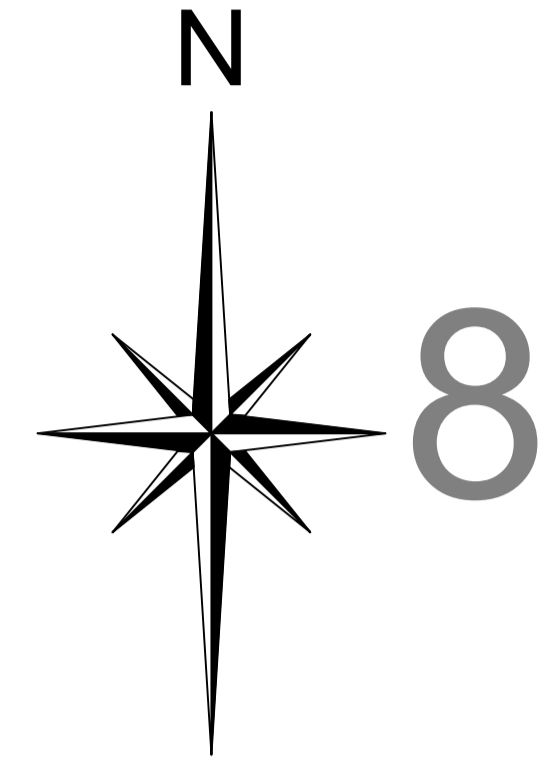
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BOLLARDS	BD +	BUS STOP	BS +	CRASH BARRIER	CB	GATE	EP +	ELECTRICITY POLE	EP +	TELEPHONE POLE	TP +	EARTHING ROD	ER +	LAMP POST	LP +	MARKER POST	MKR +	SIGN POST	TL +	TRAFFIC LIGHT	TL +	TELEPHONE BOX	TB	POST	POST +	POST BOX	RS-RS	ROADSIGN	BH +	BORE HOLE	TPIT +	TRIAL PIT	TPIT +
BOTTOM OF CHAMBER	BOC	CAST-IRON	CI	CONCRETE	CONC	DIAMETER	DIA																										

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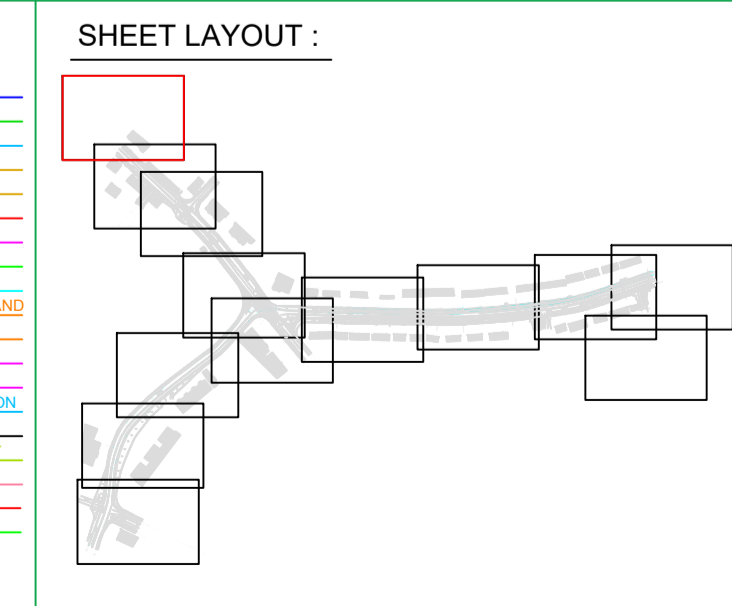
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DOWNSPIPE	DP	EARTHENWARE	EW	NO FURTHER TRACE	NFT	OFFSITE	O/S																								

**LEVELS :**

BED LEVEL	+BED101.50	FLOOR LEVEL	+FL101.50	INVERT LEVEL	+IL101.50	ROAD LEVEL	+101.50	SOFFIT LEVEL	+SL101.50	SPOT LEVEL	+101.50	TOP OF WALL LEVEL	+TOW101.50	WATER LEVEL	+WL101.50	SURVEY CONTROL STATION	SCS
STOPCOCK	ST	SERVICE BOX (UNKNOWN)	SBX	TRAFFIC COVER	TLIC	VENT	VENT +	WATER METER	WM +								
START OF RUN	SOR	UNABLE TO OPEN	UTO	UNABLE TO TRACE	UTT												

**UNDERGROUND LEGEND :**

WATER MAIN	WATER	GAS MAIN	GAS	STORM DRAIN	STORM	POUL SEWER	POUL	COMBINED SEWER	COMB	ELECTRIC CABLE	POWER	ELECTRIC LIGHTING	LIGHTING	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	UNKNOWN	O/H EAD ELECTRICITY	O/H	O/H EAD TELECOM	OT
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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	04/03/20	Original Drawing
002	06/11/20	Additional Information Added

PROJECT:

**Sandford Park, Miltown**

SCALE : 1/200 A1

DATE : 04/03/2020

DRG No: 4234

SHEET: 8 of 10

DESCRIPTION : 2D Utilities

SURVEYED BY : Mario Gaspar

PROCESSED BY : Apex Surveys

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
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Apex Surveys Ltd. Disclaimer - Utility Survey

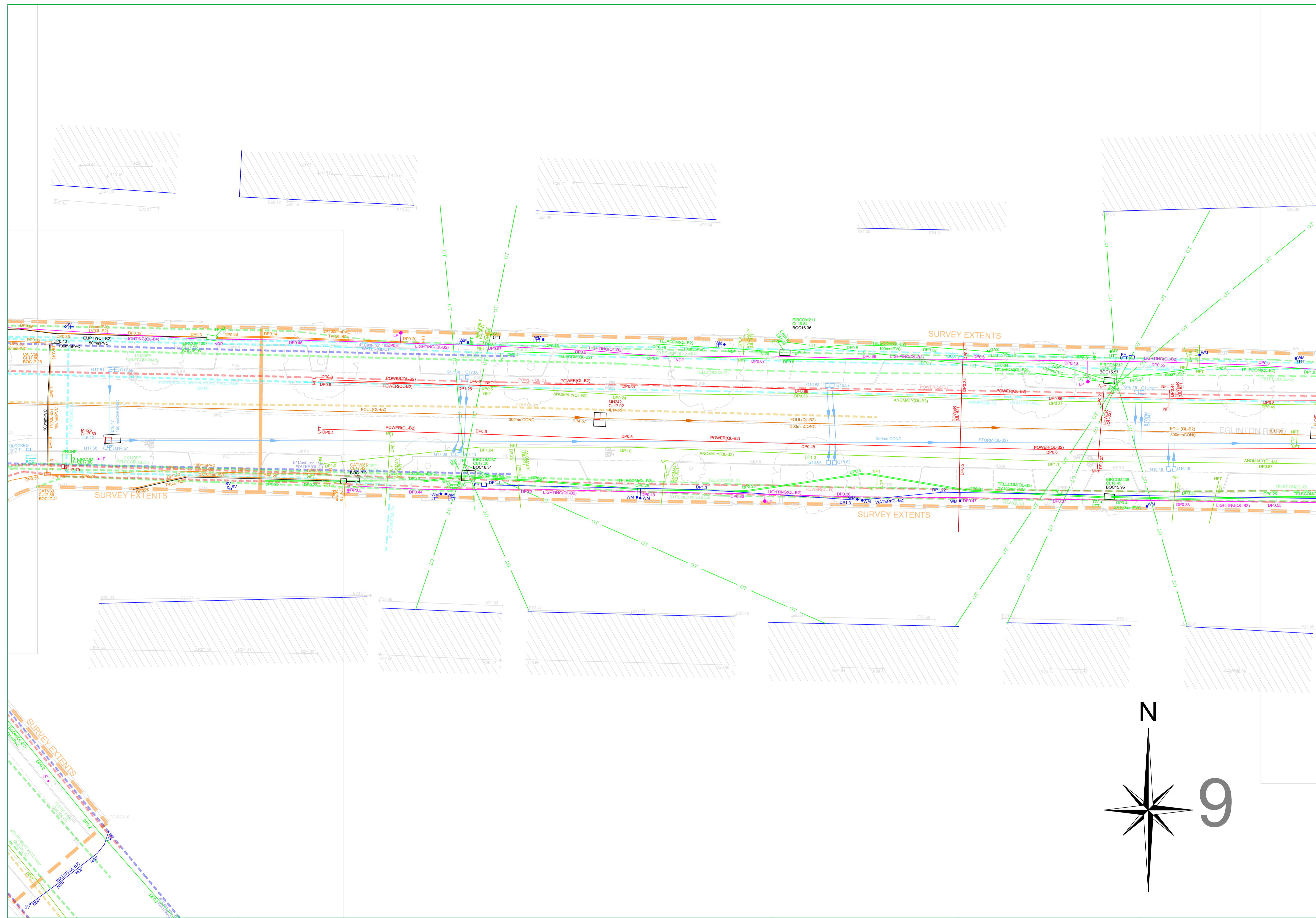
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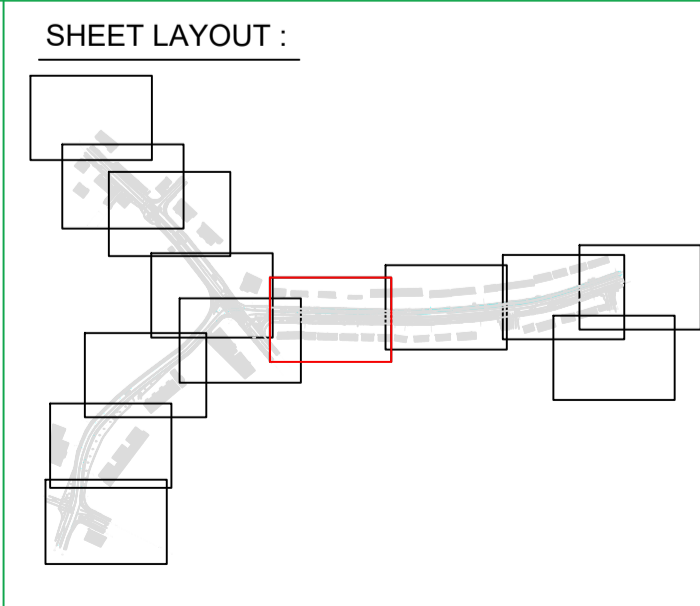
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<p><b>STREET FURNITURE :</b></p> <p>BOLLARDS BS+ BUS STOP CB CRASH BARRIER EP+ ELECTRICITY POLE ER+ ELECTRICITY POLE LP+ ELECTRICITY POLE MKR+ ELECTRICITY POLE SIGN POST TB ELECTRICITY POLE TELEPHONE BOX POST ELECTRICITY POLE TELEPHONE BOX POST BOX RS-RS ELECTRICITY POLE TELEPHONE BOX BORE HOLE TPIT+ ELECTRICITY POLE TRIAL PIT</p> <p>BOTTOM OF CHAMBER BOC CAST-IRON CI CONCRETE CONC DIAMETER DIA</p>	<p><b>SERVICES :</b></p> <p>AIR VALVE AV ARMSTRONGS JUNCTION AJ CABLE TV IC CATV COVER LEVEL EIRCOM EIRCOM COVER EIRCOM EIRCOM JUNCTION BOX EIRCOM BOX ELECTRICAL CABLE PIT ECP ESAT COVER ESB ESB COVER ESB BOX ESB JUNCTION BOX ESB FIRE HYDRANT FH GAS VALVE G INSPECTION COVER IC MANHOLE MH SEPTIC TANK SEPTIC SLUICE VALVE SV</p> <p>DOWNPIPE DP EARTHENWARE EW NO FURTHER TRACE NFT OFFSITE O/S</p>	<p><b>LEVELS :</b></p> <p>BED LEVEL +BED101.50 FLOOR LEVEL +FL101.50 INVERT LEVEL +IL101.50 ROAD LEVEL +RL101.50 SOFFIT LEVEL +SL101.50 SPOT LEVEL +SL101.50 TOP OF WALL LEVEL +TOW101.50 WATER LEVEL +WL101.50 SURVEY CONTROL STATION</p> <p>STOPCOCK SERVICE BOX (UNKNOWN) TRAFFIC COVER VENT WATER METER</p> <p>ST - BOX TLIC - TRAFFIC LIGHT WM - WATER METER</p>	<p><b>UNDERGROUND LEGEND :</b></p> <p>WATER MAIN GAS MAIN STORM DRAIN FOUL SEWER COMBINED SEWER ELECTRIC CABLE ELECTRIC LIGHTING EIRCOM FIBRE OPTIC CABLE BROADBAND CABLE TV TRAFFIC AND SIGNAL CABLE IRRIIGATION PIPE EMPTY DUCT GPR ANOMALY UNKNOWN CABLE O'HEAD ELECTRICITY O'HEAD TELECOM</p> <p>WATER GAS STORM FOUL COMB POWER LIGHTING EIRCOM BROADBAND TRAFFIC CCTV IRRIGATION EMPTY ANOMALY CABLE IK UT</p>
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No.	Date	Description
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002	06/11/20	Additional Information Added

PROJECT:

Sandford Park, Miltown

SCALE : 1/200 A1

DATE : 04/03/2020

DRG No: 4234

SHEET: 9 of 10

DESCRIPTION : 2D Utilities

SURVEYED BY : Mario Gaspar

PROCESSED BY : Apex Surveys

CHECKED BY : Alan Brady

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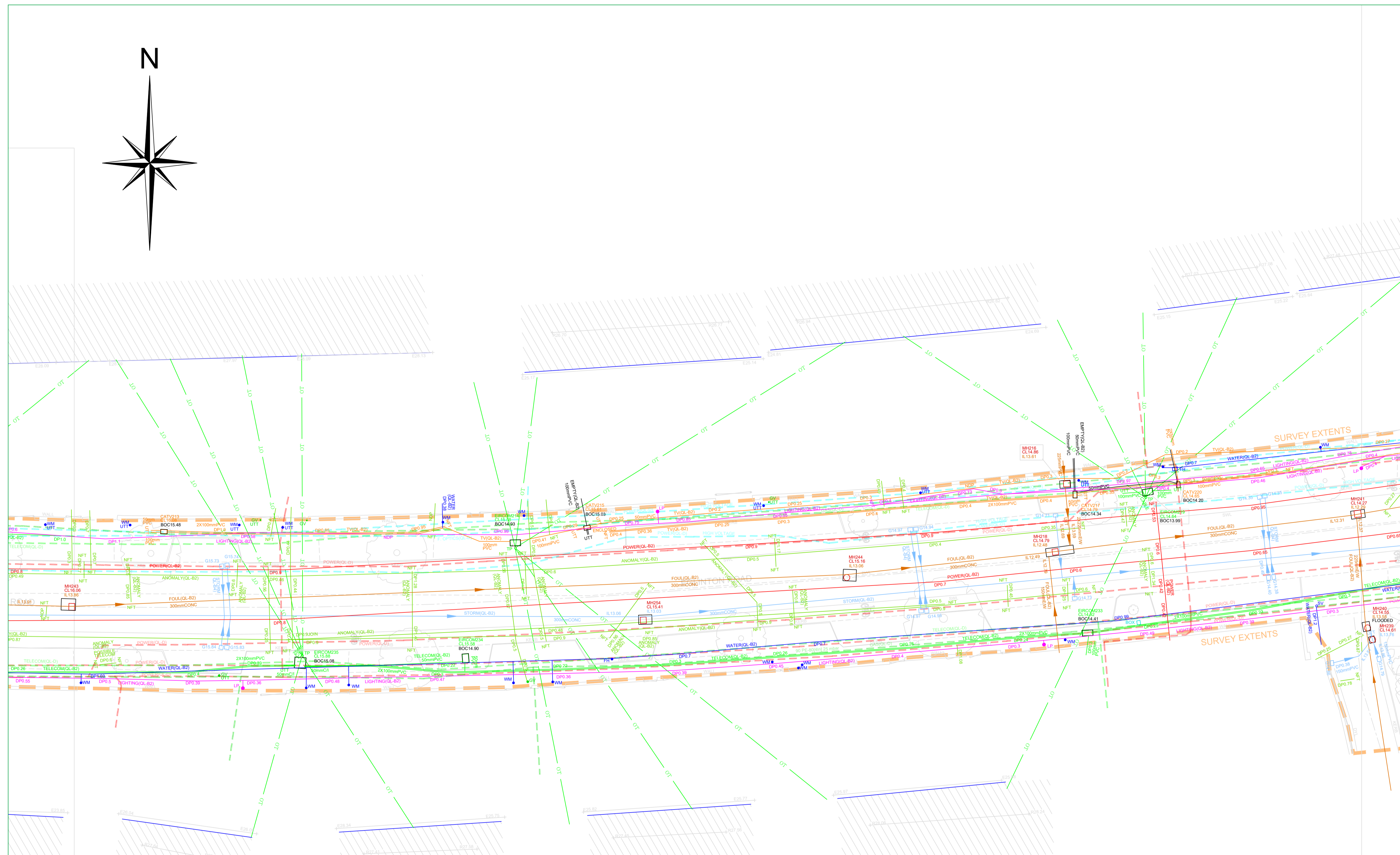
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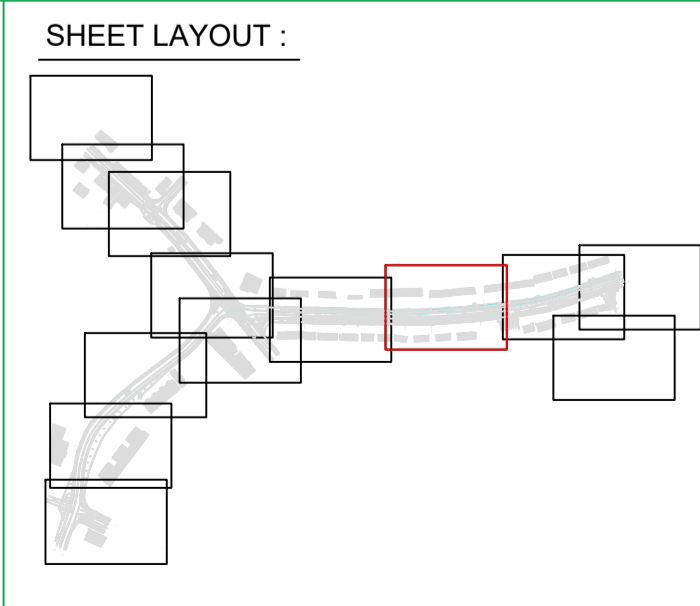
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PROJECT:

**Sandford Park, Miltown**

SCALE : 1/200 A1

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DRG No: 4234

SHEET: 10 of 10

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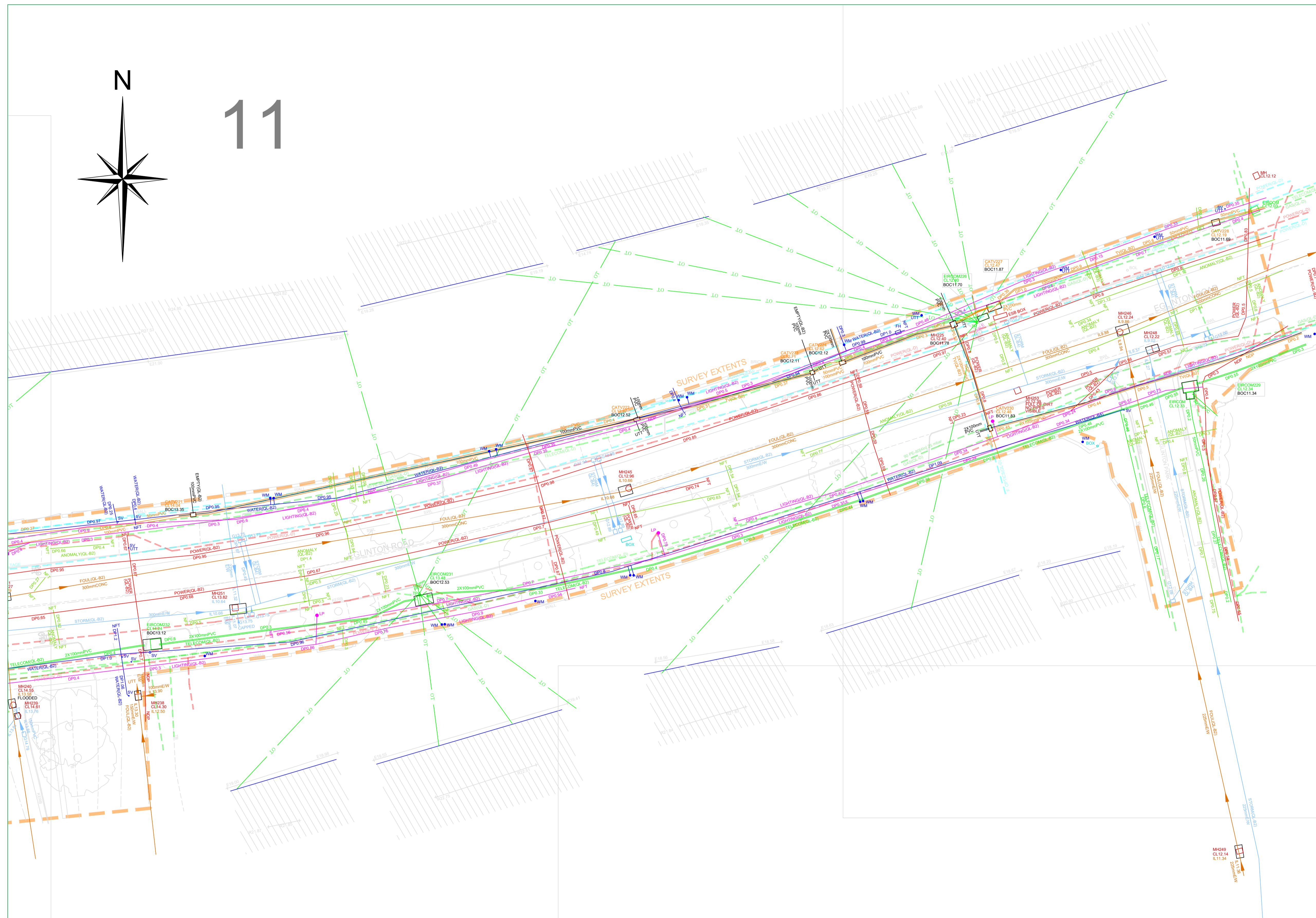
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**STREET FURNITURE :**

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	SP+
TRAFFIC LIGHT	TL+
TELEPHONE BOX	TB
POST	POST
POST BOX	POST BOX
RS-RIS	RS-RIS
BORE HOLE	BH+
TRIPIT	TRIPIT+
BOTTOM OF CHAMBER	BOC
CAST-IRON	CI
CONCRETE	CONC
DIAMETER	DIA

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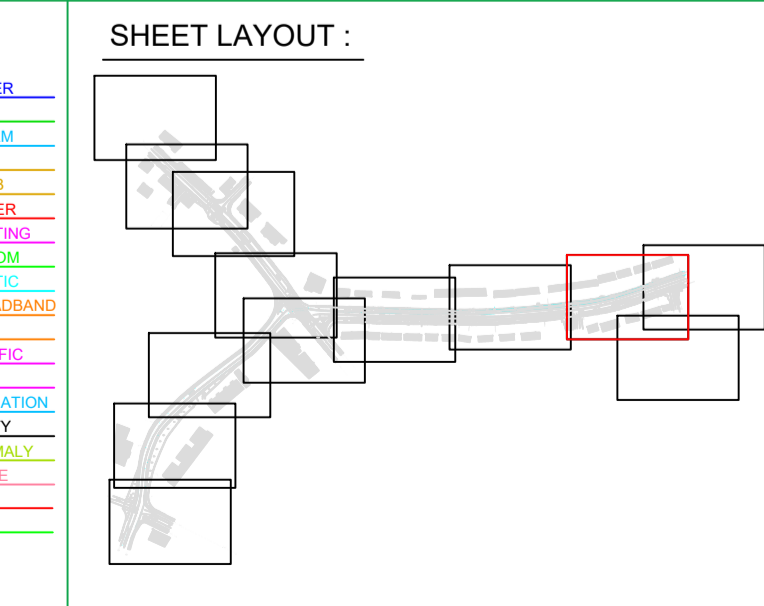
AIR VALVE	AV
ARMSTRONG JUNCTION	AJ
CABLE TV IC	CATV
COVER LEVEL	CL
EIRCOM JUNCTION	EIRCOM
EIRCOM JUNCTION BOX	EIRCOM BOX
ELECTRICAL CABLE PIT	ECP
ESAT COVER	ESAT
ESB COVER	ESB
ESB JUNCTION BOX	ESB BOX
FIRE HYDRANT	FH
ESAT COVER	ESAT
GAS VALVE	GV
GULLY	G
INSPECTION COVER	IC
MANHOLE	MH
SEPTIC TANK	ST
SLUICE VALVE	SV
DOWNPIPE	DP
EARTHENWARE	EW
NO FURTHER TRACE	NFT
OFFSITE	O/S

**LEVELS :**

BED LEVEL	+BED101.50
FLOOR LEVEL	+FL101.50
INVERT LEVEL	+IL101.50
ROAD LEVEL	+101.50
SOFFIT LEVEL	+SL101.50
SPOT LEVEL	+101.50
TOP OF WALL LEVEL	+TOW101.50
WATER LEVEL	+WL101.50
SURVEY CONTROL STATION	SCS
START OF RUN	SOR
UNABLE TO OPEN	UTO
UNABLE TO TRACE	UTT

**UNDERGROUND LEGEND :**

WATER MAIN	WATER
GAS MAIN	GAS
STORM DRAIN	STORM
FULL SEWER	FOUL
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
O/H HEAD ELECTRICITY	O/H HEAD ELECTRICITY
O/H HEAD TELECOM	O/H HEAD TELECOM



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	04/03/20	Original Drawing
002	06/11/20	Additional Information Added

PROJECT:

**Sandford Park, Miltown**

SCALE : 1/200 A1

DATE : 04/03/2020

DRG No: 4234

SHEET: 11 of 10

DESCRIPTION : 2D Utilities

SURVEYED BY : Mario Gaspar

PROCESSED BY : Apex Surveys

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:** It may not be possible to 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.

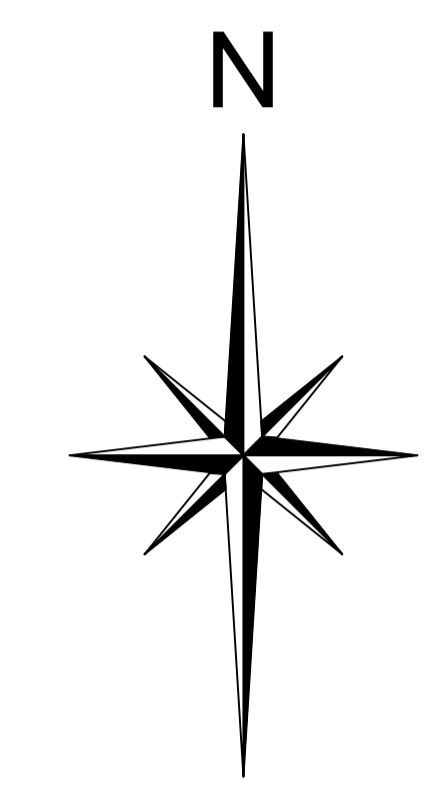
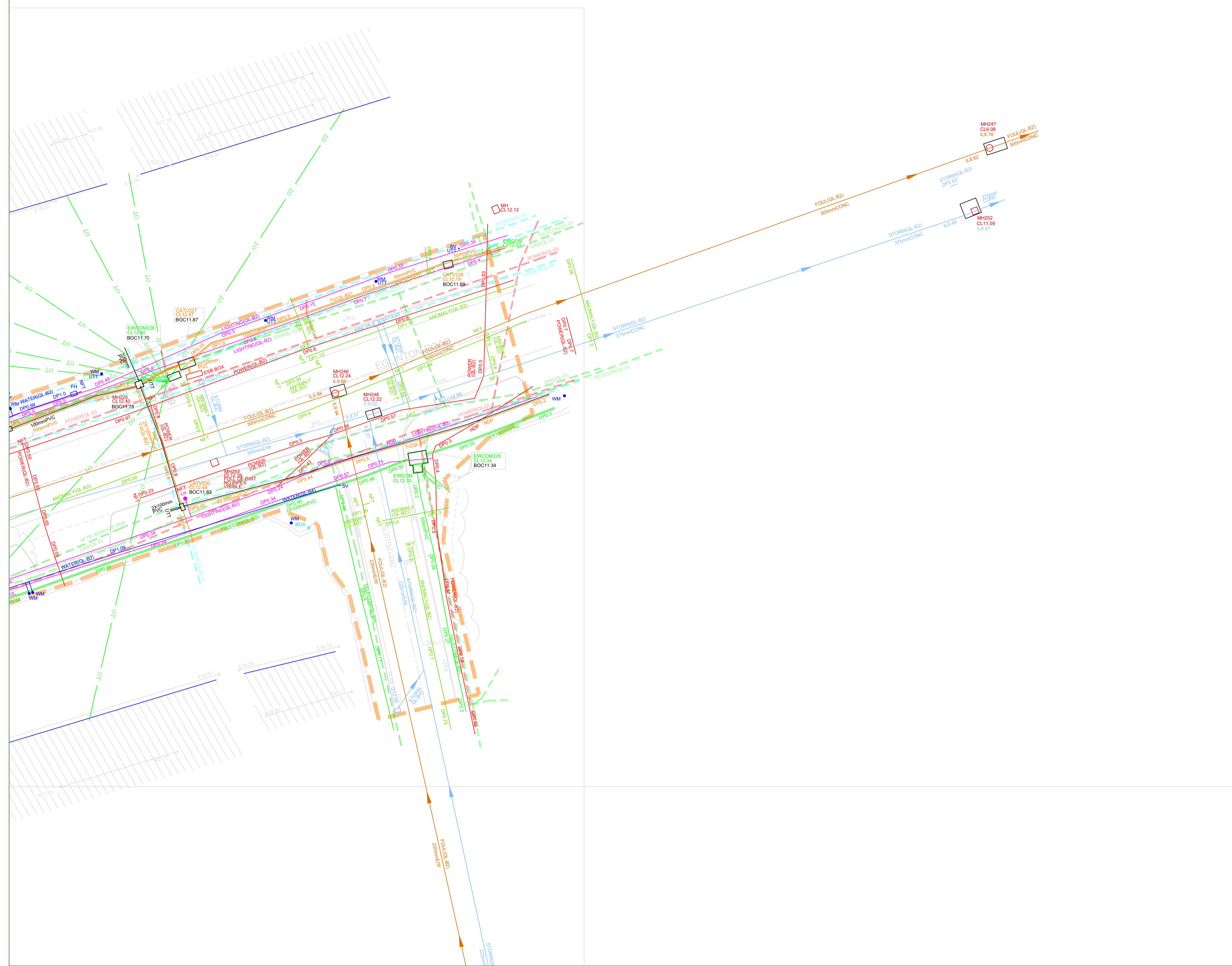
Accuracy estimates:

- 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



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**APEX SURVEYS**  
www.apexsurveys.ie  
info@apexsurveys.ie  
00353 1 691 0156

<b>STREET FURNITURE :</b>	BD+ BS+ CB EP+ TP+ ER+ LP+ MKR+ SIGN+ TB POST+ POST BOX RS-RS BH+ TPIT+	<b>SERVICES :</b>	AV AJ CATV EIRCOM EIRCOM BOX ECP ESAT ESB ESB BOX FH G GV G IC MH SEPTIC SV	STOPCOCK SERVICE BOX (UNKNOWN) TRAFFIC COVER VENT WATER METER <b>LEVELS :</b> BED LEVEL FLOOR LEVEL INVERT LEVEL ROAD LEVEL SOFFIT LEVEL SPOT LEVEL TOP OF WALL LEVEL WATER LEVEL SURVEY CONTROL STATION	ST+ BOX TLIC VENT+ WM+ +BED101.50 +FL101.50 +IL101.50 +101.50 +SL101.50 +101.50 +TOW101.50 +WL101.50	<b>UNDERGROUND LEGEND :</b>	WATER MAIN GAS MAIN STORM DRAIN FOUL SEWER COMBINED SEWER ELECTRIC CABLE ELECTRIC LIGHTING EIRCOM FIBRE OPTIC CABLE BROADBAND CABLE TV TRAFFIC AND SIGNAL CABLE CCTV IRRIGATION PIPE EMPTY DUCT GPR ANOMALY UNKNOWN CABLE O'HEAD ELECTRICITY O'HEAD TELECOM	WATER GAS STORM FOUL COMB POWER LIGHTING EIRCOM F.OPTIC BROADBAND TV TRAFFIC CCTV IRRIGATION EMPTY ANOMALY CABLE HK UT
<b>BOTTOM OF CHAMBER</b> CAST-IRON CONCRETE DIAMETER	BOC CI CONC DIA	<b>DOWNPIPE</b> EARTHENWARE NO FURTHER TRACE OFFSITE	DP EW NFT O/S	<b>START OF RUN</b> UNABLE TO OPEN UNABLE TO TRACE	SOR UTO UTT			

**SHEET LAYOUT :**

PLAN PRODUCED BY:

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PROJECT:

**Sandford Park, Miltown**

SCALE :	1/200 A1	DATE :	04/03/2020
DRG No:	4234	DESCRIPTION :	2D Utilities
SHEET:	12 of 10	SURVEYED BY :	Mario Gaspar
		PROCESSED BY :	Apex Surveys
		CHECKED BY :	Alan Brady

