



Energy for
generations

Ballycummin 110 kV Substation



NETWORKS

Engineering Services Report

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Date: July 2025

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Ballycummin 110kV Substation – Engineering Services Report

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1 Introduction

1.1 Project Background

This Engineering Services Report (ESR) has been prepared to accompany the Strategic Infrastructure Development (SID) planning application to be submitted by the Electricity Supply Board (ESB) to An Coimisiún Pleanála.

ESB Networks (ESBN) are progressing a high – priority project to alleviate load and supply issues in the greater Limerick area as a result of the existing Limerick 110 / 38 kV MV substation reaching load capacity. The new substation is required to off load the existing limerick 110 kV substation and provide additional capacity for the Greater Limerick Area and the Raheen Business Park and is proposed to be located at Ballycummin on lands currently owned and adjacent to the existing Eli Lilly site in Raheen Business Park.

The proposed development will involve the installation of a new 110/38kV/MV station at a site in Raheen Business Park beside the Eli Lilly plant in Ballycummin, County Limerick.

The site is located on Roches Avenue, fully within the Raheen Business Park immediately adjacent to the Eli Lilly plant. The primary land uses in the business park comprise industrial and business-related uses.

The site will consist of an indoor GIS double busbar C-type 110 kV station (it will be a transmission station), 2 x 63 MVA 110/38 kV transformers and 2 x 15 MVA 38kV/ MV transformers. All 110 kV designs to EirGrid standards.

The development will also involve works to the existing overhead 110kV line in order to loop the new station into the line. These works will result in replacement of some existing structures and underground cabling of some of the existing overhead line.

It is planned that the station will loop into the existing Limerick – Moneteen 110 kV transmission circuit.

The proposed development constitutes the provision of a new 110 /38 / 20 kV Gas Insulated Switchgear (GIS) electrical substation and will include the following elements:

1. Removal of four existing 110 kV Overhead Line timber polesets (c. 15 m in height) and c.800 m of Overhead Line conductor
2. Construction of:
 - i. A new substation compound (c. 5,950 sq.m.) with a 2.6 m high palisade fencing;
 - ii. A new 110 kV GIS building with eight 110 kV bays (c. 700 sq.m.; 12 m in height);
 - iii. A new 38 / 20 kV GIS building with fourteen 38 kV bays and eighteen MV (20 kV) bays (c. 235 sq.m.; 7 m in height);
 - iv. Two 110 / 38 kV power transformers in transformer bays (c. 5 m high) with associated electrical equipment;

- v. Two 38 / 20 kV power transformers in transformer bays (c. 5 m high) with associated electrical equipment;
 - vi. Three Arc Suppression Coil transformers in transformer bays (c. 4 m high) with associated electrical equipment;
 - vii. Two new 110 kV double circuit overhead (OHL) line / cable interface end masts (c. 17m in height)
 - viii. One new 110 kV double circuit overhead (OHL) line angle mast (c. 17 m in height)
 - ix. One temporary 110 kV Overhead Line timber poleset (c. 16 m in height)
 - x. Temporary diversion of the existing 110 kV overhead line to the temporary timber poleset (c. 320 m of OHL conductor)
 - xi. Diversion of the existing 110 kV overhead line to the new end masts (c. 510 m of OHL conductor);
 - xii. 110 kV underground cabling between the 110 kV GIS building and the new line / cable interface end masts;
 - xiii. Associated and ancillary outdoor electrical equipment and other apparatus, including installation of underground cables;
3. Site development works including provision of access roads, car parking area, lighting, telecommunications, fencing, landscaping, site services including drainage and all other ancillary works

The proposed development is illustrated on drawing No. PE492-D184-067-002-000 in Appendix A. All levels mentioned within the report are to Malin Head.

1.2 Purpose of the Proposed Development

The proposed development will contribute to additional capacity and improvements in the security of supply for the area.

- 1. Limerick station is a 2x63 MVA 110/30 kV station. Due to multiple applications for new connections, there will be significant additional loads of 27.2 MVA on Limerick Station. Therefore, a new station is required to cater for the load stress in Limerick Station.
- 2. The new Ballycummin station will facilitate a reconfiguration of connections to various customers and to other substation in the area, in order to reduce existing loadings.
- 3. There is very limited capacity available in the region for the future electrification of Heat and Transport as per Government CAP targets.
- 4. Considering the development initiatives in the region of Raheen Business Park it is predicted that the development of this region will happen at a very fast pace. In order to facilitate future developments, the strengthening of the electricity network is imperative.

1.3 Site of Proposed Development

1.3.1 Site Location

The proposed Ballycummin 110 kV Substation will be located in the Raheen Business Park, in the southeast of Limerick City. It is proposed for the substation to be accessed via an existing entrance off Roche's Avenue, located within Raheen Business Park.

The substation is bound to the east by a large car park, to the West by the new Eli Lilly Manufacturing Facility and to the North by a landscaped area.

1.3.2 Site Topography

A topographical survey was undertaken in June 2025 and is included in Appendix C.

The site is relatively flat with a gentle slope Northwest to Southeast. The level at the centre of the site is approx. 23.80mAOD. Site levels range from approx. 24.40mAOD at the northwestern boundary to 23.30mAOD at the southeastern side.



Figure 1.1: General Site Location



Figure 1.2: Proposed Site Boundary

2 Surface Water

2.1 Design Principles

The design and management of the Surface Water for the proposed development will comply with the policies and guidelines outlined in the following.

- The Greater Dublin Strategic Drainage Study (GDSDS).
- Limerick Development Plan 2022-2028.
- Limerick City and County Council Surface Water/ SuDs Specification 2022.
- Greater Dublin Regional Code of Practice for Drainage Works, and
- The Sustainable Urban Drainage System (SuDs) Manual (2015).

The key design principles of the Surface Water drainage are as follows:

1. The flow from the development to the existing Surface Water Infrastructure is designed to equal the natural greenfield runoff in accordance with the GDSDS, Limerick City and County Council Surface Water/ SuDs Specification and sustainable drainage best practices.
2. There are no additional or increased flows for the developed site compared to the existing greenfield condition.
3. The site will have an Attenuation Area designed to store volumes from the 30 year and 100-year storm events on site in accordance with SuDs best practice, and
4. The design of the attenuation system includes an allowance for 30% climate change

2.2 Existing Surface Water Drainage

There is currently two existing IDA owned surface water drainage pipes located within the northern footway of Roche's Avenue as follows:

- A 300mm diameter pipe is flowing west to east and discharges into a drainage ditch on the Eli Lilly site, and

- A 350mm diameter pipe falls from west to east, flowing back into the IDA site.



Figure 2.1: GPR Map Showing Existing Services Adjacent to the Site

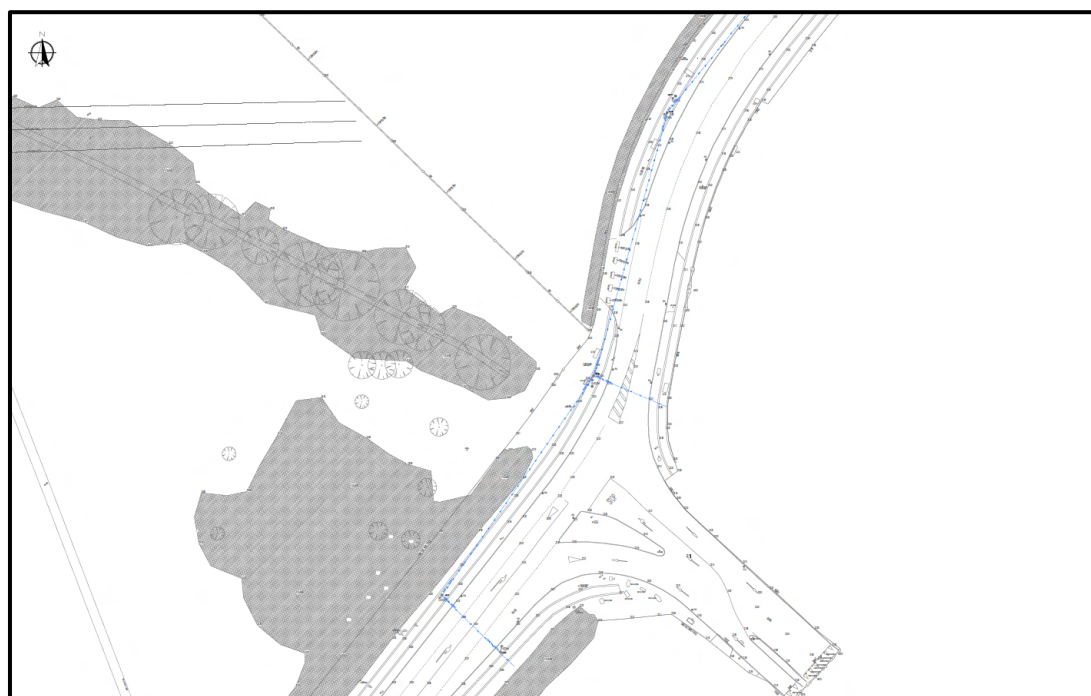


Figure 2.2: Snippet of GPR Map Showing Existing Surface Water Infrastructure Adjacent to the Site

2.3 Ground Conditions

From reviewing adjacent planning applications and their subsequent information the site's geology consists of:

- Glacial deposits are overlain by peat indicating that this is a former waterlogged basin which supported growth of vegetation. A maximum depth of 5.1m of fill and peat was encountered, and
- The overburden soils were penetrated to reveal bedrock. The bedrock was Sandstone and Limestone.

Infiltration testing to BRE 365 was conducted in the adjacent Eli Lilly site in 2022. The infiltration rates varied throughout the site but an infiltration rate of 23.3m/hr was accepted for the infiltration rate within the proposed design.

2.4 Proposed Surface Water Drainage

2.4.1 Surface Water Drainage Proposals

The surface water drainage proposals for the proposed electrical substation have been developed to mimic the natural drainage patterns of the site and in accordance with SuDs. The surface water proposals replicate greenfield drainage conditions where possible.

The Surface Water drainage infrastructure has been designed with the following Parameters:

- Return period for pipe network 5 years,
- Time of entry 5 minutes;
- Pipe Friction (ks) 0.6mm;
- Minimum velocity 0.75m/s;
- M5-2D = 54.8 mm;
- M5-60 = 17.9 mm;
- Ratio r (M5-60/M5-2D) = 0.326;
- SAAR = 942mm, and
- Climate Change 30% for rainfall intensities.

Drainage from the proposed substation development will be collected on site by a dedicated-drainage network and will discharge to a proposed soakaway. A soakaway tank with a storage capacity of 189cu.m will be located in the southwest of the proposed development site.

The soakaway system will manage flows during storm events and will incorporate an isolator row to enhance the removal of total suspended solids.

The new access road within the site will be drained to the underground drainage infrastructure through the use of gullies. This will then be discharged into the soakaway to allow for infiltration into the ground. An outfall pipe from the soakaway is also provided to allow water to leave site during heavy rainfall events, when the rain entering the underground drainage system surpasses the Infiltration rate. The outfall pipe will be fitted with a flow control device to limit the flow exiting the site to 2l/s/ha or the greenfield runoff rate.

All runoff will pass through a catchpit before flowing through the proposed soakaway system to catch any fines.

The remainder of the compound area of the substation will comprise a permeable surface consisting of 50 mm single sized clean compound stone. The permeable compound stone will provide a means of attenuating runoff in these areas and will allow rainwater to saturate the soil. This will then either infiltrate to ground or will evaporate as it would on a greenfield site.

The surface water drainage proposals are illustrated on drawing No. PE492-F0545-067-017-000 in Appendix A.

The surface water drainage network has been designed and simulated for a range of storm events (including 1 in 5, 1 in 30 and 1 in 100-year storm events) using the Causeway Flow software. Refer to Appendix E for simulation results.

2.5 Greenfield Runoff Rate

It is proposed to limit the flow discharging from the site to the greenfield runoff rate of the site prior to development, as per the requirements of the GDSDS. The Q_{bar} method was used to determine the greenfield runoff rate as per the Institute of hydrology equation.

$$Q_{bar[rural]} = 0.00108 \times Area^{0.89} \times SAAR^{1.17} \times SPR^{2.17}$$

Where:

$Q_{bar[rural]}$ = is the mean annual peak flow rate from a rural catchment

Area = the area of the catchment in ha = 50ha

SAAR = is the standard average annual rainfall = 942mm

SPR = Standard Percentage Runoff Co-efficient for the soil category. Where SPR values for the 5 soil types are as follows;

- Soil 1 = 0.1
- Soil 2 = 0.3
- Soil 3 = 0.37
- Soil 4 = 0.47
- Soil 5 = 0.53

An SPR value of 0.30 (Soil Type 2, matching Eli Lilly site) has been applied for the subject site.

$$Q_{bar[rural]} = 0.00108 \times 50^{0.89} \times 942^{1.17} \times 0.37^{2.17}$$

$$Q_{bar[rural]} = 12.25/s \text{ for } 50 \text{ ha or } 0.33/s \text{ for an area of } 1.349\text{ha}$$

As per the best practice a flow restriction of 2.0l/s will be applied to the site due to smaller restrictions being prone to blockages.

3 Foul Water

3.1 Existing Foul Water Drainage

There is currently an existing IDA foul water drainage pipe located within the southern footway of Roche's Avenue. The pipe diameter is 225mm and it falls from west to east. There is no Uisce Éireann foul infrastructure adjacent to the site. A copy of the Uisce Éireann records are included in Appendix B, along with the GPR survey adjacent to the site.

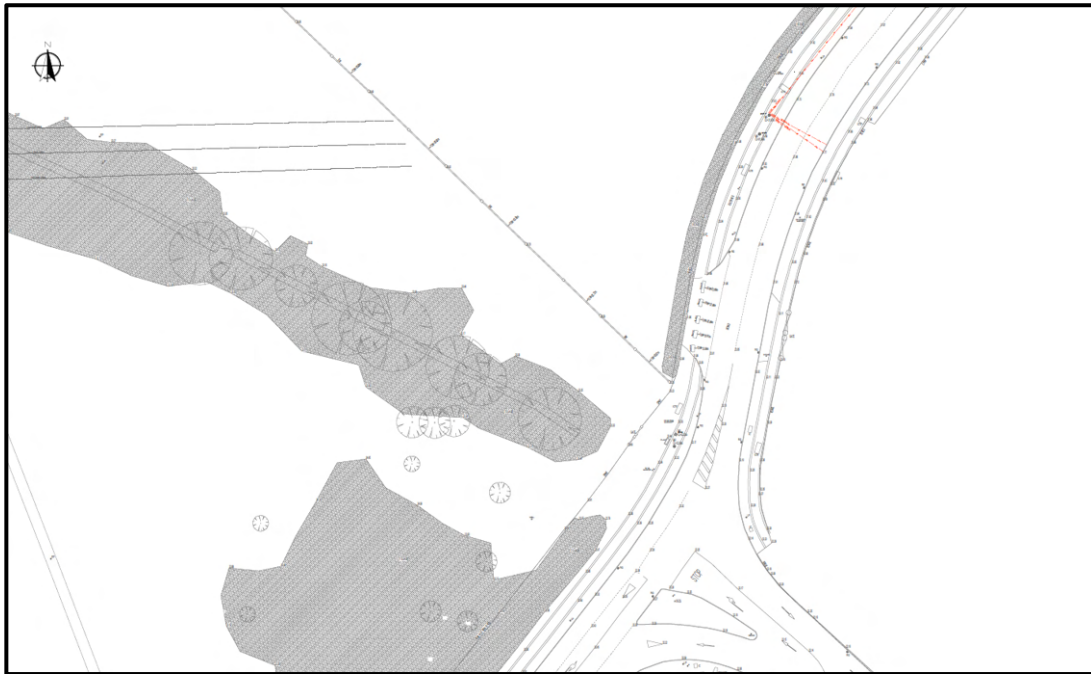


Figure 3.1: Snippet of GPR Map Showing Existing Foul Infrastructure Adjacent to the Site

3.2 Proposed Foul Water Drainage

It is proposed to discharge foul water generated by the welfare facilities in the substation building to the existing foul water infrastructure within the northern footway of Roche's Avenue. A new foul sewer is proposed to convey wastewater to the existing infrastructure.

A Pre-Connection Enquiry was made to Uisce Éireann in June 2025. The Confirmation of Feasibility can be seen in Appendix D. Uisce Éireann indicated that they do not have any infrastructure within the area for wastewater. The proposed pipe the subject site will discharge to is in the ownership of the IDA and ESB have received confirmation from the IDA that the subject site can discharge into the pipe.

3.3 Foul Water Volumes

The foul drainage proposals must cater for the wastewater generated in the welfare facilities of the proposed development. These welfare facilities include for one toilet (WC) and one wash hand basin (WHB) in the northwestern side of the GIS substation building,

In addition there are to be two eye wash stations, one in the control room and one in the entrance lobby in the west of the building.

The proposed development will generate small quantities of foul waste. The facility will typically be unmanned. As such, the quantities of foul waste generated will therefore be low.

There will be visits to the site for scheduled and unscheduled inspections, maintenance and repairs as necessary. A two-person crew visiting site for three days a week would be the most that would be expected on the site. In such circumstances the operatives could be expected to use each of the facilities four times a day.

The calculated Population Equivalent (PE) for foul loading is estimated at 7.6 litres per day. This is consistent with the recommended wastewater loading for a Wash Closet (6.0l), Wash Hand Basin (1.0l) and a Sink (0.6l) in the Uisce Éireann Appendix C Wastewater Code of Practice. This equates to 2,774 litres per annum. While such a consistently high visitation rate is unlikely, there is the possibility of increased numbers of staff being present on site for short durations of one to two weeks for the commissioning of electrical elements of the site from time to time. It is considered that these irregular occurrences would balance with the ordinary operation of the unmanned site to produce a maximum of 2,774 litres of foul waste per annum.

It is common for much lower usage of the facilities on unmanned stations and therefore a much lower foul loading. A common problem on such unmanned stations is odours in the toilet areas due to the water trap in the WC drying out through evaporation from the lack of use. For this reason, it is proposed to use self-flushing toilets in the station, which would flush automatically twice per week. The station will include one 6 litre flush WC so a minimum weekly foul flow of 12 litres can be expected from this. The self-flushing WC together will therefore contribute 624 litres per annum.

Combining the automatic flush and maximum user demand figures would result in a maximum annual generation of 3,398 litres of foul water.

The foul design report can be seen in appendix F.

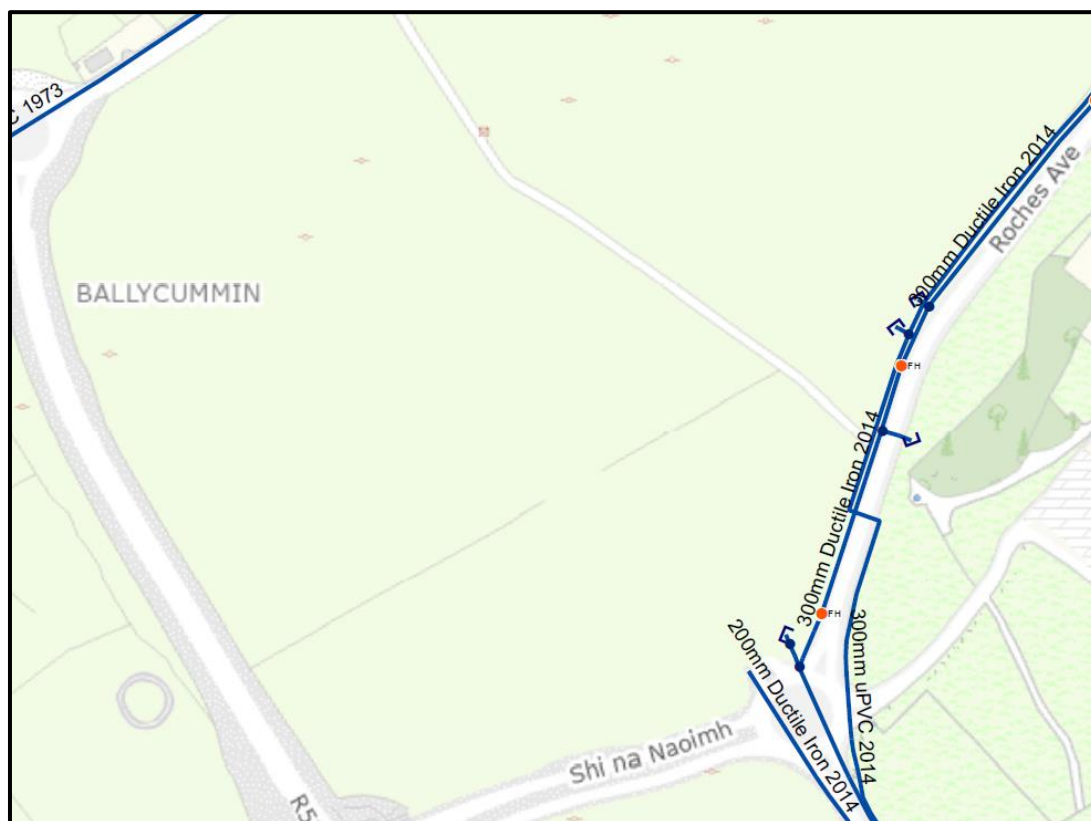


Figure 4.2: Snippet of Uisce Éireann Records, Showing Existing Watermain Infrastructure Adjacent to the Site

A copy of the Uisce Éireann records are included in Appendix B

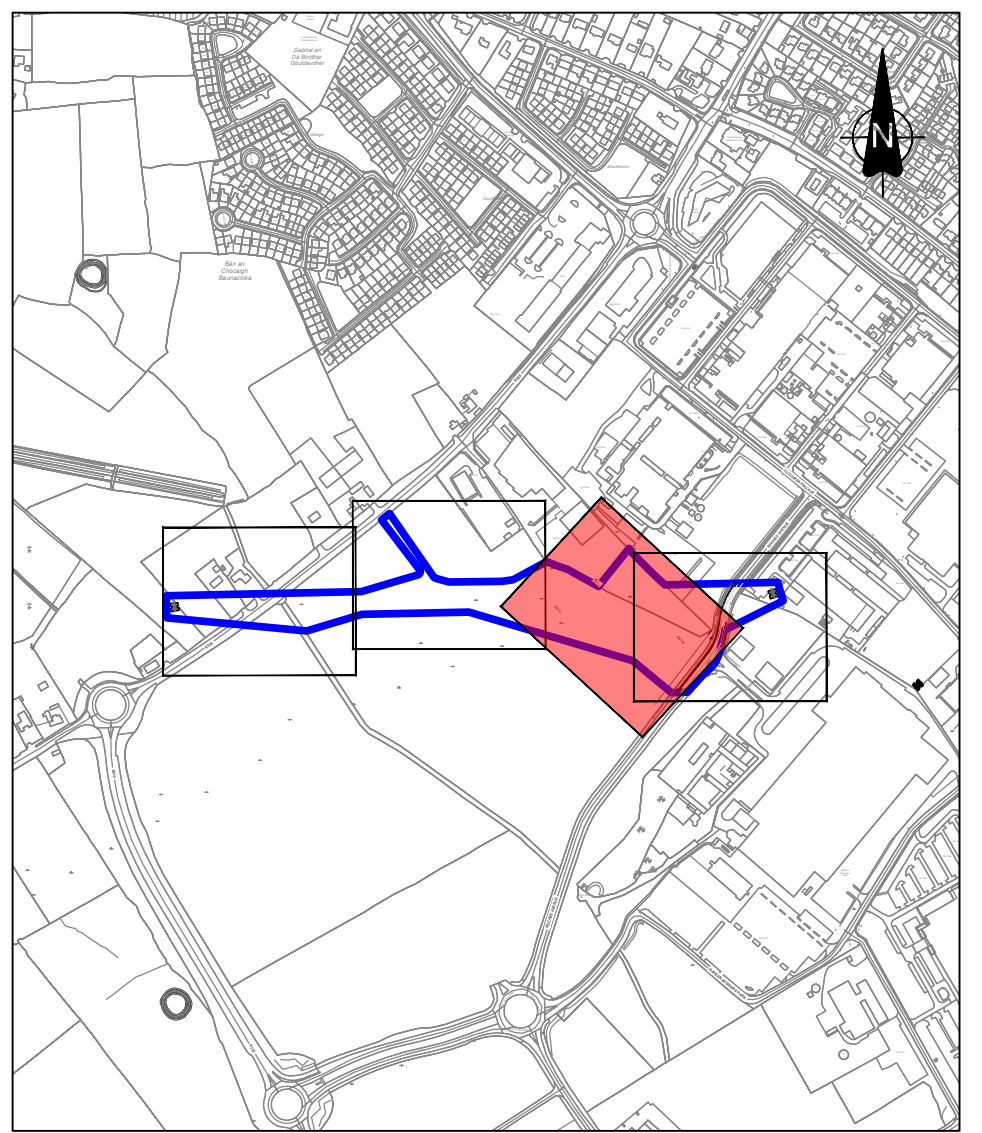
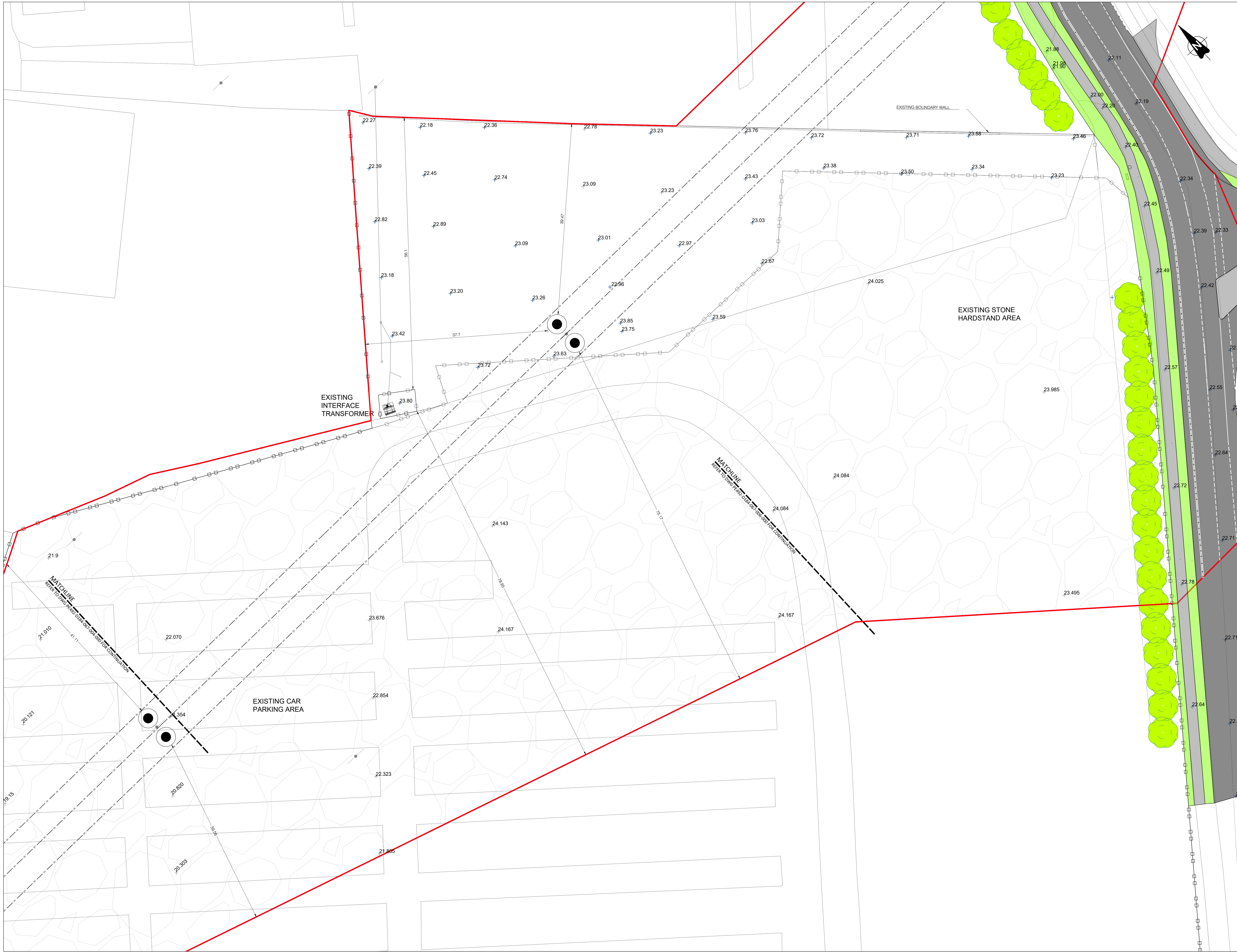
4.2 Water Supply Proposals

It is proposed to connect to the 300mm diameter uPVC watermain located within Roche's Avenue via a 100mm diameter connection for the site.

A Pre-Connection Enquiry was made to Uisce Éireann in June 2025 and a Confirmation of Feasibility was received, which can be seen in Appendix D. The connection was confirmed as feasible without any infrastructure updates required.

Appendix A: Proposed Development

- Drawing No. PE492-D184-063-001-000 Site Location Plan
- Drawing No. PE492-D184-067-002-000 Overall Project Layout
- Drawing No. PE492-D184-067-017-000 Proposed Drainage Layout
- Drawing No. PE492-D184-067-018-000 Proposed Watermain Layout



KEY PLAN
SCALE 1:1000

LEGEND

- PROPOSED PLANNING BOUNDARY
- EXISTING 110 kV OVERHEAD LINE
- EXISTING MAST
- EXISTING DOUBLE POLESET
- SITE NOTICE LOCATION
- EXISTING FENCE
- EXISTING WALL
- EXISTING HEDGE
- MEADOW BARLEY PROTECTION AREA
- EXISTING ROAD
- EXISTING FOOTPATH
- EXISTING GRASS VERGE
- EXISTING STONED AREA
- EXISTING GROUND LEVEL

- NOTES:
- DRAWING TO BE PRINTED IN COLOUR.
 - ALL DIMENSIONS IN m UNLESS OTHERWISE STATED.
ALL LEVELS ARE IN m RELATIVE TO ORDNANCE DATUM AT MALIN HEAD.
 - DO NOT SCALE FROM THIS DRAWING.
 - DRAWING FOR PLANNING PURPOSES ONLY. NOT FOR CONSTRUCTION USE.
 - PROPOSED PLANNING BOUNDARY AREA: 5.45 ha
 - TALTE EIREANN MAP REF: 4802-10, 4802-15, 4802-18.

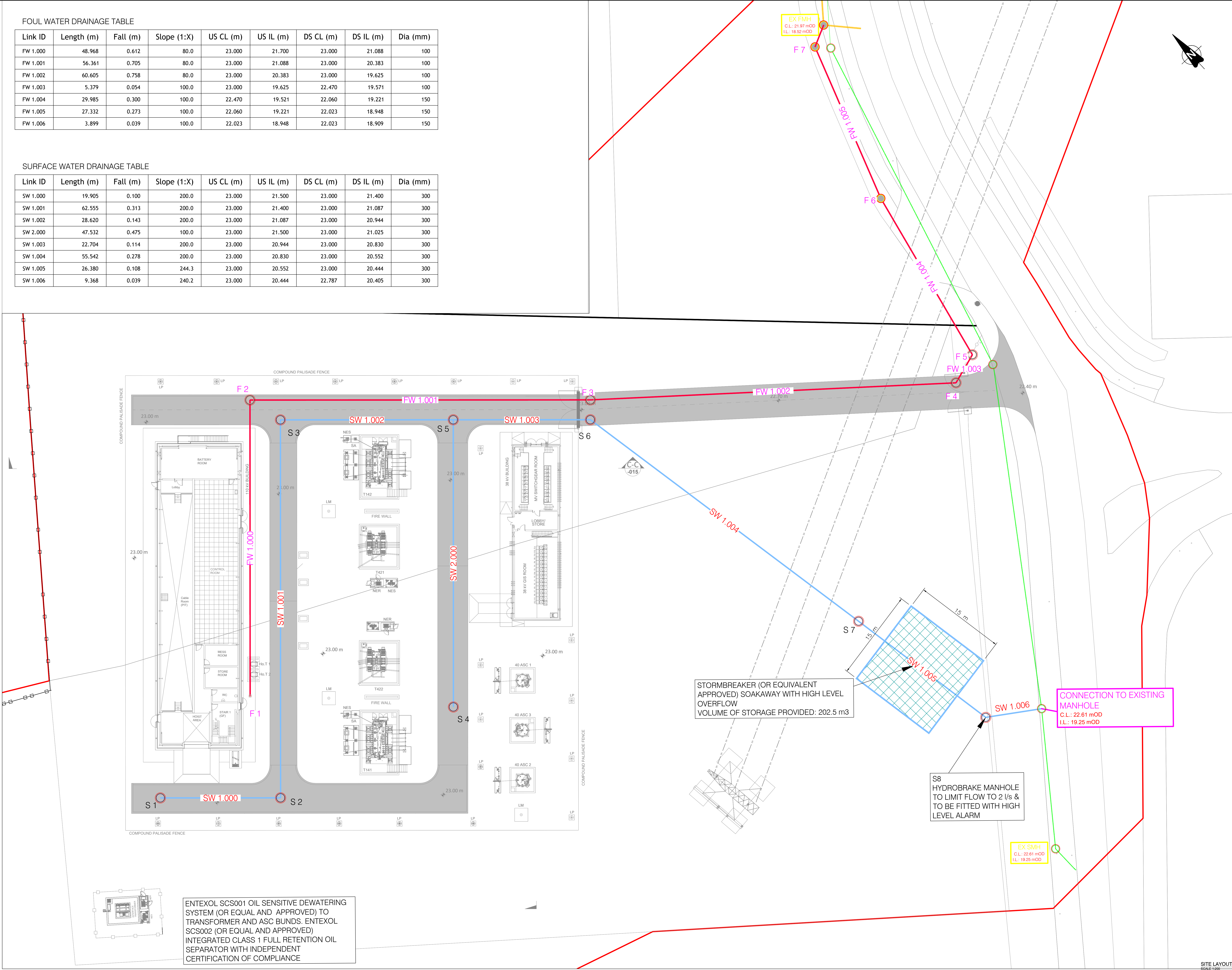
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CONTRACT						
DRAWING TITLE						
PRODUCTION UNIT						
DRAWN						
PRODUCED						
VERIFIED						
APPROVED						
APPROVAL DATE						
CLIENT REF						
DRAWING NUMBER						

FOUL WATER DRAINAGE TABLE

Link ID	Length (m)	Fall (m)	Slope (1:X)	US CL (m)	US IL (m)	DS CL (m)	DS IL (m)	Dia (mm)
FW 1.000	48.968	0.612	80.0	23.000	21.700	23.000	21.088	100
FW 1.001	56.361	0.705	80.0	23.000	21.088	23.000	20.383	100
FW 1.002	60.605	0.758	80.0	23.000	20.383	23.000	19.625	100
FW 1.003	5.379	0.054	100.0	23.000	19.625	22.470	19.571	100
FW 1.004	29.985	0.300	100.0	22.470	19.521	22.060	19.221	150
FW 1.005	27.332	0.273	100.0	22.060	19.221	22.023	18.948	150
FW 1.006	3.899	0.039	100.0	22.023	18.948	22.023	18.909	150

SURFACE WATER DRAINAGE TABLE

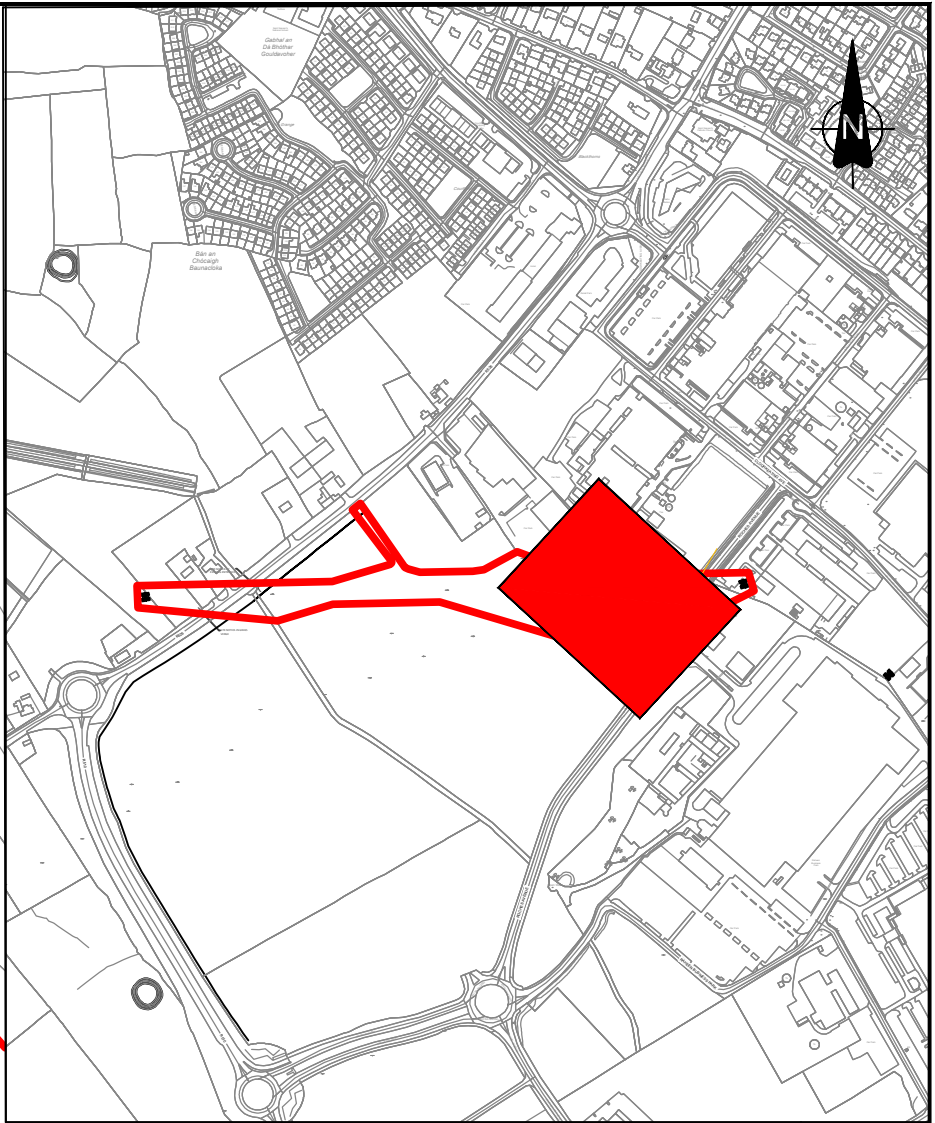
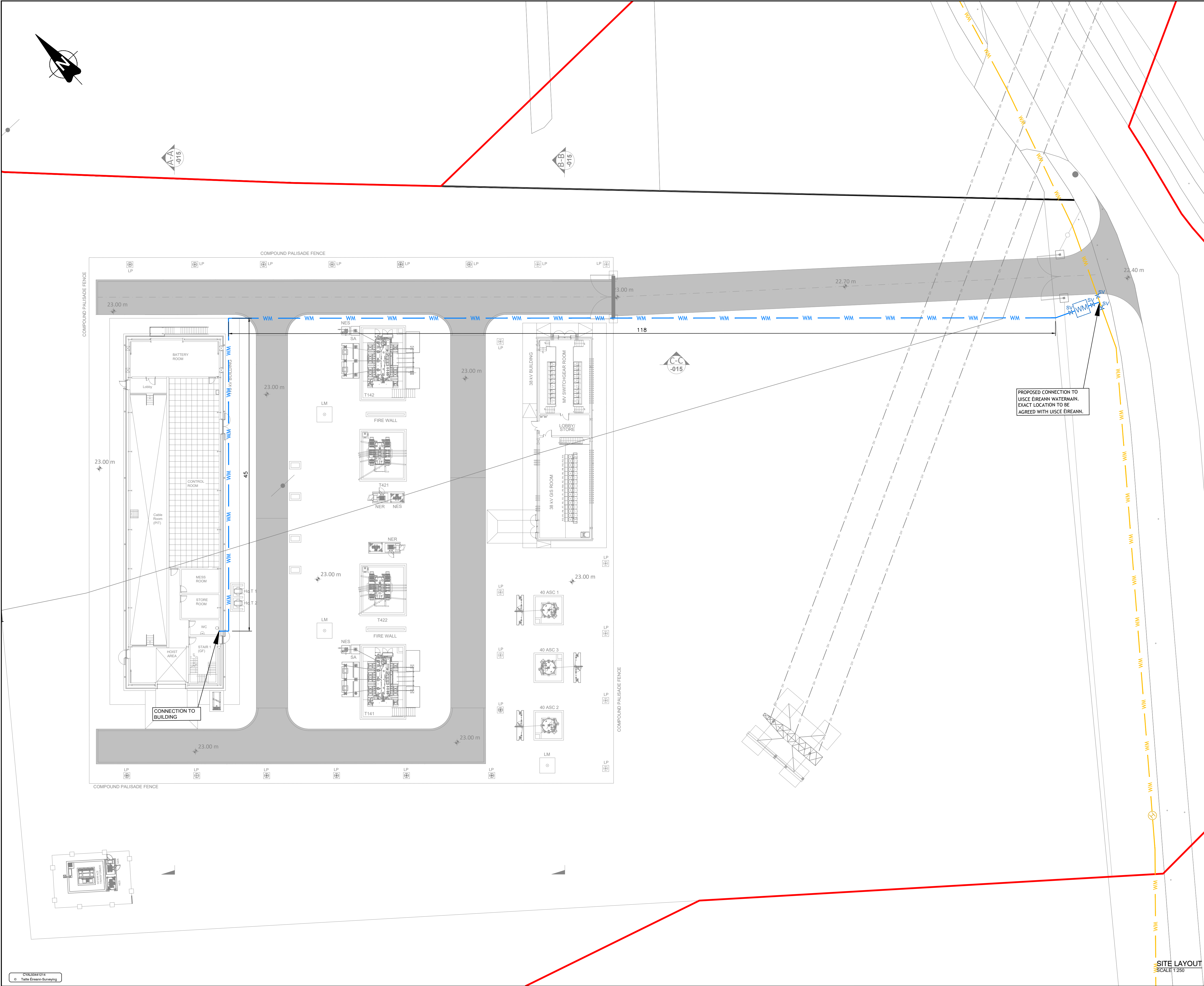
Link ID	Length (m)	Fall (m)	Slope (1:X)	US CL (m)	US IL (m)	DS CL (m)	DS IL (m)	Dia (mm)
SW 1.000	19.905	0.100	200.0	23.000	21.500	23.000	21.400	300
SW 1.001	62.555	0.313	200.0	23.000	21.400	23.000	21.087	300
SW 1.002	28.620	0.143	200.0	23.000	21.087	23.000	20.944	300
SW 2.000	47.532	0.475	100.0	23.000	21.500	23.000	21.025	300
SW 1.003	22.704	0.114	200.0	23.000	20.944	23.000	20.830	300
SW 1.004	55.542	0.278	200.0	23.000	20.830	23.000	20.552	300
SW 1.005	26.380	0.108	244.3	23.000	20.552	23.000	20.444	300
SW 1.006	9.368	0.039	240.2	23.000	20.444	22.787	20.405	300



LEGEND

- PROPOSED PLANNING BOUNDARY
- EXISTING SURFACE WATER SEWER (FROM RECORDS)
- EXISTING SURFACE WATER MANHOLE
- PROPOSED SURFACE WATER SEWER
- PROPOSED SURFACE WATER MANHOLE
- PROPOSED SOAKAWAY TANK
- EXISTING FOUL SEWER (FROM RECORDS)
- EXISTING FOUL MANHOLE
- PROPOSED FOUL SEWER
- PROPOSED FOUL MANHOLE
- PROPOSED FOUL AJ

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PURPOSE OF ISSUE - PRELIMINARY UNLESS INDICATED						
CLIENT	ESB NETWORKS					
PROJECT	Ballycummin 110 kV Substation					
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DRAWING TITLE	BALLYCUMMIN 110 kV SUBSTATION PLANNING PROPOSED DRAINAGE LAYOUT					
PRODUCTION UNIT	Transmission and Distribution Delivery					
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LM:Maun	Fanning, Pa	H Griffin		30/09/2025		
CLIENT REF	NO. OF SHEETS	SIZE	SCALE			
TC284417	1	A0	1:200			
DRAWING NUMBER				SHEET REV		
PE492-D184-067-017-001						



KEY PLAN
SCALE 1:10000

LEGEND

PROPOSED PLANNING BOUNDARY

EXISTING WATERMAIN
(300 mm DUCTILE IRON)

PROPOSED WATERMAIN
(SDR11 PIPE)

EXISTING FIRE HYDRANT

SLUICE VALVE

WATERMETER

REV	DATE	ISSUED FOR	AB	AB	AB	AB
0	00.00.00	ISSUED FOR	---	---	---	---

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PROJECT
Ballycummin 110 kV Substation

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DRAWING TITLE
BALLYCUMMIN 110 kV SUBSTATION
PLANNING
PROPOSED WATERMAIN LAYOUT

PRODUCTION UNIT
Transmission and Distribution Delivery



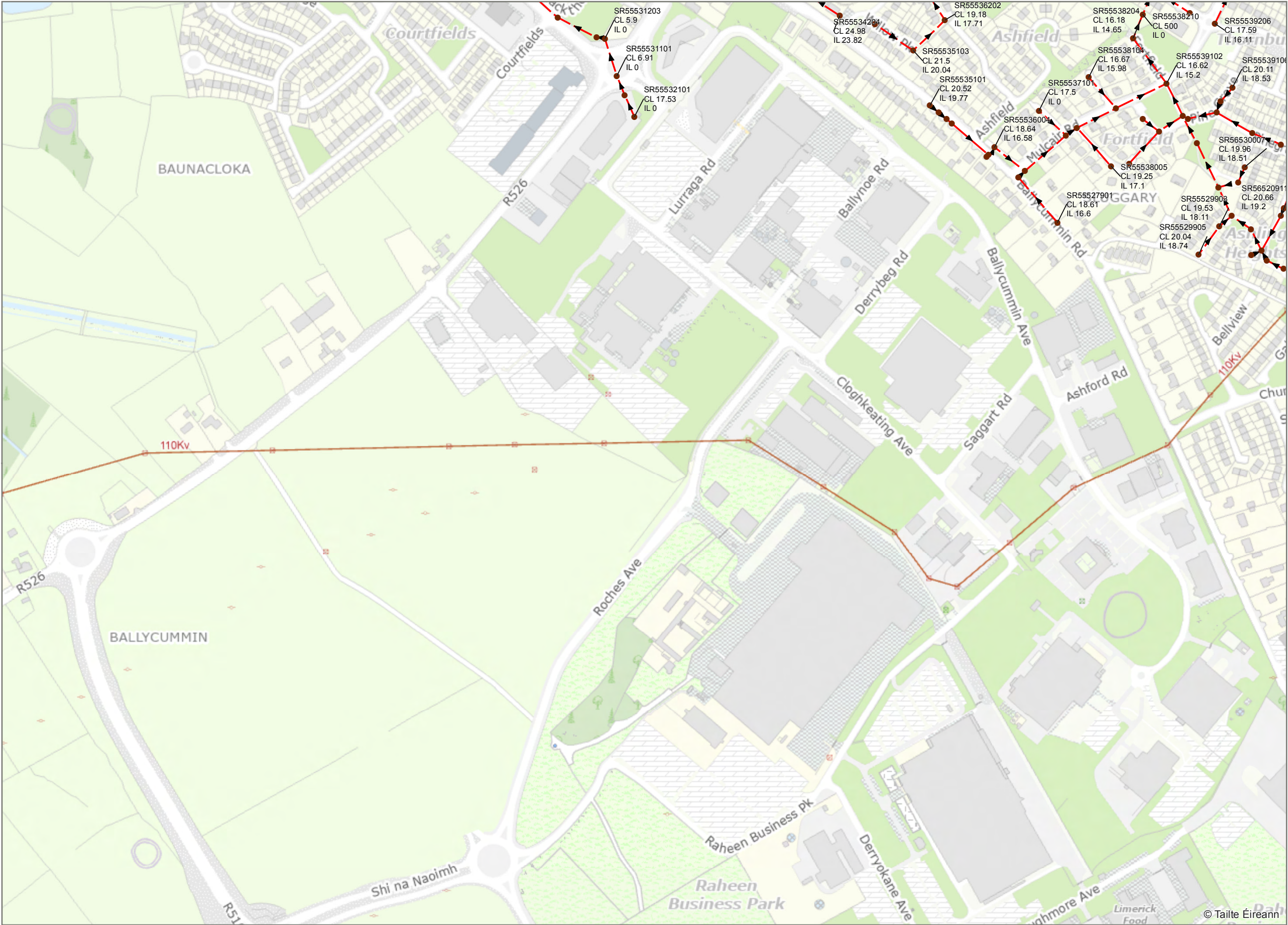
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L.McManus	Fanning_Pa	d.ryan	H.Griffin	30/09/2025
CLIENT REF	NO. OF SHTS	SIZE	SCALE	SCALE
TC234417	1	A1	As Shown	As Shown

DRAWING NUMBER
PE492-D184-067-018-000

SITE LAYOUT
SCALE 1:250

Appendix B: Existing Record maps & Services



Legend

Sewer Manholes

- Standard

Sewer Mains (Irish Water)

- Gravity - Foul



Coordinate System: TM65 Irish Grid
Projection: Transverse Mercator

Scale @ A3: 1:5,000

Drawing No.: IW-AGG-2018-000

Drawn By:

RD

Checked By:

<Add Name>

Approved By:

<Add Name>

Drawn Date

08/05/2025

Checked Date:

<dd/mm/yyyy>

Approved Date:

<dd/mm/yyyy>



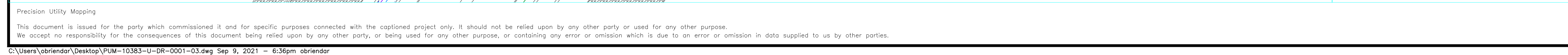
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Sewer Network Ballycummin, Raheen



1. Topographical information has been taken from drawing 'PUM-10383-T-DR-0001', some information may have been removed for clarity. Please refer to original drawing for full details.

2. This drawing should be read in conjunction with the utility survey report.

Cautionary Notes

any excavations undertaken on site are to be in accordance with HSG (47) Avoiding Danger From Underground Services.

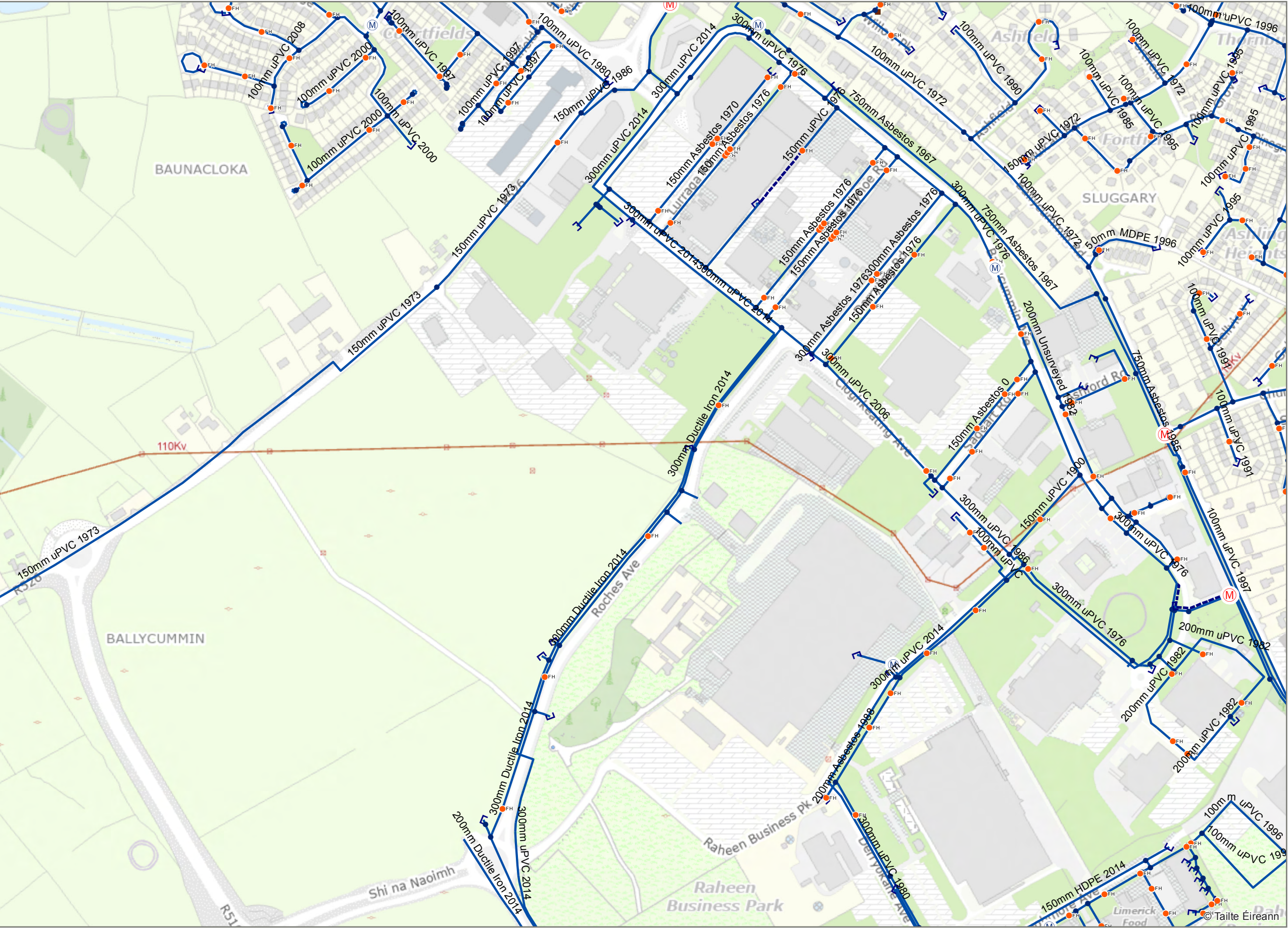
PRECISION
UTILITY MAPPING

34 Broomfield Place
East Kilbride
Glasgow
G75 8YG
www.Precision-UM.co.uk

DA

Reviewer	J. Markham	J.M.	Eng check	-	-
own	S. Lannon	S.L.	Coordination	-	-
Eng check	J. Markham	J.M.	Approved	S. Lannon	S.L.
Scale at A0	Status		Rev		
1:250	Complete		03		

Rowing Number
PUM-10383-U-DR-0001



- Legend**
- Non Boundary Meter**
- Meter
- Boundary Meter**
- District (Boundary Meter)
- Water Hydrants**
- Fire Hydrant
- Water Fittings**
- Cap
 - Other Fitting
- Pressure Monitoring Point**
- Pressure Monitoring Point
- Water Mains(Irish Water Owned)**
- Potable Water
- Water Abandoned Lines**
- Water Abandoned Lines



Coordinate System: TM65 Irish Grid
Projection: Transverse Mercator

Scale @ A3: 1:5,000

Drawing No.: IW-AGG-2018-000

Drawn By: RD

Checked By: <Add Name>

Approved By: <Add Name>

Drawn Date 08/05/2025

Checked Date: <dd/mm/yyyy>

Approved Date: <dd/mm/yyyy>



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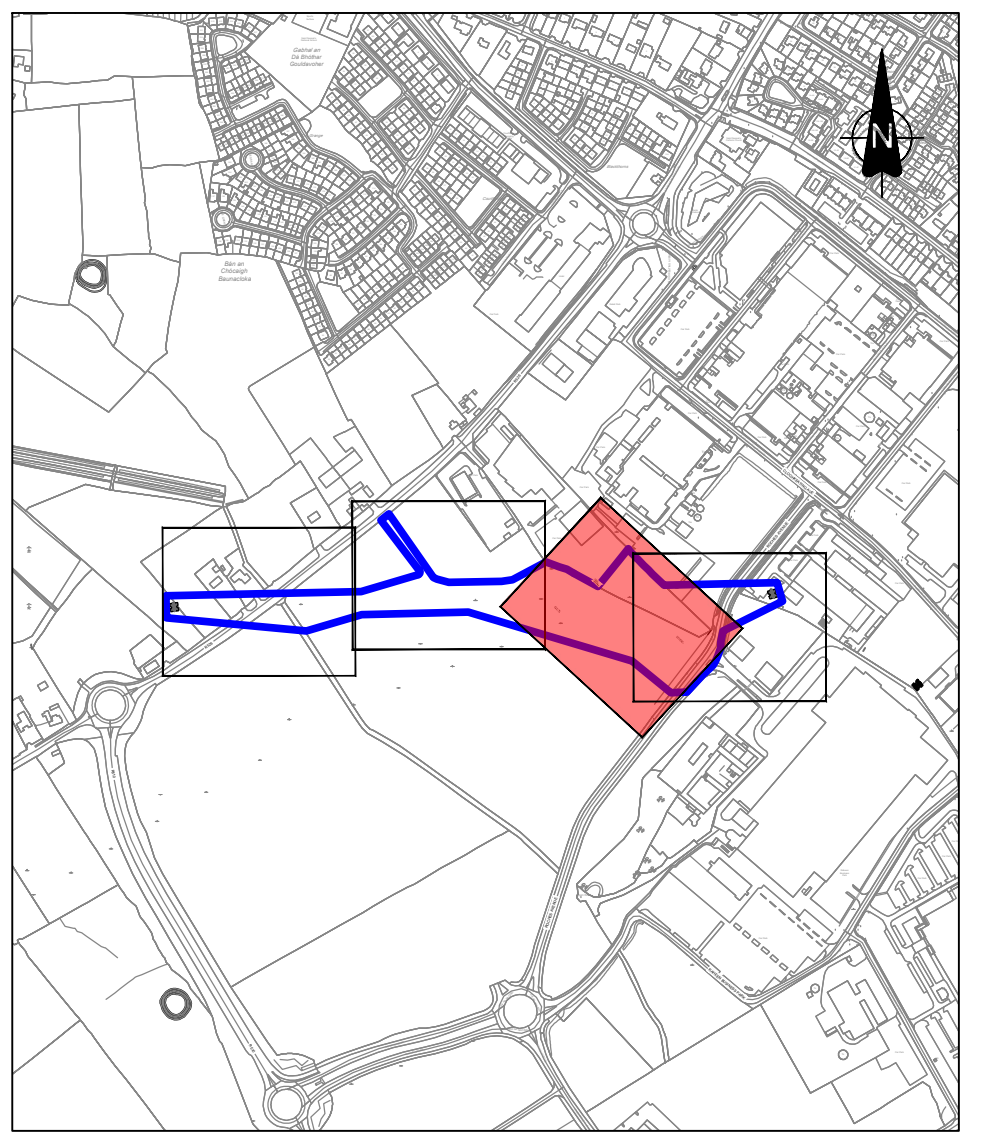
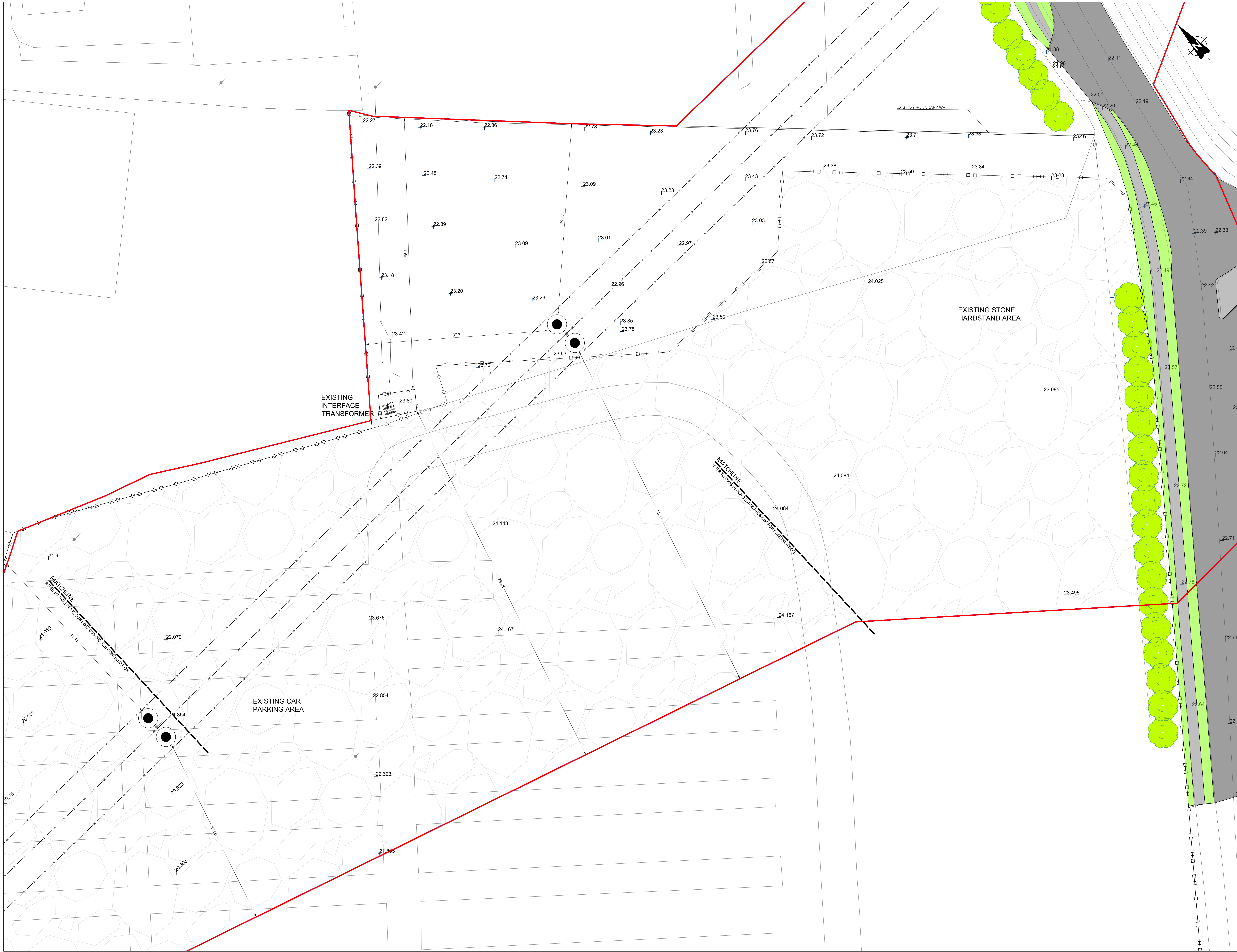
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Water Distribution Ballycummin, Raheen

Appendix C: Topographical Survey



LEGEND

- PROPOSED PLANNING BOUNDARY
- EXISTING 110 kV OVERHEAD LINE
- EXISTING MAST
- EXISTING DOUBLE POLESET
- SITE NOTICE LOCATION
- EXISTING FENCE
- EXISTING WALL
- EXISTING HEDGE
- MEADOW BARLEY PROTECTION AREA
- EXISTING ROAD
- EXISTING FOOTPATH
- EXISTING GRASS VERGE
- EXISTING STONED AREA
- EXISTING GROUND LEVEL

NOTES:

- DRAWING TO BE PRINTED IN COLOUR.
- ALL DIMENSIONS IN m UNLESS OTHERWISE STATED. ALL LEVELS ARE IN m RELATIVE TO ORDNANCE DATUM AT MALIN HEAD.
- DO NOT SCALE FROM THIS DRAWING.
- DRAWING FOR PLANNING PURPOSES ONLY. NOT FOR CONSTRUCTION USE.
- PROPOSED PLANNING BOUNDARY AREA: 5.45 ha
- TALUE EIREANN MAP REF: 4802-10, 4802-15, 4802-18.

REV	DATE	REVISION DESCRIPTION	DRN	PROJ	VER	APP
0	SEP 25	ISSUED FOR PLANNING				

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PURPOSE OF ISSUE - PRELIMINARY UNLESS INDICATED

CLIENT APPROVAL: ☐ PLANNING ☒ TENDER ☐ CONSTRUCTION ☐ AS BUILT

CLIENT: **ESB NETWORKS**

PROJECT: **Ballycummin 110 kV Substation**

CONTRACT: **I_EL0419**

DRAWING TITLE: **BALLYCUMMIN 110 kV SUBSTATION
PLANNING
EXISTING SITE LAYOUT
SHEET 3 OF 4**

PRODUCTION UNIT: **Transmission and Distribution Delivery**

ESB Engineering and Major Projects,
One Dublin Airport Central, Dublin Airport,
Cloughra, Co. Dublin, K67 XFT2, Ireland.
Tel: +353 (0)1 703 8000 Web: www.esb.ie
Engineering and Major Projects is a division of ESB.

DRAWN	PRODUCED	VERIFIED	APPROVED	APPROVAL DATE
J Byrne	J Byrne	L McManus		25/09/2025

CLIENT REF	NO. OF SHEETS	SHEET	SCALE
TC284417	1	40	1:250

DRAWING NUMBER: **PE492-D184-067-005-000**

SHEET: **3** REV: **0**

EXISTING SITE LAYOUT (STATION)
SCALE 1:250

Appendix D: Uisce Eireann Confirmation of Feasibility

CONFIRMATION OF FEASIBILITY

Alex Ssemujju
One Dublin Airport Central
Clonghran
Dublin
K67XF72

Uisce Éireann
Bosca OP 448
Oifig Sheachadta na
Cathrach Theas
Cathair Chorcaí

Uisce Éireann
PO Box 448
South City
Delivery Office
Cork City

www.water.ie

9 July 2025

**Our Ref: CDS25003936 Pre-Connection Enquiry
Ballycummin 110kV substation, Ballycummin, Limerick**

Dear Applicant/Agent,

We have completed the review of the Pre-Connection Enquiry.

Uisce Éireann has reviewed the pre-connection enquiry in relation to a Water & Wastewater connection for a Business Connection of 1 unit(s) at Ballycummin 110kV substation, Ballycummin, Limerick. (the **Development**).

Based upon the details provided we can advise the following regarding connecting to the networks;

- **Water Connection** - Feasible without infrastructure upgrade by Uisce Éireann

- **Wastewater Connection** - Not Feasible
- Please note this Confirmation of Feasibility relates to water only, Uisce Éireann do not have any wastewater infrastructure in the area of the proposed development.

This letter does not constitute an offer, in whole or in part, to provide a connection to any Uisce Éireann infrastructure. Before the Development can be connected to our network(s) you must submit a connection application and be granted and sign a connection agreement with Uisce Éireann.

Stiúthóirí / Directors: Niall Gleeson (POF / CEO), Jerry Grant (Cathaoirleach / Chairperson), Gerard Britchfield, Liz Joyce, Michael Nolan, Patricia King, Eileen Maher, Cathy Mannion, Paul Reid, Michael Walsh.

Oifig Chláraithe / Registered Office: Teach Colvill, 24-26 Sráid Thalbóid, Baile Átha Cliath 1, D01 NP86 / Colvill House, 24-26 Talbot Street, Dublin, Ireland D01NP86

Is cuideachta ghníomhaíochta ainmnithe atá faoi theorainn scaireanna é Uisce Éireann / Uisce Éireann is a designated activity company, limited by shares.

Cláraithe in Éirinn Uimh.: 530363 / Registered in Ireland No.: 530363.

As the network capacity changes constantly, this review is only valid at the time of its completion. As soon as planning permission has been granted for the Development, a completed connection application should be submitted. The connection application is available at www.water.ie/connections/get-connected/

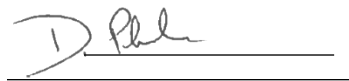
Where can you find more information?

- **Section A** - What is important to know?

This letter is issued to provide information about the current feasibility of the proposed connection(s) to Uisce Éireann's network(s). This is not a connection offer and capacity in Uisce Éireann's network(s) may only be secured by entering into a connection agreement with Uisce Éireann.

For any further information, visit www.water.ie/connections, email newconnections@water.ie or contact 1800 278 278.

Yours sincerely,

A handwritten signature in dark ink, appearing to read 'D. Phelan', is written over a horizontal line.

Dermot Phelan
Connections Delivery Manager

Section A - What is important to know?

What is important to know?	Why is this important?
Do you need a contract to connect?	• Yes, a contract is required to connect. This letter does not constitute a contract or an offer in whole or in part to provide a connection to Uisce Éireann's network(s). • Before the Development can connect to Uisce Éireann's network(s), you must submit a connection application <u>and be granted and sign</u> a connection agreement with Uisce Éireann.
When should I submit a Connection Application?	• A connection application should only be submitted after planning permission has been granted.
Where can I find information on connection charges?	• Uisce Éireann connection charges can be found at: https://www.water.ie/connections/information/charges/
Who will carry out the connection work?	• All works to Uisce Éireann's network(s), including works in the public space, must be carried out by Uisce Éireann*. *Where a Developer has been granted specific permission and has been issued a connection offer for Self-Lay in the Public Road/Area, they may complete the relevant connection works
Fire flow Requirements	• The Confirmation of Feasibility does not extend to fire flow requirements for the Development. Fire flow requirements are a matter for the Developer to determine. • What to do? - Contact the relevant Local Fire Authority
Plan for disposal of storm water	• The Confirmation of Feasibility does not extend to the management or disposal of storm water or ground waters. • What to do? - Contact the relevant Local Authority to discuss the management or disposal of proposed storm water or ground water discharges.
Where do I find details of Uisce Éireann's network(s)?	• Requests for maps showing Uisce Éireann's network(s) can be submitted to: datarequests@water.ie

What are the design requirements for the connection(s)?	• The design and construction of the Water & Wastewater pipes and related infrastructure to be installed in this Development shall comply with <i>the Uisce Éireann Connections and Developer Services Standard Details and Codes of Practice</i>, available at www.water.ie/connections
Trade Effluent Licensing	• Any person discharging trade effluent** to a sewer, must have a Trade Effluent Licence issued pursuant to section 16 of the Local Government (Water Pollution) Act, 1977 (as amended). • More information and an application form for a Trade Effluent License can be found at the following link: https://www.water.ie/business/trade-effluent/about/ **trade effluent is defined in the Local Government (Water Pollution) Act, 1977 (as amended)

Appendix E: Surface Water Simulation Result

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	5	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	Scotland and Ireland	Connection Type	Level Soffits
M5-60 (mm)	17.900	Minimum Backdrop Height (m)	0.200
Ratio-R	0.326	Preferred Cover Depth (m)	1.200
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
S 1	0.074	5.00	23.000	1200	555088.579	652705.235	1.500
S 2	0.038	5.00	23.000	1200	555103.202	652691.730	1.600
S 3	0.050	5.00	23.000	1200	555145.643	652737.685	1.913
S 4	0.099	5.00	23.000	1200	555134.419	652683.348	1.500
S 5	0.064	5.00	23.000	1200	555166.668	652718.267	2.056
S 6	0.102	5.00	23.000	1200	555183.347	652702.863	2.170
S 7			23.000	1200	555193.319	652648.224	2.448
S 8			23.000	1200	555197.978	652622.259	2.556
EX SMH			22.787	1200	555205.752	652617.032	2.382

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
SW 1.000	S 1	S 2	19.905	0.600	21.500	21.400	0.100	200.0	300	5.30	50.0
SW 1.001	S 2	S 3	62.555	0.600	21.400	21.087	0.313	200.0	300	6.24	50.0
SW 1.002	S 3	S 5	28.620	0.600	21.087	20.944	0.143	200.0	300	6.67	50.0
SW 2.000	S 4	S 5	47.532	0.600	21.500	21.025	0.475	100.0	300	5.50	50.0
SW 1.003	S 5	S 6	22.704	0.600	20.944	20.830	0.114	200.0	300	7.01	50.0
SW 1.004	S 6	S 7	55.542	0.600	20.830	20.552	0.278	200.0	300	7.85	50.0
SW 1.005	S 7	S 8	26.380	0.600	20.552	20.444	0.108	244.3	300	8.29	50.0
SW 1.006	S 8	EX SMH	9.368	0.600	20.444	20.405	0.039	240.2	300	8.44	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
SW 1.000	1.108	78.3	10.0	1.200	1.300	0.074	0.0	72	0.766
SW 1.001	1.108	78.3	15.2	1.300	1.613	0.112	0.0	89	0.864
SW 1.002	1.108	78.3	21.9	1.613	1.756	0.162	0.0	108	0.953
SW 2.000	1.572	111.1	13.4	1.200	1.675	0.099	0.0	70	1.073
SW 1.003	1.108	78.3	44.0	1.756	1.870	0.325	0.0	161	1.139
SW 1.004	1.108	78.3	57.9	1.870	2.148	0.427	0.0	192	1.209
SW 1.005	1.001	70.8	57.9	2.148	2.256	0.427	0.0	207	1.113
SW 1.006	1.010	71.4	57.9	2.256	2.082	0.427	0.0	206	1.121

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
SW 1.000	19.905	200.0	300	Circular	23.000	21.500	1.200	23.000	21.400	1.300
SW 1.001	62.555	200.0	300	Circular	23.000	21.400	1.300	23.000	21.087	1.613
SW 1.002	28.620	200.0	300	Circular	23.000	21.087	1.613	23.000	20.944	1.756
SW 2.000	47.532	100.0	300	Circular	23.000	21.500	1.200	23.000	21.025	1.675
SW 1.003	22.704	200.0	300	Circular	23.000	20.944	1.756	23.000	20.830	1.870
SW 1.004	55.542	200.0	300	Circular	23.000	20.830	1.870	23.000	20.552	2.148
SW 1.005	26.380	244.3	300	Circular	23.000	20.552	2.148	23.000	20.444	2.256
SW 1.006	9.368	240.2	300	Circular	23.000	20.444	2.256	22.787	20.405	2.082

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
SW 1.000	S 1	1200	Manhole	Adoptable	S 2	1200	Manhole	Adoptable
SW 1.001	S 2	1200	Manhole	Adoptable	S 3	1200	Manhole	Adoptable
SW 1.002	S 3	1200	Manhole	Adoptable	S 5	1200	Manhole	Adoptable
SW 2.000	S 4	1200	Manhole	Adoptable	S 5	1200	Manhole	Adoptable
SW 1.003	S 5	1200	Manhole	Adoptable	S 6	1200	Manhole	Adoptable
SW 1.004	S 6	1200	Manhole	Adoptable	S 7	1200	Manhole	Adoptable
SW 1.005	S 7	1200	Manhole	Adoptable	S 8	1200	Manhole	Adoptable
SW 1.006	S 8	1200	Manhole	Adoptable	EX SMH	1200	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
S 1	555088.579	652705.235	23.000	1.500	1200		0	SW 1.000	21.500	300
S 2	555103.202	652691.730	23.000	1.600	1200		1	SW 1.000	21.400	300
S 3	555145.643	652737.685	23.000	1.913	1200		0	SW 1.001	21.400	300
							1	SW 1.001	21.087	300
S 4	555134.419	652683.348	23.000	1.500	1200		0	SW 1.002	21.087	300
S 5	555166.668	652718.267	23.000	2.056	1200		0	SW 2.000	21.500	300
							1	SW 2.000	21.025	300
							2	SW 1.002	20.944	300
S 6	555183.347	652702.863	23.000	2.170	1200		0	SW 1.003	20.944	300
							1	SW 1.003	20.830	300
S 7	555193.319	652648.224	23.000	2.448	1200		0	SW 1.004	20.830	300
							1	SW 1.004	20.552	300
							0	SW 1.005	20.552	300

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
S 8	555197.978	652622.259	23.000	2.556	1200		SW 1.005	20.444	300
EX SMH	555205.752	652617.032	22.787	2.382	1200		SW 1.006	20.444	300
							SW 1.006	20.405	300

Simulation Settings

Rainfall Methodology	FSR	Skip Steady State	x
Rainfall Events	Singular	Drain Down Time (mins)	60
FSR Region	Scotland and Ireland	Additional Storage (m³/ha)	0.0
M5-60 (mm)	17.900	Starting Level (m)	
Ratio-R	0.326	Check Discharge Rate(s)	✓
Summer CV	0.750	100 year (l/s)	5.9
Winter CV	0.840	Check Discharge Volume	x
Analysis Speed	Normal		

Storm Durations

15	60	180	360	600	960	2160	4320	7200	10080
30	120	240	480	720	1440	2880	5760	8640	

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
5	0	0	0
30	10	0	0
100	30	0	0

Pre-development Discharge Rate

Site Makeup	Greenfield	Region	11
Greenfield Method	IH124	Growth Factor 100 year	1.96
Positively Drained Area (ha)	1.200	Betterment (%)	0
SAAR (mm)	924	QBar	3.0
Soil Index	2	Q 100 year (l/s)	5.9
SPR	0.30		

Node Soakaway Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	0.000	Product Number	CTL-SHE-0067-2000-1000-2000
Design Depth (m)	1.000	Min Outlet Diameter (m)	0.100
Design Flow (l/s)	2.0	Min Node Diameter (mm)	1200

Node S 7 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	20.552
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.90	Time to half empty (mins)	0

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	225.0	225.0	1.000	225.0	278.2	1.001	0.0	278.2

Results for 5 year Critical Storm Duration. Lowest mass balance: 97.21%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S 1	10	21.590	0.090	14.6	0.1016	0.0000	OK
15 minute winter	S 2	11	21.506	0.106	22.0	0.1201	0.0000	OK
15 minute winter	S 3	11	21.216	0.129	31.0	0.1460	0.0000	OK
15 minute winter	S 4	10	21.584	0.084	19.6	0.0949	0.0000	OK
15 minute winter	S 5	11	21.179	0.235	61.5	0.2659	0.0000	OK
15 minute winter	S 6	11	21.107	0.277	78.7	0.3135	0.0000	OK
30 minute winter	S 7	25	20.696	0.144	64.9	29.3403	0.0000	OK
30 minute winter	S 8	25	20.592	0.148	30.3	0.1678	0.0000	OK
30 minute winter	EX SMH	25	20.539	0.134	30.3	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	S 1	SW 1.000	S 2	14.4	0.725	0.184	0.3970	
15 minute winter	S 2	SW 1.001	S 3	21.6	0.852	0.275	1.6045	
15 minute winter	S 3	SW 1.002	S 5	30.8	0.694	0.394	1.2626	
15 minute winter	S 4	SW 2.000	S 5	19.3	1.021	0.173	1.2395	
15 minute winter	S 5	SW 1.003	S 6	59.9	0.977	0.764	1.4445	
15 minute winter	S 6	SW 1.004	S 7	79.6	1.877	1.016	2.3287	
30 minute winter	S 7	SW 1.005	S 8	30.3	0.890	0.429	0.8990	
30 minute winter	S 8	SW 1.006	EX SMH	30.3	0.933	0.425	0.3045	45.6

Results for 30 year +10% CC Critical Storm Duration. Lowest mass balance: 97.21%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S 1	12	21.679	0.179	23.5	0.2023	0.0000	OK
15 minute winter	S 2	12	21.656	0.256	35.6	0.2891	0.0000	OK
15 minute winter	S 3	12	21.621	0.534	47.6	0.6037	0.0000	SURCHARGED
15 minute winter	S 4	10	21.608	0.108	31.6	0.1220	0.0000	OK
15 minute winter	S 5	11	21.585	0.641	87.4	0.7249	0.0000	SURCHARGED
15 minute winter	S 6	11	21.448	0.618	105.8	0.6994	0.0000	SURCHARGED
30 minute winter	S 7	25	20.769	0.217	91.5	44.2487	0.0000	OK
30 minute winter	S 8	26	20.658	0.214	55.4	0.2422	0.0000	OK
30 minute winter	EX SMH	26	20.588	0.183	55.3	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	S 1	SW 1.000	S 2	23.4	0.812	0.299	1.0726	
15 minute winter	S 2	SW 1.001	S 3	35.4	0.843	0.452	4.2022	
15 minute winter	S 3	SW 1.002	S 5	48.8	0.713	0.623	2.0154	
15 minute winter	S 4	SW 2.000	S 5	31.3	0.965	0.281	2.2151	
15 minute winter	S 5	SW 1.003	S 6	80.2	1.139	1.024	1.5988	
15 minute winter	S 6	SW 1.004	S 7	105.9	1.935	1.352	3.2183	
30 minute winter	S 7	SW 1.005	S 8	55.4	1.022	0.783	1.4306	
30 minute winter	S 8	SW 1.006	EX SMH	55.3	1.118	0.775	0.4626	77.4

Results for 100 year +30% CC Critical Storm Duration. Lowest mass balance: 97.21%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S 1	12	22.980	1.480	38.8	1.6735	0.0000	FLOOD RISK
15 minute winter	S 2	12	22.962	1.562	46.0	1.7671	0.0000	FLOOD RISK
15 minute winter	S 3	12	22.852	1.765	63.1	1.9967	0.0000	FLOOD RISK
15 minute winter	S 4	12	22.800	1.300	48.6	1.4705	0.0000	FLOOD RISK
15 minute winter	S 5	12	22.737	1.793	128.1	2.0278	0.0000	FLOOD RISK
15 minute winter	S 6	12	22.354	1.524	170.2	1.7236	0.0000	SURCHARGED
30 minute winter	S 7	27	20.855	0.303	139.8	61.7333	0.0000	SURCHARGED
30 minute winter	S 8	27	20.714	0.270	76.1	0.3056	0.0000	OK
30 minute winter	EX SMH	28	20.620	0.215	76.1	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	S 1	SW 1.000	S 2	28.4	0.852	0.363	1.4017	
15 minute winter	S 2	SW 1.001	S 3	43.2	0.802	0.552	4.4051	
15 minute winter	S 3	SW 1.002	S 5	62.8	0.891	0.802	2.0154	
15 minute winter	S 4	SW 2.000	S 5	40.8	0.969	0.367	3.3472	
15 minute winter	S 5	SW 1.003	S 6	125.6	1.783	1.603	1.5988	
15 minute winter	S 6	SW 1.004	S 7	164.6	2.637	2.102	3.8218	
30 minute winter	S 7	SW 1.005	S 8	76.1	1.098	1.076	1.8103	
30 minute winter	S 8	SW 1.006	EX SMH	76.1	1.246	1.067	0.5666	120.2

Appendix F: Foul Water Design Report

Design Settings

Frequency of use (kDU)	0.00	Minimum Velocity (m/s)	0.75
Flow per dwelling per day (l/day)	4000	Connection Type	Level Soffits
Domestic Flow (l/s/ha)	0.0	Minimum Backdrop Height (m)	0.200
Industrial Flow (l/s/ha)	0.0	Preferred Cover Depth (m)	1.200
Additional Flow (%)	0	Include Intermediate Ground	✓

Nodes

Name	Add Inflow (l/s)	Cover Level (m)	Diameter (mm)	Width (mm)	Easting (m)	Northing (m)	Depth (m)
F 1	1.6	23.000	600	600	555110.945	652707.539	1.350
F 2		23.000	1200		555144.168	652743.513	1.962
F 3		23.000	1200		555185.573	652705.274	2.667
F 4		23.000	1200		555231.947	652666.256	3.425
F 5		22.470	1200		555237.093	652667.822	2.949
F 6		22.060	1200		555243.520	652697.110	2.839
F 7		22.023	1200		555252.532	652722.914	3.075
EX FMH		22.023	1200		555256.041	652724.613	3.114

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)
FW 1.000	F 1	F 2	48.968	1.500	21.650	21.038	0.612	80.0	150
FW 1.001	F 2	F 3	56.361	1.500	21.038	20.333	0.705	80.0	150
FW 1.002	F 3	F 4	60.605	1.500	20.333	19.575	0.758	80.0	150
FW 1.003	F 4	F 5	5.379	1.500	19.575	19.521	0.054	100.0	150
FW 1.004	F 5	F 6	29.985	1.500	19.521	19.221	0.300	100.0	150
FW 1.005	F 6	F 7	27.332	1.500	19.221	18.948	0.273	100.0	150
FW 1.006	F 7	EX FMH	3.899	1.500	18.948	18.909	0.039	100.0	150

Name	Pro Vel @ 1/3 Q (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Dwellings (ha)	Σ Units (ha)	Σ Add Inflow (ha)	Pro Depth (mm)	Pro Velocity (m/s)
FW 1.000	0.434	0.980	17.3	1.6	1.200	1.812	0.000	0	0.0	1.6	31	0.604
FW 1.001	0.434	0.980	17.3	1.6	1.812	2.517	0.000	0	0.0	1.6	31	0.604
FW 1.002	0.434	0.980	17.3	1.6	2.517	3.275	0.000	0	0.0	1.6	31	0.604
FW 1.003	0.404	0.876	15.5	1.6	3.275	2.799	0.000	0	0.0	1.6	33	0.558
FW 1.004	0.404	0.876	15.5	1.6	2.799	2.689	0.000	0	0.0	1.6	33	0.558
FW 1.005	0.404	0.876	15.5	1.6	2.689	2.925	0.000	0	0.0	1.6	33	0.558
FW 1.006	0.404	0.876	15.5	1.6	2.925	2.964	0.000	0	0.0	1.6	33	0.558

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
FW 1.000	48.968	80.0	150	Circular	23.000	21.650	1.200	23.000	21.038	1.812
FW 1.001	56.361	80.0	150	Circular	23.000	21.038	1.812	23.000	20.333	2.517
FW 1.002	60.605	80.0	150	Circular	23.000	20.333	2.517	23.000	19.575	3.275
FW 1.003	5.379	100.0	150	Circular	23.000	19.575	3.275	22.470	19.521	2.799
FW 1.004	29.985	100.0	150	Circular	22.470	19.521	2.799	22.060	19.221	2.689
FW 1.005	27.332	100.0	150	Circular	22.060	19.221	2.689	22.023	18.948	2.925
FW 1.006	3.899	100.0	150	Circular	22.023	18.948	2.925	22.023	18.909	2.964

Link	US Node	Dia (mm)	Width (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
FW 1.000	F 1	600	600	Manhole	Adoptable	F 2	1200	Manhole	Adoptable
FW 1.001	F 2	1200		Manhole	Adoptable	F 3	1200	Manhole	Adoptable
FW 1.002	F 3	1200		Manhole	Adoptable	F 4	1200	Manhole	Adoptable
FW 1.003	F 4	1200		Manhole	Adoptable	F 5	1200	Manhole	Adoptable
FW 1.004	F 5	1200		Manhole	Adoptable	F 6	1200	Manhole	Adoptable
FW 1.005	F 6	1200		Manhole	Adoptable	F 7	1200	Manhole	Adoptable
FW 1.006	F 7	1200		Manhole	Adoptable	EX FMH	1200	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Width (mm)	Connections	Link	IL (m)	Dia (mm)
F 1	555110.945	652707.539	23.000	1.350	600	600				
							0	FW 1.000	21.650	150
F 2	555144.168	652743.513	23.000	1.962	1200			1	FW 1.000	21.038
							0	FW 1.001	21.038	150
F 3	555185.573	652705.274	23.000	2.667	1200			1	FW 1.001	20.333
							0	FW 1.002	20.333	150
F 4	555231.947	652666.256	23.000	3.425	1200			1	FW 1.002	19.575
							0	FW 1.003	19.575	150
F 5	555237.093	652667.822	22.470	2.949	1200			1	FW 1.003	19.521
							0	FW 1.004	19.521	150
F 6	555243.520	652697.110	22.060	2.839	1200			1	FW 1.004	19.221
							0	FW 1.005	19.221	150
F 7	555252.532	652722.914	22.023	3.075	1200			1	FW 1.005	18.948
							0	FW 1.006	18.948	150

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Width (mm)	Connections	Link	IL (m)	Dia (mm)
EX FMH	555256.041	652724.613	22.023	3.114	1200		1	FW 1.006	18.909	150

