




Appendix 3 - Mechanical & Electrical

Moanbaun, Mountrath, Co. Laois

HAYES HIGGINS PARTNERSHIP		 <small>HAYES HIGGINS PARTNERSHIP</small>	Dwg.Cat: Electrical
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DRAWING / DOCUMENT REGISTER & ISSUE SHEET

Project: 15no. Social Housing Units at Moanbaun, Mountrath, Co. Laois	Issue Date and Revision No.	Sheet: 1 of 1
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Job No.	22ME014	Day	18	10														
		Month	09	11														
		Year	23	23														
Drawing/ Document No.	Drawing / Document title	Scale	Rev	Rev														
ME-1000(A)	Proposed ESB Layout	1:250 @ A1	P1	P2														
ME-1000(B)	Proposed Telecom Layout	1:250 @ A1	P1	P2														
ME-1000(C)	Proposed Public Lighting Layout	1:250 @ A1	P1	P2														

Specifications																		
Site Specific Electrical Specification																		
General Electrical Specification																		
Electrical Datasheets																		
Electrical BCAR Requirements																		

Copies issued to:					Number of Copies :													
CLIENT	Laois County Council		1	1														
ARCHITECT	Van Dijk Architects		1	1														
QS																		
C&S																		
PSDP																		

Purpose of Issue																		
FOR INFORMATION			I	I														
FOR APPROVAL																		
FOR TENDER																		
CONTRACT ISSUE																		
FOR CONSTRUCTION																		
ELECTRONIC			E	E														
PAPER																		

*** Purpose of Issue: I = Information, A = Approval, T = Tender, CI = Contract Issue, C = Construction, E = Electronic, P = Paper
 *** P1, P1, C1 : Designates Drawings and/or Revisions Issued



*Project Managers
Chartered Civil, Structural
& Building Services Engineers*

MOANBAUN , CO. LAOIS

STAGE 2A

MECHANICAL AND ELECTRICAL ENGINEERING

SERVICES REPORT

22ME014

Nov 2023

1. Executive Summary

This project is for the provision of housing units at a site at Moanbaun, for Laois County Council

This report describes the proposed building services and the performance of the dwellings in the planned development for Laois County Council. On the mechanical services side the mechanical site services, heating systems, ventilation systems, drainage systems, water services and controls system are specified. On the electrical services side the electrical site services, electrical supply and main distribution, power, lighting, communications, security and protection, and controls are detailed. The environmental performance of the dwellings is also discussed within this report.

2. (5-) PROPOSED MECHANICAL SERVICES

2.1 (50) Mechanical Site Services

Piped Services

It is proposed that an air source heat pump be provided for each dwelling as:

- There is no natural gas in the area
- There are issues with locating and accessing LPG or oil tank

Piped Water Services

In this project site water services are included in the civil and structural package.

2.2 (51) Heating Centre

Heating Centre

In each unit the external condenser for the air source heat pump shall be located in the dwellings garden and the internal unit shall be located in the hot press. The air source heat pump type will be proposed at detailed design stage.



The air source heat pump will provide sufficient heating capacity for the unit and any brief defined future expansion. The air source heat pump will be linked to a controls system providing weather compensation and zoned heating through two port valves with temperature and time control. A heating circuit will be provided for each floor and the DHW circuit is fabricated into the internal unit. The air source heat pump will be selected for its reliability, quality, efficiency and the availability of spare parts in the local region.

2.3 (52) Drainage

Soils and Wastes

An above ground, gravity fed, soils and wastes system will be installed to BS EN12056-2:2000. Toilets have been arranged over each other where possible to reduce the number of drop locations.

2.4 (53) Water Distribution

Water Services

A valved mains water connection, complete with water meter, will be provided to each unit. Mains water will be provided to the kitchen tap and to the cold water tank in the attic.

The water storage tank in each house will be a one piece insulated glass reinforced plastic tank to format 30, complete with lightweight cover, drip tray and overflow pipe. The tank will be located in the attic space of the house. This location will provide the head required to feed the house by gravity. Any dwellings where there is inadequate head will have a centralised water tank with a boosted delivery system.

Hot Water Strategy

Hot water services shall be generated by means of an in-built hot water tank in the internal heat pump unit (596mm x 690mm x 1845mmH) located in the hot press. This unit will have an immersion heater as a back-up which can also be used as a back-up for the heating system.

All hot water outlets will be fitted with fail-safe lockable local TMV2 thermostatic mixing valves within 1 metre of the outlets. Hot water will only be combined with cold water taps, not mains water taps for use of thermostatic valves.

2.5 (56) Space Heating

Space Heating and Distribution

Space heating shall comprise the following:

- One no. fully compensated aluminium radiator circuit per unit floor configured through thermostatic radiator valves into individual room zones. A manifold will be provided for each floor from which all individual radiator runs will be taken. This allows the system to be easily balanced and maintained.
- In two storey units, the distribution pipework will generally run in the first floor, rising to feed first floor radiators and dropping in stud walls to feed the ground floor radiators at low level on the ground floor.
- The heating circuits will be controlled from a digital controller located in the kitchen providing 7 day control.

2.6 (57) Ventilation and Air Conditioning

In general the units will be naturally ventilated.

In addition the following mechanical ventilation systems will be installed:

- Extract from all toilets and kitchen in line with Part F requirements via a Demand Control Ventilation system. This includes a central extract fan unit to extract stale air from the toilets, kitchen and other wet rooms, with moisture activated passive external wall vents in living spaces and bedrooms. A separate extract will be taken from the Kitchen Canopy.
- DCV was chosen over natural ventilation due to the level of airtightness in the dwellings requiring the background ventilation provision to be increased by 40% if natural ventilation was utilised. This would reduce energy performance and increase the risk of the vents being permanently closed or blocked by the tenants to eliminate cold draughts. This would lead to an unhealthy indoor environment and increased moisture content within the dwelling contributing to risk of internal condensation and mould growth.
- Demand control ventilation (DCV) is preferred over a mechanical ventilation heat recovery (MVHR) due to the additional costs associated with the installation and the maintenance of a MVHR system.

3. (6-) Proposed Electrical services

3.1 (60) Electrical Site Services

Ducted External Power Services and Supplies

There is an existing ESB substation situated at the edge of the existing estate which will be centrally situated for the new expanded development

Each house will have its own ESB meter recessed on an external wall and the dwellings in the existing building shall have a centralised meter switch room. The site cables will be installed by ESB Networks in trenches and ducts provided by the contractor. Mini-pillars will be provided for houses with a maximum of eight houses fed from each mini-pillar.

There is an ESB overhead line along the north boundary of the site. Although this may not physically impinge on the site it should be undergrounded for aesthetic reasons.

A letter on a Laois County Council letterhead confirming the official name of the estate will be required when the application for connection is made to the ESB.

External Lighting System

Public lighting will be provided to the roadways and footpaths in accordance with the Laois County Council guidelines. All lanterns will be energy efficient LED with trimming photocells and fixed dimming drivers. It is proposed that a P4 lighting class be used for the roadways.

Telephone , TV and Broadband Services

Each house will be provided with two wallboxes for telecoms and media connections. These will be fed by two separate generic duct systems which can be rented to service providers.

3.2 (61) Electrical Supply and Main Distribution

Electrical Supply

Each unit will be provided with a single-phase supply by the ESB. For houses this supply will be provided from a recessed meter box on a wall at the front of each house. These meters will be in turn fed from a mini-pillar for a maximum of 8 No. houses per mini-pillar. Each house will have an MIC of 12KVA and the installation will allow for the brief expansion area in terms of system capacity.

Electricity Centre

A new main low voltage switchboard consumer unit will be located at high level at the main entrance door in in each unit. The consumer will be designed to provide for 25% expansion capacity.

Main Distribution

From the main consumer unit dedicated radial cable circuits will distribute the electricity supply to each room as required. In two storey units generally cables will distribute in the first floor, the attic and drop in partition walls. All cabling will be installed in steel conduit.

A system of galvanised steel conduit will be designed to distribute general and emergency lighting, power, data, fire alarm and mechanical services control wiring throughout each house. Separate systems shall be segregated in accordance with the ETCI National rules for electrical installations.

3.3 (62) Power

Power Distribution Services

Socket outlets shall be 13 Amp type and shall be wired in 20 Amp radial circuits and carried in galvanised steel conduit. Quantities and locations of outlets will be as required for this type of accommodation.

Fixed items of equipment will be supplied via fused, switched cable outlets and isolators, suitably rated.

Earthing

Earthing and bonding will be provided with the objective to provide an effective system to minimise danger to life and equipment arising from:

- Faults between line conductors and non-current carrying metal work
- Atmosphere discharges
- Accumulation of static charges
- The design parameters are defined within the ETCI National rules and ESB Regulations for Electrical Installations.

Photovoltaic

A Part L compliant photovoltaic system will be provided for each unit providing renewable energy with associated energy savings and reduced environmental impact. For the dwellings the photovoltaic system will provide electricity.

3.4 (63) Lighting

Internal Lighting System

The internal lighting system will be designed to provide high efficiency, low maintenance lighting that promotes well-being for house users.

The internal lighting system will incorporate flexibility to provide the levels of illumination appropriate to each type of activity within the house. In general living areas ceiling roses will be provided with LED lamps. In the kitchen, bathroom, attic and storerooms LED luminaires will be provided.

LED bulkhead fittings will be provided at the front and rear doors.

Lighting Control

Lighting in each unit will be controlled by means of switches. This is the preferable approach in housing where the lighting is "owned" by unit occupier as opposed to a common landlord areas where lighting will be controlled by sensors.

3.5 (64) Communications

IT Installation

TV points will be provided in line with requirements.

Telephone points will be provided in line with requirements

3.6 (65) Security and Protection

Intruder Alarm System

A circuit breaker will be provided in the consumer unit for the supply to a future wireless intruder alarm system

Fire Detection and Alarm Systems

In each unit a fire alarm system consisting of linked automatic smoke detectors, and alarm sounders will be provided in accordance with the Irish Standard IS 3218 to provide an LD2 type system.

4. Environmental Performance of Building:

The environmental performance strategy for the proposed buildings will be developed by the design team to provide new Part L (NZEB) compliance, and an optimised living environment that promotes well-being and low energy costs for house users.

The following strategies will be implemented.

(i) Site Layout & Building Orientation

The Orientation of the houses allows for passive solar heating of important areas while adhering to the site restrictions.

(ii) Thermal Insulation

The U-values to achieve a NZEB compliance in line with the works requirements but will be finalised with detailed design at a later stage.

Element	Min U-value
External Walls	0.15
Ground Floors	0.13
All Roofs	0.12
All Glazing	1.2

The build-ups to achieve these U-values will be detailed by the architect at a later stage.

(iii) Demand Control Ventilation

Extract from all toilets and kitchen in line with Part F requirements Demand Control Ventilation system with central extract fan and humidity controlled inlets.

The building has been designed to be naturally ventilated with background ventilation through window vents and purge ventilation from openable sections in windows.

(iv) Heating Distribution and Controls

Heating distribution and controls will be designed to reduce energy consumed for heating by allowing timed zone control and individual control of heating to all rooms. Heating will only be provided to an area when it is needed and the heating system will automatically regulate pumping of low pressure hot water to avoid wasteful pumping to areas that do not require heat.

5. Controls:

5.1 Heating Controls

The air source shall be provided with the following control functions:

- The air source shall be enabled by any room on any of the time scheduled floor zones calling for heat.
- The air source shall also be enabled by the time scheduled Domestic Hot Water cylinder calling for heat.
- Weather compensation, through both the modulation of the air source heat pump. .

The air source heat pump shall be controlled as follows: The unit is capable of receiving a set point temperature from the control system. As the external temperature increases, the heating flow set point temperature shall reduce in order to maximise the system efficiency of the heat pump. The controls system must use the system load to modulate the heat pump to provide the maximum efficiency for the active load.

5.2 Hot Water Controls

The water heater shall be enabled by a seven day time schedule and shall control its own water temperature while enabled.

5.3 Extract Fan Control

The kitchen canopy will be provided with integral fan controls. Demand Controlled Ventilation (DCV) measures the air quality and adjusts the rate of air exchange constantly, room by room, based on actual need. A humidity sensitive strip can open and shut the inlet grilles based on the relative humidity in the room. Both the inlets and the extracts react to the indoor air quality and adjust the rate of airflow; the extract fan detects these changes by pressure which means there are no cables or controls needed, and adjusts its running speed accordingly.

5.4 Lighting Controls

The internal lighting system will be designed to provide high efficiency, low maintenance lighting that promotes well-being for house users.

The internal lighting system will incorporate flexibility to provide the levels of illumination appropriate to each type of activity within the house.

Luminaries will generally be LED.

5.5 Energy Metering

For the purpose of billing and energy use information on individual performance the following items will be metered:

- Electricity usage for the air source heat pump
- Total water usage (Mains)
- Electricity Consumption

HAYES HIGGINS PARTNERSHIP

Chartered Engineers & Project Managers
Mechanical & Electrical Engineering

ISSUE REGISTRATION:

Project: Moanbaun, Co. Laois.

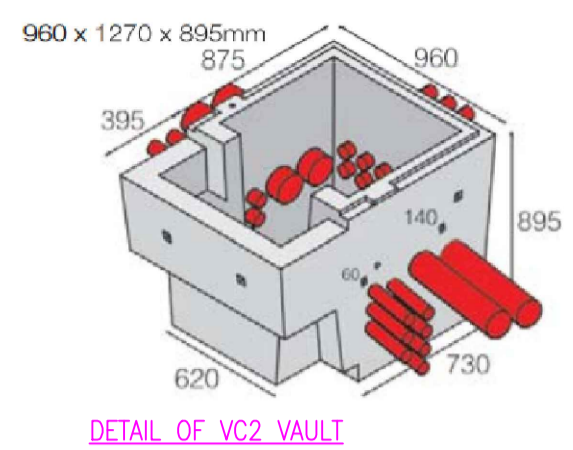
Project No: 22ME014

Rev	Date	Purpose of Issue/Nature of Revision	Prepared by	Issue Authorised by
Stage 2A	16.11.23	Stage 2A Approval	B.C.	B.C

This document takes into account the particular instructions and requirements of our Client. It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

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- LEGEND**
- PROPOSED ESB LV DUCT Ø125mm RED
 - PROPOSED ESB MV DUCT SIRO CABLES, OPEN TRENCH ONLY SIRO INSTALLS IN OPEN PIT
 - EXISTING ESB LINE
 - M MANHOLE FOR DRAWING WIRES, ACCESS AND MAINTENANCE.
 - MP ESB MINIPILLAR "n" C/W VC2 VAULT IMMEDIATELY IN FRONT
 - ⬇ ø50mm RED DUCT TO MINIPILLAR "n"



EXISTING MINIPILLAR POSITION TO BE CONFIRMED MIGHT REQUIRE RELOCATION

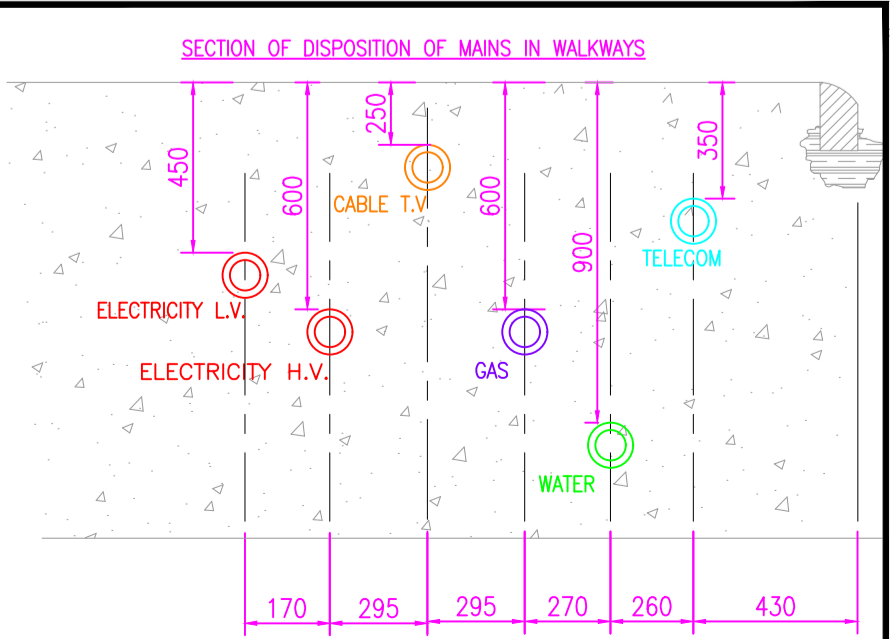
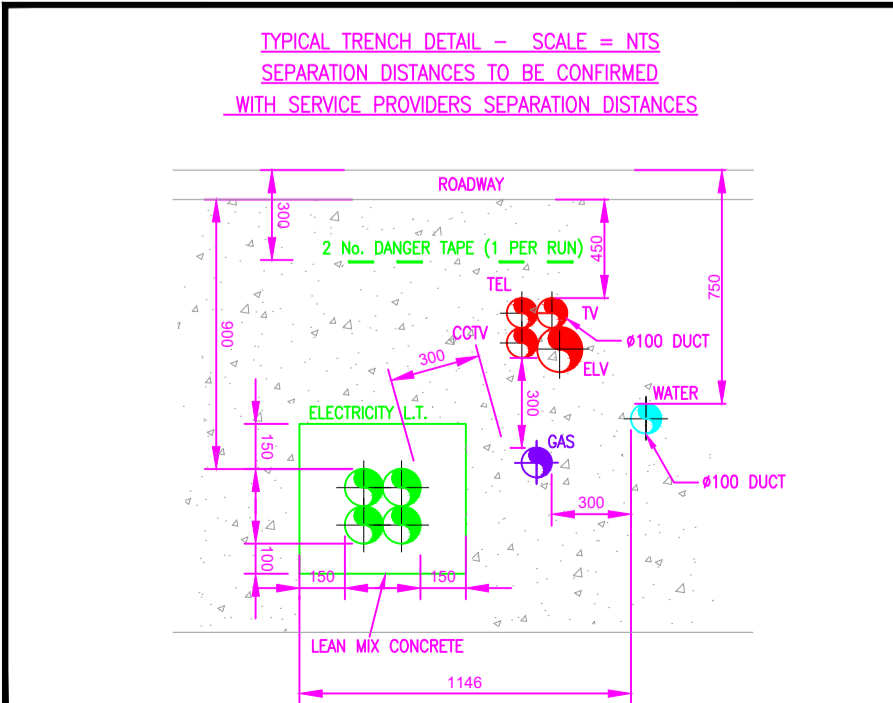
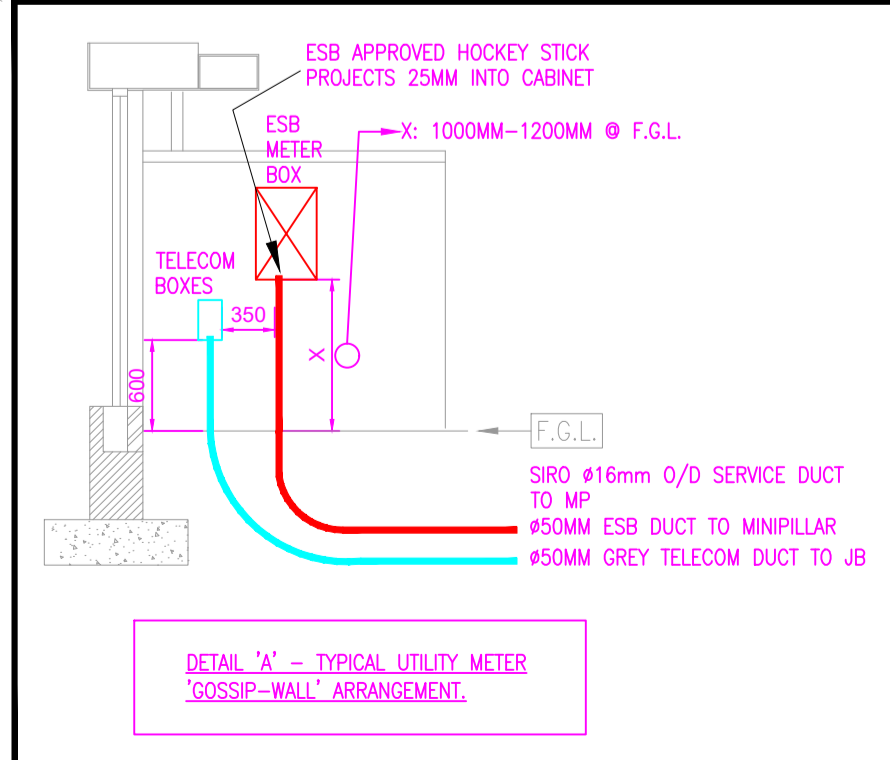
EXISTING MINIPILLAR POSITION TO BE CONFIRMED MIGHT REQUIRE RELOCATION

FEED HOUSES FROM EXISTING MINIPILLAR A1

FEED HOUSES FROM EXISTING MINIPILLAR A2

FEED HOUSES FROM EXISTING MINIPILLAR A5

- NOTES:**
1. USE ONLY SOLID WALL HIGH IMPACT RESISTANCE ESB NETWORKS APPROVED RED DUCTING TO IS 370 COLOUR STANDARD AND ESB NETWORKS SPECIFICATION 16113 (3.8MM MINIMUM WALL THICKNESS PVC FOR 125MM DUCTS). DISCOLOURED DUCT NOT ACCEPTABLE.
 2. LIGHTWEIGHT, FLEXIBLE CORRUGATED TWIN WALL DUCTING IS NOT ACCEPTABLE TO ESB NETWORKS IRRESPECTIVE OF MANUFACTURER
 3. DUCTS SHALL BE LAID WITH THE LEGEND FACING UPWARDS, IN A STRAIGHT LINE, ROPED USING 12MM POLYPROPYLENE ROPE WITH CERTIFIED SAFE BREAKING LOAD OF 1.5 TONS.
 4. THE INSTALLATION SHALL COMPLY WITH THE ESB'S "STANDARD SPECIFICATION FOR ESB NETWORKS MV/LV NETWORKS DUCTING".
 5. THE THERMAL RESISTIVITY OF THE DUCT SURROUND MATERIAL MUST BE MAXIMUM 1.0K.M/WATT @0% MOISTURE CONTENT. ONLY ESB NETWORKS APPROVED UNWASHED SAND GRADED TO BS882 STANDARD OR EQUIVALENT ESB NETWORKS APPROVED MATERIAL IS ACCEPTABLE. PEA GRAVEL AND FOAM CONCRETE ARE UNACCEPTABLE.
 6. AN IDENTIFYING RED TAPE MUST BE PLACED ON TOP OF THE SAND AND A YELLOW 300mm FROM THE SURFACE.
 6. A MINIMUM DEPTH OF 450MM IS REQUIRED IN ESTABLISHED FOOTWAYS, 600MM IN NEW HOUSING ESTATE CARRIAGEWAYS & FOOTWAYS AND ALL GRASSED AREAS, 750MM ALL NON-HOUSING ESTATE CARRIAGEWAYS.



NOTES:

GENERAL NOTES:

1. THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS, C&S ENGINEERS DRAWINGS & SPECIFICATIONS.
2. ALL WORKS TO BE CARRIED OUT IN ACCORDANCE WITH THE RELEVANT BUILDING REGULATIONS.
3. DO NOT SCALE - WORK TO FIGURE DIMENSIONS ONLY.

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ENGINEERS IRELAND
cpd ACCREDITED COMPANY

Rev.	Date	Description	Drawn	Checked	Approved
P1	18/09/23	INFORMATION	HP	BC	BC
P2	10/11/23	INFORMATION	HP	BC	BC

Client: LAOIS COUNTY COUNCIL

Job Description: 15 No. SOCIAL HOUSING UNITS AT MOANBAUN, MOUNTRATH, Co. LAOIS

Status: INFORMATION

Drawing Title: ESB SITE SERVICES LAYOUT

Project No: 22ME014 Drawing Ref: ME-1000(A) P2

Date: 18/09/2023 Scale: 1:250 @ A1 (1:500@A3)

Drawn By: H.P. Checked By: B.C. Approved By: B.C.

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The Open House, 11 Ode Lane, Smithfield, (01) 6632321 (01) 6625804 admin@hayeshiggins.ie

- NOTES:**
- Ducting shall comply with latest version of BS EN 50086 and shall be single wall, coloured red and manufactured from high-density polyethylene. The nominal external diameter of the duct shall be 107mm with a minimum wall thickness of 5mm.
 - Ducts shall be laid with the legend facing upwards, in a straight line, close to the line of the column locations and shall contain a continuous draw wire of 8 kN strength.
 - The bedding shall consist of a mix for concrete grade C35 to be: 1 cement, 1 sand, 2 washed pebble.
 - The surround shall consist of either a lean mix concrete (1 cement to 3 sand 6 gravel) or crushed rock to CL804, to be laid in 200mm thick layers and each layer to be well consolidated with a mechanical compactor.
 - The bottom of the trench shall be levelled and rammed, in rocky or stony soils, earth, free from stones, shall be spread over the bottom of the trench and rammed to afford a bedding of 75mm in thickness upon which the duct shall be laid.
 - Ducting will be covered with sand (or equivalent substrate) before back filling the trench to avoid damage by back fill aggregate material.
 - An identifying tape must be placed on top of the sand.
 - A minimum depth of 450mm cover is required in urban footways, grass margins, pedestrian ways, laneways and vehicular accesses; and a minimum depth of 750mm is required at road crossings or under roadways.
 - All sleeves to be in accordance with Section 11 and Appendix E of the "Construction Standards for Road and Street Works in Dublin City Council"

INTERSECT EXISTING DUCTS AND BUILD JB4A CHAMBER

EXISTING EIR CHAMBER 1297

RUN 2No.125MM DUCTS IN ORDER TO FUTURE PROOF FOR FUTURE DEVELOPMENT

RUN 2No.125MM DUCTS IN ORDER TO FUTURE PROOF FOR FUTURE DEVELOPMENT

- NOTES:**
- GENERAL NOTES:**
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Referenced drawings

Dwg No.	Dwg Title

Issue register

Rev.	Date	Description	Drawn	Checked	Approved
E1	18/09/23	INFORMATION	HP	BC	BC
E2	10/11/23	INFORMATION	HP	BC	BC

Client: WICKLOW COUNTY COUNCIL

Job Description: 15 No. SOCIAL HOUSING UNITS AT MOANBAUN, MOUNTRATH, Co. LAOIS

Status: INFORMATION

Drawing Title: TELECOM SITE SERVICES LAYOUT

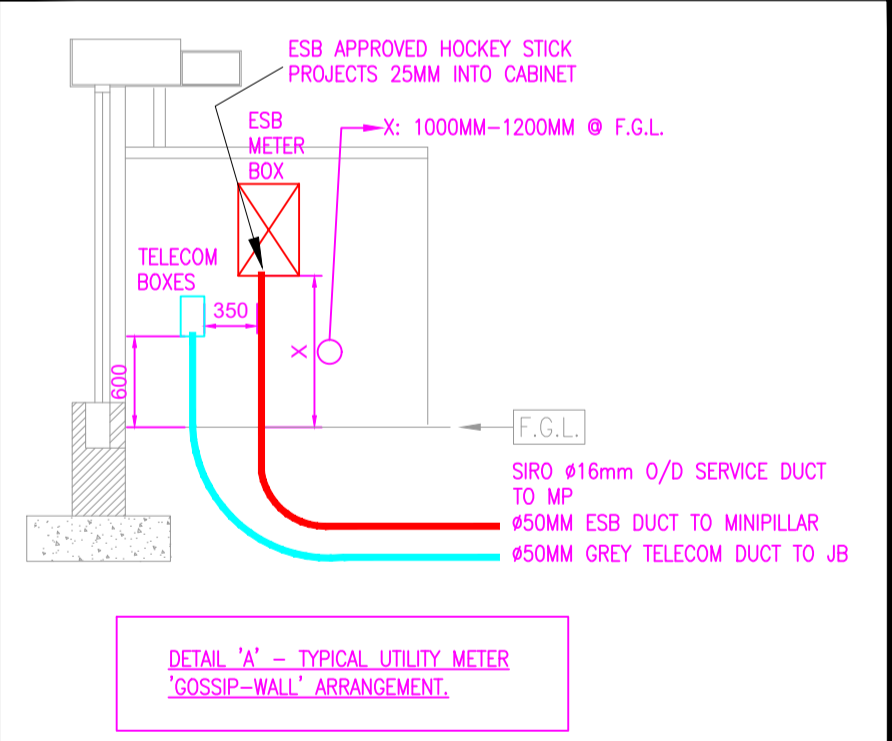
Project No: 22ME014	Drawing Ref: ME-1000(B)	Rev: P2
Date: 18/09/2023	Scale: 1:250 @ A1 (1:500@A3)	
Drawn By: H.P.	Checked By: B.C.	Approved By: B.C.

Hayes Higgins Partnership

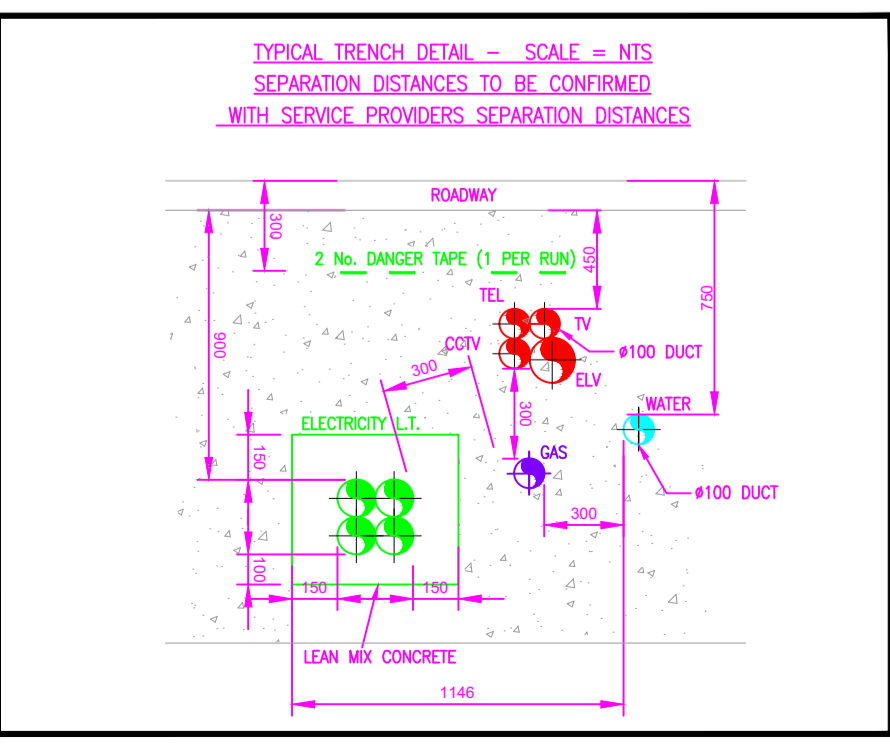
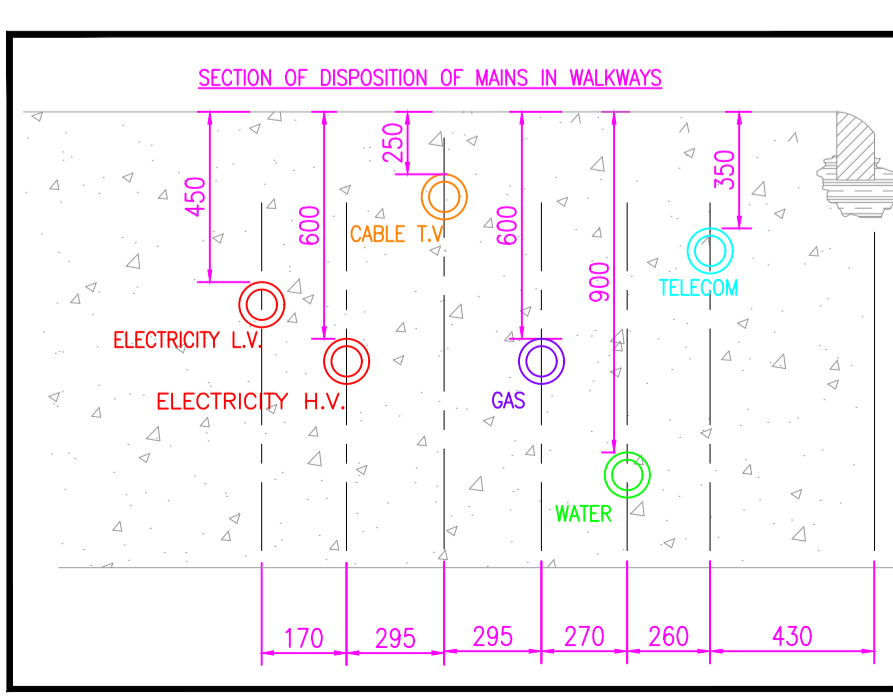
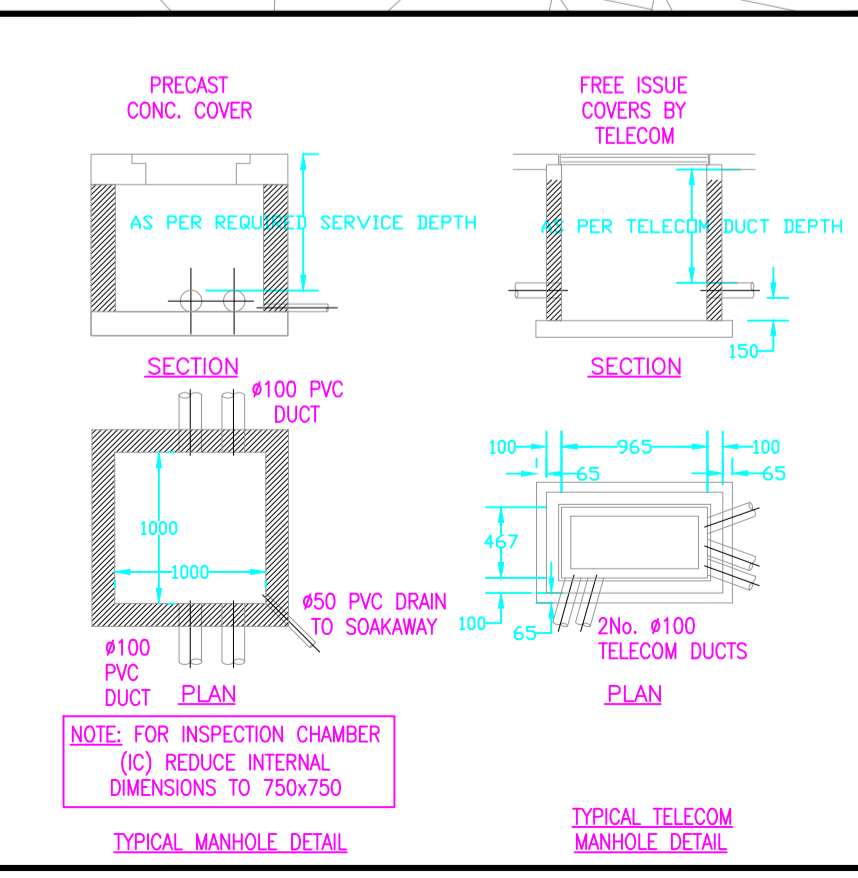
Gas House Lane, Kilkenny.

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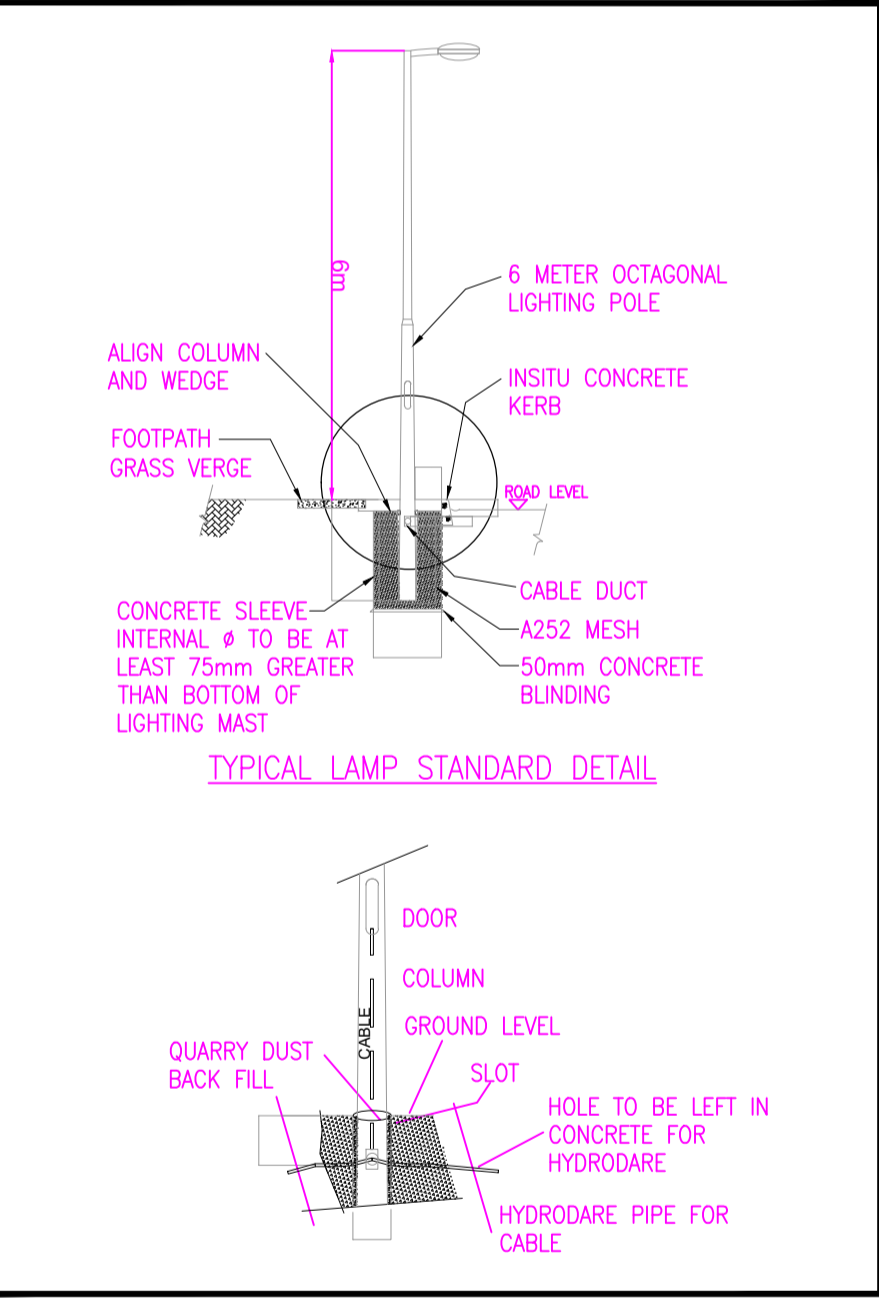
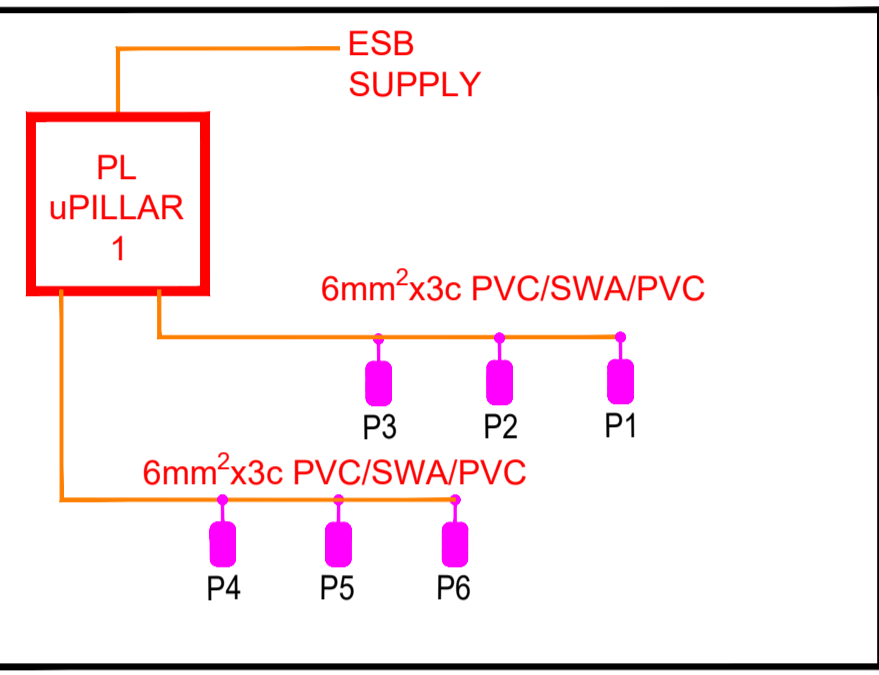
The Open House, 11 Odeon Lane, Smithfield, (01) 863231 (01) 862504 admin@hayeshiggins.ie



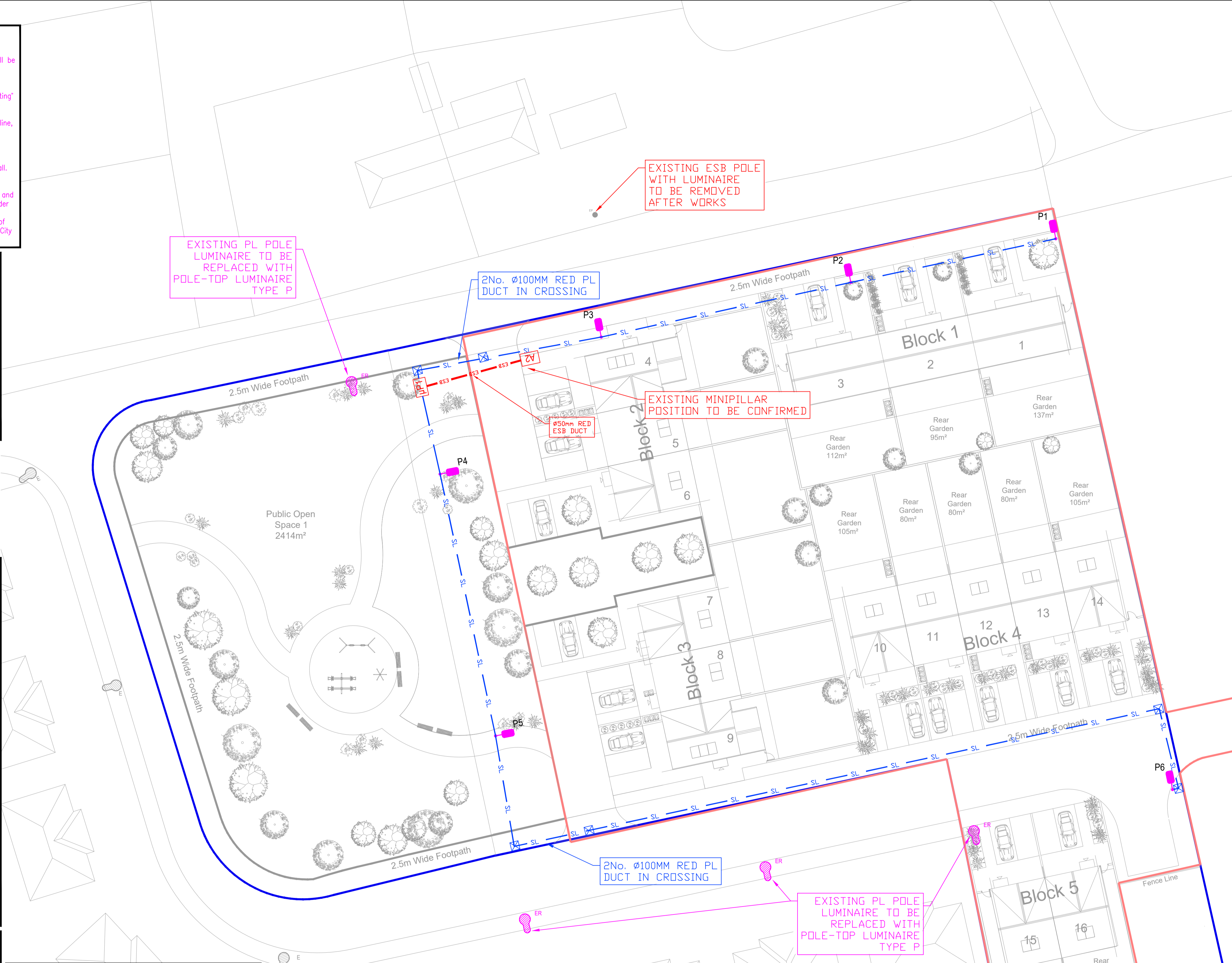
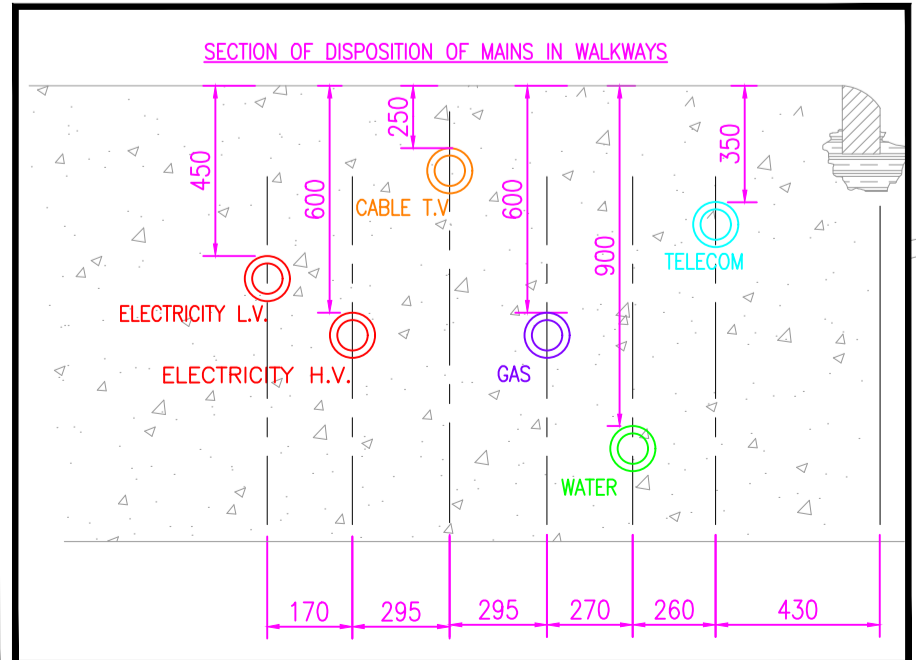
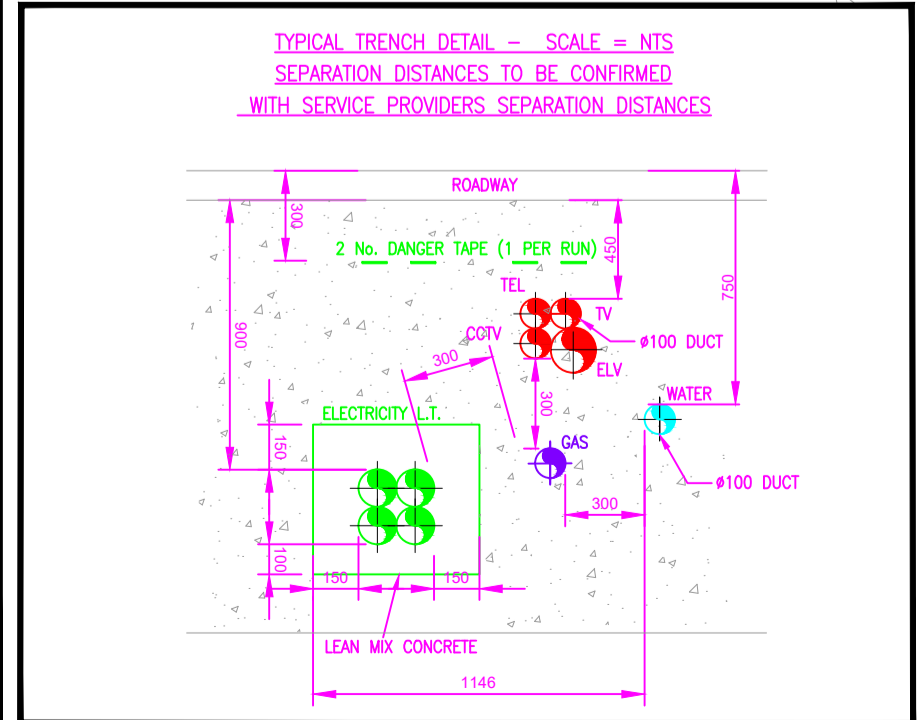
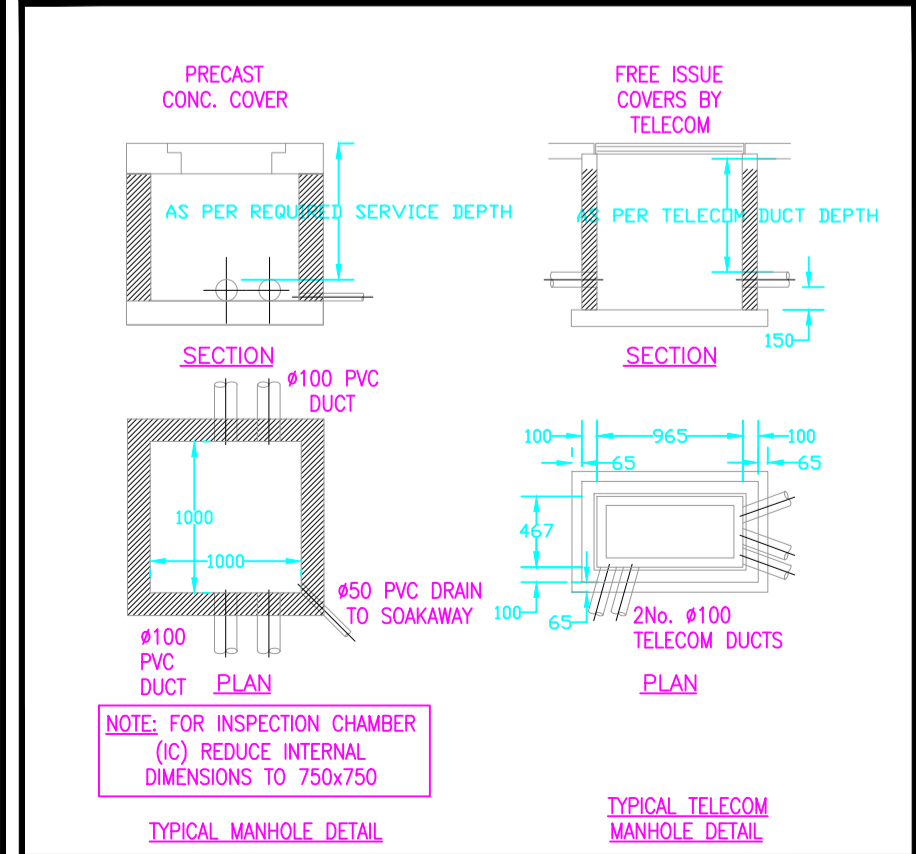
- LEGEND**
- TEL TELECOM GREY DUCTS #110mm MAINS TO CHAMBERS AND #50mm FROM CHAMBERS TO ETU'S
 - EIR EXISTING EIR DUCT
 - PROPOSED JB4/FW3 MANHOLE, EXCEPT OTHERWISE NOTED
 - En TELECOM 1 JB "n"
 - #50mm GREY DUCT TO JB "n"
 - TP EIR TELECOM POLE



- NOTES:**
- Ducting shall comply with latest version of BS EN 50086 and shall be single wall, coloured red and manufactured from high-density polyethylene. The nominal external diameter of the duct shall be 107mm with a minimum wall thickness of 5mm.
 - Each length of duct shall be stamped with the words "Public Lighting" or "Street Lighting", in 18mm block lettering repeated at 1-metre intervals.
 - Ducts shall be laid with the legend facing upwards, in a straight line, close to the line of the column locations and shall contain a continuous draw wire of 8 kN strength.
 - Sand should be used to backfill to 150mm above the top of the ducting.
 - A clearance of at least 100mm shall be allowed to the trench wall.
 - An identifying tape must be placed on top of the sand.
 - A minimum depth of 450mm cover is required in urban footways, grass margins, pedestrian ways, laneways and vehicular accesses; and a minimum depth of 750mm is required at road crossings or under roadways.
 - All sleeves to be in accordance with Section 11 and Appendix E of the "Construction Standards for Road and Street Works in Dublin City Council"



- LEGEND**
- SL — EXTERNAL LIGHTING DUCT Ø100mm (RED)
 - P'n' LED LANTERN, 22W, 3400lm, 4000K, DWS0 DISTRIBUTION ON 6m POLE
 - E EXISTING LUMINAIRE
 - ER EXISTING LUMINAIRE TO BE REPLACED WITH POLE-TOP LUMINAIRE TYPE P
 - ⊠ MANHOLE FOR DRAWING WIRES, ACCESS AND MAINTENANCE.
 - ESB ESb MINIPILLAR "n"
 - PL PL MICROPILLAR "n"



- NOTES:**
- GENERAL NOTES:**
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Referenced drawings		Issue register					
Dwg No.	Dwg Title	Rev.	Date	Description	Drawn	Checked	Approved
		P1	18/09/23	INFORMATION	HP	BC	BC
		P2	10/11/23	INFORMATION	HP	BC	BC

Client: WICKLOW COUNTY COUNCIL

Job Description: 15 No. SOCIAL HOUSING UNITS AT MOANBAUN, MOUNTRATH, Co. LAOIS

Status: INFORMATION

Drawing Title: PUBLIC LIGHTING SITE SERVICES LAYOUT

Project No: 22ME014 Drawing Ref: ME-1000(C) P2

Date: 18/09/2023 Scale: 1:250 @ A1 (1:500@A3)

Drawn By: H.P. Checked By: B.C. Approved By: B.C.

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