CHARLESTOWN PLACE SHD

ENERGY AND SERVICES STRATEGY REPORT

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CHARLESTOWN PLACE AND ST. MARGARET'S ROAD, CHARLESTOWN, DUBLIN 11

PUDDENHILL PROPERTY LIMITED

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LINKED PRACTICES

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Preamble Introduction:

This report was produced to accompany the Strategic Housing Development Application at Charlstown Place and St. Margaret's, Charlestown, Dublin 11. The Development consists of four Apartment Blocks consisting 590 apartments consisting of one, two and three bed units with a number of retail shell units at ground floor. The development also includes a naturally ventilated basement car park, and a fully landscaped podium level.

This report describes the strategies and considerations to be taken with regards to the Utility Infrastructures, the mechanical and electrical services installations, and the requirements of Building Regulations Part L, each to adequately serve the proposed development.

The proposed development will comply with the current Building Regulations, 'TGD Part L 2019 ''Conservation of Fuel and Energy – Dwellings'' (NZEB).

All buildings in the proposed development shall be designed and constructed to ensure that the energy performance of each building is such as to limit the amount of energy required for the operation of the building and the amount of carbon dioxide emissions associated with this energy use.

The proposed mechanical and electrical design strategies will incorporate energy efficient systems, while at the same time providing robust, durable and maintainable systems.

This report is broken down under the following main headings

- Section 1 : Network Utilities supporting the Development
- Section 2 : Proposed New Mechanical and Electrical Services Installation
- Section 3 : Part L Study and Approach.

Utility Network drawings and Preliminary Layout Drawings outlining the intended scope are appended to this report as follows

- Appendix 1 : Utility Network Maps
- Appendix 2 : Proposed Site Lighting and Services Drawings
- Appendix 3 : Proposed Typical Apartment Mechanical Layouts
- Appendix 4 : Proposed Typical Apartment Electrical Layouts
- Appendix 5 : Proposed Roof Plans with Solar PV Panels Layouts

1. Network Utilities Supporting the Development

1.1. Network Utilities

A preliminary investigation has been carried out in order to establish the availability of services in the vicinity of the proposed development and is outlined in the following sections.

Utilities to service the proposed site shall typically connect into the existing, adjacent utility provider infrastructure. Prior to any alterations taking place agreement will be sought from each of the relevant Utility Providers.

Maps of existing infrastructure in the vicinity of the proposed development have been sought from each of the main Utility Providers and are included in Appendix 1 of this report.

Each Utility Provider will subsequently carry out a design including drawing upon receipt of a full application.

All Utility Provider service cables associated with the proposed development shall be located underground. Ducting will be provided to facilitate the provision of new ESB and Telco's / Broadband infrastructure. All underground chambers shall be suitably traffic rated for the location in which it is intended that they are installed.

1.2. ESB Networks

From preliminary investigation and consultation with ESBN it is envisaged that the new electricity supply will originate from the main ESBN underground distribution network located on St. Margaret's Road to service the new development.

It is anticipated that three new ESBN double substations will be sufficient to service the proposed developments electricity demands. The substations will serve off loader panels located in the adjacent switch rooms.

The switch rooms in turn will serve a metering room in each apartment block through a network of underground ducting.

All apartments will have centralized metering housed within dedicated electrical cupboards located in the metering room of each block. Non-Residential facilities shall also be supplied from their associated centralized metering room in each block.

ESB supply sequence of works:

- Postal plan with formal development name required
- ESB application to be made by Varming Consulting Engineers
- ESB to issue Capital Contribution for new supply works

- ESB to attend site & agree ducting arrangement
- Main contractor to install new substations to ESB specifications
- ESB to install new ducting
- ESB to install new supply cables

1.3. Open Eir

The telephone, television and broadband services with be supplied on site by Eir as a service provider. Open Eir is the section responsible for the delivery of the infrastructure network.

From preliminary investigation and consultation with Open Eir it is expected that new communications ducting infrastructure can tie into the existing underground network located along Charlestown Place, to extend the current network to service the proposed development.

Each block will have centralized incoming services and equipment as required, housed within dedicated communications rooms located at basement level for blocks 1, 2 & 4 and at ground floor level for block 3. Open Eir may in addition require new plinth mounted externally located equipment cabinets subject to further detailed design.

Eir supply sequence of works:

- Eir application to be made by Varming Consulting Engineers
- Eir to attend site and identify source of service & discuss cable route with main contractor
- Eir to issue their contract to main contractor
- A required quantity of unbranded ducts to be installed by main contractor
- Eir to install cables to the building

1.4. Virgin Media Ireland

In addition to Eir, telephone, television and broadband services will also be supplied to the site by Virgin Media

From preliminary investigation and consultation with Virgin Media Ireland it is expected that new communications ducting infrastructure can tie in to the existing underground network located along St. Margaret's road, to extend the current network to service the proposed development.

Apartments will have centralized incoming services and equipment as required, housed within dedicated communications rooms located at basement level for blocks 1, 2&4 and ground floor level for block 3.Virgin Media may in addition require new plinth mounted externally located equipment cabinets subject to further detailed design.

Virgin Media supply sequence of works:

- VM application to be made by Varming Consulting Engineers
- VM to attend site and identify source of service & discuss cable route with main contractor
- VM to issue their contract to main contractor
- A required quantity of unbranded ducts to be installed by main contractor
- VM to install cables to the building

1.5. Gas Networks Ireland

A preliminary consultation with GNI has established that a natural gas service is currently available in the locality.

It is proposed that the Residential element of this developments energy requirement will be supplied via Electricity and as opposed to Natural Gas.

There is an existing 180 PE 4 bar gas main located on Charlestown Place (refer to Gas Networks Ireland Drawing) which runs adjacent to the north elevation of the proposed development.

It is proposed to make a connection to this Natural Gas main on Charlestown Place and bring a low pressure supply into the naturally ventilated basement to provide a natural gas supply for the Retail Units.

Gas Networks Ireland supply sequence of works:

- Natural Gas application to be made by Varming Consulting Engineers
- Capital Contribution to be issued by Gas Networks Ireland for new supply.
- Location of Pressure Reducing Station to be agreed with Gas Networks Ireland
- Gas Networks Ireland to attend site and identify source of service & discuss pipe route and location of pressure reducing skid and meter manifold at basement
- Gas Networks Ireland to install new supply into basement to agreed location.

1.6. Satellite Television

The option of providing a central satellite television network will be considered in further detail to provide Satellite & Saorview television services to the development with a centrally located satellite dish and aerial equipment for each Apartment Block.

1.7. Street Lighting

Landscape lighting will be provided throughout the development for the illumination of communal areas and walkways. The proposed layout utilizes LED lighting through a combination of column, bollard and uplighter luminaires.

Photo-electric cells will be integrated into column light fittings for automatic switching on at dusk and off at dawn. These luminaires can also be supplied with a pre-set dimming function applied to each driver, with a dimming regime to 75% of the light output between the hours 12.00 midnight and 6am.

Bollard and uplighter luminaires shall have automatic switching through local photo-electric cells for each block as appropriate.

The landscape lighting luminaire positions will be coordinated with the architectural landscape layout taking account of walkways, tree positions etc. while positioning each one to ensure the optimal uniformity and reduced glare.

The street and landscaping lighting designs have been designed with input from the project bat ecologist to ensure that no negative effects to bats will arise.'

2. Proposed New Mechanical and Electrical Services Installation

2.1. Introduction:

As previously stated the development consists of 4 main Apartment Blocks consisting of some 590 Apartments along with a number of Retail Units at ground floor level. The development also includes a naturally ventilated basement carpark and a landscaped area.

The design team recognises the need for the development to be designed and operated in a manner that reduces the environmental impact of the development, while achieving it in an economical manner and maintaining an internal environment that is comfortable and secure for the occupants and users.

The mechanical and electrical installations in this new development will be designed to comply with all relevant aspects of TGD Part L for domestic and non-domestic buildings and shall be cost efficient, energy efficient and flexible in use in order to minimise both energy consumption and associated CO2 production.

Varming Consulting Engineers', Sustainable Energy Authority of Ireland registered Building Energy Rating assessor for domestic and non-domestic buildings, will provide a Building Energy Rating (BER) assessment for each dwelling unit and the landlord/communal areas.

The environmental strategy for the development is to provide energy efficient systems and to employ a holistic approach to the integration of the buildings, its energy systems and its users.

The domestic and non-domestic BER's will be calculated using the Dwelling Energy Assessment Procedure (DEAP) and Non-Domestic Energy Assessment Procedure (NEAP) respectively.

The BER assessments, including all input information, will be issued to Fingal County Council upon commencement of works and will also be submitted for publication on the National BER Register on completion of the project.

The Energy Performance of Buildings Directive (recast) mandates that all new buildings should be Nearly Zero-Energy Buildings (NZEB) by 2020. TGD L 2019 for Dwellings NZEB specification came into effect November 2019. This document outlines the requirements in order to achieve a NZEB compliant development. It includes a number of measures to improve the building envelope along with improvements to the building systems. The specification also includes a requirement for a very significant proportion of the building energy consumption to be provided by renewable energy sources.

2.2. Standards and Codes

The following design codes, standards and guidance documents will be adhered to where applicable in the design, installation and commissioning of the Mechanical and Electrical Engineering Services for this new development , including:-

- Current Building Regulations
- Local Authority Bye-Laws and Regulations
- SR50-1 Table 8 “Code of Practice for Building Services.
- ESB Requirement and Safety Guidelines
- Fire Officers Requirements
- NSAI, I.S. 10101:2020 National Rules for Electrical Installations
- CIBSE Guidelines, Volumes A, B, C, D, E, F and K
- CIBSE Commissioning Codes Volumes A, C, R and W
- Institute of Plumbing Engineering Services Design Guide
- Institute of Electrical Engineers 18th Edition Wiring Regulations
- IS 3217 and 3218, Emergency Lighting and Fire Alarm Standards
- BS 4371, IS EN 62305 and BS 6651, Earthing and Lightning Protection
- BS EN 14336, Heating Systems in Buildings
- HVCA Specifications for Ventilation Ductwork
- Safety, Health and Welfare at Work Construction Regulations

2.3. Principal Design Strategies:

The following are the principal services strategy and design proposals for the Development;

- Provision of a suitably sized and efficient air source heat pump unit suitable for each apartment to meet NZEB requirements with panel radiators throughout each apartment.
- Provision of Solar photovoltaic panels necessary to meet the NZEB Renewable Energy Ratio (RER) requirement for the apartments and landlord areas.
- Provision of electrical panel heaters in the Landlord common/circulation spaces to satisfy BER and Part L requirements.
- Provision of Mechanical Heat Recovery Ventilation (MHRV) within each Apartment.
- All main Landlord / common areas of the building will be naturally ventilated.
- Provision of centrally stored mains and cold water at basement levels to serve each Block and each apartment.
- Hot water generation shall be via the local heat pump unit.
- Provision of energy efficient light fittings and controls throughout.
- Provision of an air tightness level minimum of 3.0m³/ m²/ hr @ 50 Pa for all Apartments.

- All selected materials will be cost effective, robust, energy efficient and ozone friendly.
- All items of plant will be provided with a proven track record in reliability and robustness.
- All services will be designed & installed in a manner to facilitate NZEB compliance.
- Provision of a Building Energy Management System (BeMS) to control all Landlord mechanical plant items and optimise energy performance.

2.4. Fabric Insulation and Air Tightness

To achieve NZEB compliance without over-reliance on renewable energy systems a "Fabric First" approach is proposed and the design team will use improved insulation levels to minimise the heating load of the development and provide improved comfort for the occupants.

A comparison of the Part L 2019 elemental U-Values for fabric elements and the Target U-values are shown in the table below.

New Build Elements	U-Value (W/m^{2}k)	
	Part L 2019	Target Values
Flat Roof	0.20	0.12 (TBC)
Pitched Roof	0.16	0.12 (TBC)
Walls	0.18	0.18 (TBC)
Ground Floors	0.18	0.12 (TBC)
Doors, windows, rooflights	1.40	1.30 (TBC)

Table 1 : Target U-Values

Air tightness can greatly reduce the heating load of a building. This is determined by the quality of sealing to windows and doors, minimization of service penetrations and correct sealing around any remaining service penetrations.

With a reasonable standard of workmanship we would expect to achieve an air permeability rate of <3.0 m3/(h.m2), considerably better than current Part L requirements for new buildings.

Thermal Bridging is an important aspect in the "Fabric First" approach. To avoid excessive heat losses at building junctions, reasonable care will be taken by the design team to ensure continuity of insulation and to limit local thermal bridging at key junctions, e.g. around windows, doors, other wall openings and at junctions between elements.

For the Development the default thermal bridging value of 0.15 has been used for all NZEB calculations.

2.5. Apartment Heating Plant

Efficient space heating systems & controls will ensure greater levels of comfort for occupants and reduced energy use. As the thermal performance of building envelopes is constantly improving due to newer stringent regulations, space heating system loads are reducing which subsequently requires careful consideration and selection of appropriate systems to meet these requirements sufficiently.

A number of alternative Heat Pump systems were investigated and identified in terms of their suitability to services the apartments on a standalone basis;

Option A: A Hot Water Heat Pump with electric panel radiator system (Dimplex System)

Option B: An Exhaust Air Heat Pump with wet radiator system (Comfortzone System)

Option A:

The Hot Water Heat Pump system is an indoor unit with a fresh air intake and exhaust ducted to external wall louvres and does not require an outdoor condenser unit. The principle of operation is it extracts heat from the external air through a ducted system, increases it to a higher temperature via a compressor within the indoor unit and then transfers this heat to the domestic hot water cylinder system via a heat exchanger.

The heat pump element of the system uses a refrigeration cycle which has a very low boiling point and therefore heat can be extracted from air even at low temperatures. Heat pump systems are designed to run for extended periods of time to ensure that they perform well and operate most economically.

It must be noted that this system only generates domestic hot water and that space heating is provided separately via “Smart” electric panel radiators in the apartments. These smart electric radiators incorporate an electronic user interface and control hub/smartphone app with 7 day 24 hour timers and also include open window technology to automatically reduce output to prevent heat loss if a window is left open.

Option B:

The Exhaust Air Heat Pump extracts heat for the exhaust air of the Apartment and transfers the heat to the supply air. The system extracts energy from the exhaust air of the dwelling through a ducted system, increases it to a higher temperature via a compressor and then transfers this heat to the hot water cylinder and wet space heating system, via flow and return pipework and steel panel radiators.

Like the Hot Water Heat Pump, the Exhaust Air Heat Pump systems is designed to run for extended periods of time to ensure that they perform well and operate most economically.

In Summary

Analysis and comparison study of both of these Heat Pump systems is being carried out to determine which is the most economical and appropriate match for the Development.

The comparison study will cover such items as - Space requirements - Ease of Installation, - Cost of Installation – Ease of Operation / User Friendly – Need for supplementary PV panels – Robustness of System.

Once concluded the Optimum Heat Pump installation in compliance with NZEB will be selection and applied to the Development

2.6. Heat Pump Unit Controls

For either Heat Pump system, the unit will be provided complete with control panel and will incorporate the ability to connect to an external fire alarm systems such that in the event of an alarm activation the units shall be shut down.

The units shall have an automatic detection system that effectively monitors and controls the operation of the unit and shall provide real – time alarms with ability to store alarms for faults and failures.

The refrigeration circuit will have all necessary safety devices such as pressure release valves and shall be fully hermetically sealed systems. Temperature based automatic function for defrosting for when went the external air is below 0^{o}C on the condenser element of the unit requires it.

Each of the apartment's mechanical plant controls shall be local and stand alone to the unit with electrical power supply from the consumer unit within the apartment.

The heating shall be controlled via a wall mounted thermostat with temperature adjustment functions, which is linked back to the heat pumps time schedule control panel complete with boost switch capability.

2.7. Terminal Heat Emitters - Radiators / Electrical Panels

Depending on the final option for the Heat Pump, the terminal heat emitter will be either an electric flat panel heater with Option A Heat Pump or pressed steel panel radiators for Option B Heat Pump Unit.

All terminals - radiators or electric panels, shall be adequately designed, sized, and selected based on external design temperature of -5°C and shall provide maintainable room temperatures as outlined in SR50-1 Table 8 "Code of Practice for Building Services – Part 1 Domestic Plumbing and Heating".

2.8. Apartment Ventilation

A mechanical heat recovery ventilation system shall be provided in each apartment and shall be capable of providing adequate general ventilation at all times and of meeting requirements for additional extract ventilation that may need to be met from time to time.

Mechanical extract ventilation is required in the living room, kitchen, bathroom and WC's (where applicable) of the accommodation units to comply with the Building Regulations 2019 Part F.

The Mechanical Ventilation with Heat Recovery system shall provide a fresh air supply to each habitable room with extract from wet rooms. In order to meet extract requirements, the system requires a higher extract or boost capacity depending on the number of wet rooms (kitchens, bathrooms, etc.). The boost function shall be operated via a humidity sensor located in the unit which will activate the boost function when humidity levels rise above a programmed level.

This shall be accompanied by additional boost switches located in common areas/halls. On activation of any of the boost switches the system shall go into boost mode for a set period of time and should revert back to general ventilation mode once this time has elapsed.

Kitchen areas require an extract air volume of 60 litres/second or 30 litres/second where the ventilation is incorporated in the cooker hood on a separate exhaust duct to the external or as per the current Building Regulations and may be operated intermittently, for instance during cooking.

2.9. Controls

A full Building Energy Management System (BeMS) will be provided to monitor and control all Landlord mechanical plant items and systems throughout the development within the main water tank/landlord plantroom.

The Landlord mechanical plant items shall comprise of the following non exhaustive list-

- Water storage tanks
- Booster pump sets
- Miscellaneous extract fans and systems
- Electrical panels in communal areas

The MCC shall be located in the main water tank/plantroom at basement level and the entire system shall be networked back to a central PC nominated by the Client within the Landlord ground floor area.

The BMS system shall include self-learning/optimisation capability in order to operate the plant and systems in the most energy efficient manner. The following general functions shall be executed through the BMS installation;

2.10. Water Services Installation

It is proposed to provide a central storage water services system to serve all the apartments within the development. Separate format 30 cold water tanks will be located at basement level for each Apartment Block. From the basement level the water services system will be pressurized via packaged duty, assist and standby booster pump sets and potable cold water supply distributed to all apartments via services shafts within each Block.

Each Retail Unit will be provided with a metered valved and blanked water supply pipe.

All domestic water service pipework shall comply fully with the requirements and conditions of Irish Water and Fingal County Council. All domestic hot and cold water and above ground mains water pipework shall be fabricated from half hard copper tubing to IS EN 1057 : 2006 and shall be concealed throughout.

Hot water for the building will be generated via hot water heat pump units within each apartment.

The main cold water service line and domestic hot water cold feed shall have adjustable pressure reducing valves fitted to ensure balanced hot and cold water pressures are achieved throughout each apartment.

All water services pipework shall be insulated throughout all runs as appropriate to the duty in accordance with Section 1 and Appendix G of TGD Part L: 2017 for the purposes of energy conservation and prevention of heat transfer and condensation.

2.11. Landlord Ventilation

The basement carpark is to be naturally ventilated via louvred openings along its perimeter providing 2,5% free area of the car park floor area. Mechanical Jet Fans will be provided at basement level to dilute the possible buildup of carbon monoxide.

Miscellaneous mechanical extract systems will be provided for any basement bin stores and other storage areas that are not capable of being naturally ventilated.

Passive fire ducting will be provided to protected lobbies in line with Part B of the building regulations.

2.12. Above Ground Soils and Wastes

A complete soils and wastes system, including traps, overflows, vents, access points, fire collars and acoustic insulation shall be provided. This shall include all above ground pipework and slung drainage to outfalls on the basement perimeter, where the Apartment Block is over a Basement.

Pipework below the floor slab of the Apartment Blocks that have no basement shall be by the Architect with outfall from the perimeter of the building to the foul sewer by the Structural Engineer.

All soil pipework and fittings shall comply with BS 4514:2001 or equivalent, uPVC pipework. All waste pipework and fittings up to 55 mm dia. shall comply with BS EN 1329- 1:2000, or equivalent MuPVC pipework unless otherwise indicated.

All soils and wastes pipework running through occupied spaces shall be insulated for condensation and acoustic purposes.

All pipework 40mm and above passing through fire rated structures shall be fitted with intumescent fire collars.

2.13. Protective Services Systems

As the Apartment Blocks are over 30 meters above ground level an apartment wet sprinkler system will be installed to BS 9251:2014 Cat 2.

The sprinkler water tanks and pumps will be located at basement level and water will be distributed to each apartment in medium grade steel pipes through risers in each Block to each apartment.

A fire hose reel installation will be installed at basement level as required under Part B building regulations.

Dry Riser systems will be installed within each Apartment Block to BS 9990, 2015

Handheld portable fire extinguishers shall be provided throughout in accordance with IS 291: 2015.

2.14. Electrical Supply and Electrical Distribution

Three new double substations shall be provided from the ESB Network to serve the buildings in conjunction with a centralized metering room in each building.

All non-residential units shall be supplied via a centralized metering room, 1no for each block within the development and located at ground level with external access.

A metal clad main distribution board will be provided in a dedicated cupboard in the basement area/ main lobby as applicable of each building. 25% spare capacity will be provided on all distribution boards. Surge protection will be provided on the incoming mains.

The main switchboard shall incorporate a digital power meter linked to the energy monitoring system. All metering will be installed in accordance with the IS 10101:2020 & ESB Networks specifications.

Sub distribution boards will be provided where necessary. The sub distribution boards will be located within purpose built fire-stopped enclosures.

Galvanised cable tray will be used as the distribution method from the main distribution board to the sub distribution boards. Galvanised steel trunking will be used to distribute all power and lighting circuits around the building, with final circuits run in galvanised steel conduit. Primary distribution routes will be located above the ceiling and will be easily accessible.

2.15. Power Services

All socket surface plates will be Part M compliant and installed to fit flush with the back box.

All circuits, including socket outlet circuits, shall be of radial design and no ring main circuits shall be provided.

Corridor and circulation spaces shall be equipped with twin sockets spaced as appropriate for use of cleaner's equipment.

No more than 4 no. twin socket outlets shall be on any one circuit.

One circuit serving the bathroom lighting and extract fan (and excluding any heating appliances or electric showers) wired in 1.5mm2 twin and earth PVC/PVC cable and protected by 10A/ 30mA RCBO AFDD.

Two (2) lighting circuits serving the remainder of each accommodation unit wired in 1.5mm2 twin and earth PVC/PVC cable and protected by 10A/ 30mA RCBO AFDD.

1 no. cooker circuit wired in 6.0mm2 PVC/PVC twin and earth cable protected by 32A MCB.

All socket circuits of accommodation units shall be wired in 2.5mm2 twin and earth PVC/PVC cable and protected by 20A/ 30mA RCBO AFDD.

All circuits, including lighting circuits, shall be provided with an individual neutral. The use of 'borrowed' neutrals constitutes an unsafe practice and is prohibited.

One circuit for the supply of the heat pump wired in 2.5mm2 twin and earth PVC/PVC cable and protected by 20A MCB located in the store room of each apartment.

2.16. Lighting

A ceiling rose and lamp holder shall be provided in all rooms except the bathroom of the accommodation units.

Light switches, shall, in general, be one way with light switches located on the open side just inside doorways.

Light switches shall be located between 900mm and 1200 mm above finished floor level in accordance with I.S.10101:2020

In common areas lighting and emergency lighting shall be provided. LED light sources shall be used on all lighting points. Emergency lighting shall be provided as per IS3217:2013 and shall utilize standalone emergency fittings and exit signs.

2.17. Communications

Telephone, Data and TV Services

Each apartment will be fitted with twin telephone & data points (RJ45) which will be interchangeable. These will be wired in Cat 6 standard cable.

All communications cables will be terminated into a communications box within each accommodation unit, located primarily in the store room of each unit.

It is intended to provide both Eir and Virgin media for telephone, broadband and TV services within each accommodation unit

Each unit will be fitted with twin co-axial outlets in the living rooms which shall be wired in screened co-axial cable.

The option of providing a central satellite television network will be considered in further detail to provide Satellite & Saorview television services to the development with a centrally located satellite dish and aerial equipment for each Apartment Block.

All necessary cabling shall be installed as part of this project however the Client will be responsible for making the respective applications for the installation of the communal satellite dish and aerial.

All television cables will be terminated into the same communications box within each accommodation unit located in the store room.

2.18. Security and Protection Access Control Strategy

Each unit shall be provided with an individual fire alarm system consisting of interlinked optical smoke detectors and heat detectors. The system within each unit shall be designed to IS3218:2013 to Fire Safety Certificate requirements.

The fire alarm equipment chosen shall have the option for the provision of a detector base incorporating volt-free relay contacts in lieu of a standard base.

The detectors shall be mains operated with rechargeable lithium cell back-up and interlinked. Electrical supply shall be taken from a designated RCBO AFFD on consumer unit.

A fire alarm detector and sounder of the landlords system shall also be installed within each accommodation unit located in the main entrance hallway with additional sounders positioned in each bedroom.

Fire alarm to the common area will be designed as per IS3218:2013 to Fire Safety Certificate requirements. A full addressable fire alarm panel with local heat/smoke detectors, sounders and manual call points will be provided throughout the building.

A full IP CCTV system shall be installed in throughout the building wired back to the Comms equipment where a hard drive with remote monitoring will be housed.

External cameras shall be high quality External Fixed Cameras, these external cameras will be fixed colour to mono (day/night) cameras, complete with high resolution 1/3” Super Dynamic Camera with 3.5-8mm vari-focal Auto-iris lens and Automatic adjustment for varying light conditions (artificial and natural). They shall be Infra-red illumination sensitive and housed in vandal protected cages. All cameras shall have anti-frost protection.

Infra-red Technology

Infra-red (IR) illumination shall be installed for all cameras. They will be solid state LED devices using surface mount technology (SMT). They shall provide an adoptive beam angle to allow the light to be adjusted to the appropriate scene. They shall be low voltage and low power with a dedicated power supply unit. The IR units and associated power supply units shall be enclosed in vandal proof enclosures with a minimum protection class of IP66.

Digital Recording & Transmission

The video security system shall provide a combination of video alarm verification and long duration evidential quality recording to provide a flexible system. The system shall have 30 days of continuous recording capacity and be complete with DVD writer.

2.19. Disabled Refuge

A disabled refuge system shall be provided in each Block of the development. Call points shall be installed in each designated disabled refuge area throughout the buildings, and linked to a control and indication panel located at the main entrance to each block at ground floor level.

2.20. Lightning Protection

A lightning protection installation will be provided in accordance with IS EN 623051 Part 4 and all components used shall comply with EN 50164 Part 1 and Part 2. The system will comprise of conductor tape installed in the walls connected to the metal roof and connected to earth rods in the ground.

2.21. Solar Photovoltaic Panels

Solar PV has been included as part of renewable strategy for the new buildings. The PV panels shall be installed at roof level at a 15 degree pitch south facing. The PV array for each apartment shall be wired back to an individual consumer unit and the PV array for the landlord area shall be wired back to the landlord board. The installation shall comply with the requirements of IS 10101:2020.

The below table indicates number of Solar PV panels provisionally required for each block.

Each panel is 340W.

Block	Domestic	Non-Domestic
Apt. Block 1	202	60
Apt. Block 2	184	40
Apt. Block 3	97	28
Apt Block 4	99	48
Block 1 Pharmacy & Office	n/a	12
Block 1: Office Rental Spaces	n/a	20
Block 1: Crèche Area	n/a	28
Block 2: Health Centre	n/a	28
Block 2 Office Rental Space	n/a	26

Table 2 : Provisional Quantity of Solar PV Panels

2.22. Transportation (NSBE) 66

Hydraulic passenger lifts will be installed to serve basement/ground and above floor levels as applicable.

2.23. Earthing and Bonding

Earthing and bonding arrangements shall comply with the requirements of IS 10101:2020.

The Earth bar of the consumer unit shall be used in place of a separate external neutral block. It shall be fitted with two double screw terminals to accept the incoming 16 sq. mm. main earth lead and 16 sq. mm. neutralising lead to the approval of the Engineer.

The main earth lead shall run from the earth electrode which shall be a galvanised earth rod not less than 16 mm. in diameter, driven vertically into the ground to a depth not less than 1200mm. The connection to the earth electrode shall be made by means of a nonferrous clamp protected by an approved water-repellent tape and enclosed in a flush mounted galvanised adaptable box measuring 100 mm. x 100 mm. x 50 mm. minimum. The earth lead shall be protected by a 20 mm. “Hydrodare” tubing or equal. Earth rods of adjoining dwellings shall not be driven closer than 3 m. to each other.

Earth continuity conductors shall be brought to all switch and lighting points in accordance with IS 10101:2020.

Connections of bonding leads to pipes and of the earthing lead to the earth rod shall be made by means of approved clamps. All earthing clamps shall be of an approved non-ferrous design having a separate terminal for the cable. Pipes must be thoroughly scraped and cleaned before a clamp is is fitted.

3. Part L Study and Approach:

3.1. Summary

This Part L study outlines the nature, scope and configuration of the design solutions to be provided for the Charlestown Place Development and verifies how the proposals can meet or exceed statutory requirements.

All dwellings and landlord areas will be designed to be energy efficient and flexible in use in order to minimise both energy consumption and associated CO_2 production. The design team recognise the need for the development to be designed and operated in a manner that reduces the environmental impact of each building.

We confirm that the development complies with, or exceeds, the requirements stipulated within both both TGD Part L: 2019 (dwellings) and TGD Part L: 2017 (buildings other than dwellings) in regard to renewable allowance, U-values, air tightness, energy performance and carbon performance.

The design philosophy for the development is to use sustainable options, energy efficient materials/equipment and to employ a holistic approach to the integration of the building fabric, its systems and its users. This will benefit the occupants by providing a healthy living environment with comfortable thermal and visual conditions and good indoor air quality. In addition, this philosophy ensures an energy efficient development, with reduced whole life operational costs and CO2 emissions, which in turn delivers a positive local and global environmental impact.

3.2. Part L Requirements

Each dwelling unit was provisionally assessed using DEAP Version 4.2.0 and the landlord areas were assessed through IES VE Compliance using the SBEMie v5.5.h.1 methodology.

The Dwelling Energy Assessment Procedure (DEAP) is the official Irish methodology for calculating the energy performance and associated carbon dioxide emissions for the provision of space heating, ventilation, water heating and lighting in dwellings. DEAP consists of a software tool and an associated guidance manual is a key component of the Irish Building Energy Rating (BER) scheme. DEAP is also the compliance tool specified in Part L of the Irish Building Regulations.

SBEMie is the official Irish methodology for calculating the energy performance and associated carbon dioxide emissions for the provision of space heating, ventilation, water heating and lighting in buildings other than dwellings. The SBEMie software tool is a key component of the Irish Building Energy Rating (BER) scheme.

The majority of this project falls under the remit of the requirements set out in L1 of the Building Regulations Part L 2019 Conservation of fuel and energy - dwellings, with guidance provided in Section 1. Part L1 applies to all works to new dwellings. The non-domestic areas in this project fall under the remit of the requirements set out in L5 of the Building Regulations Part L 2017 Conservation of fuel and energy - buildings other than dwellings, with guidance provided in Section 0. Part L5 applies to all works to new buildings other than dwellings.

Option A (Dimplex System) and option B (Comfortzone System) have been provisionally assessed and both achieve full Part L and NZEB compliance.

Each block achieves compliance with MPEPC and MPCPC through the average calculation mechanism outlined in Section 1.1.3 of TGD Part L 2019, where the average EPC and CPC for all dwellings in the building is no greater than the MPEPC and MPCPC respectively.

The average EPC and CPC are calculated by multiplying the EPC and CPC for each individual dwelling by the floor area of that dwelling, adding together and dividing the results by the sum of the floor areas of all dwellings. Common areas in the building are not included in this calculation.

Part L 2019 L1 requirements:

For new dwellings, the nearly zero energy performance requirements of this regulation shall be met by:

- providing that the energy performance of the building is such as to limit the calculated primary energy consumption and related carbon dioxide (CO_2) to that of a nearly zero energy building within the meaning of the Directive insofar as is reasonably practicable, when both energy consumption and carbon dioxide (CO_2) emissions are calculated using the Dwelling Energy Assessment Procedure (DEAP) published by Sustainable Energy Authority of Ireland;
- providing that, the nearly zero or very low amount of energy required is covered to a very significant extent by energy from renewable sources including energy from renewable sources produced on-site or nearby;
- limiting the heat loss and, where appropriate, availing of heat gain through the fabric of the building;
- providing and commissioning energy efficient space and water heating systems with efficient heat sources and effective controls;
- providing to the dwelling owner sufficient information about the building, the fixed building services, controls and their maintenance requirements so that the building can be operated in such a manner as to use no more fuel and energy than is reasonable.

Part L 2017 L5 requirements:

For new buildings other than dwellings, the requirements of L1 shall be met by: –

- providing that the energy performance of the building is such as to limit the calculated primary energy consumption and related Carbon Dioxide (CO2) emissions to a Nearly Zero Energy Building level insofar as is reasonably practicable, when both energy consumption and

Carbon Dioxide emissions are calculated using the Non-domestic Energy Assessment Procedure (NEAP) published by Sustainable Energy Authority of Ireland;

- providing that, the nearly zero or very low amount of energy required is covered to a very significant extent by energy from renewable sources produced on-site or nearby;
- limiting the heat loss and, where appropriate, availing of the heat gains through the fabric of the building;
- providing and commissioning energy efficient space heating and cooling systems, heating and cooling equipment, water heating systems, and ventilation systems, with effective controls;
- ensuring that the building is appropriately designed to limit need for cooling and, where air-conditioning or mechanical ventilation is installed, that installed systems are energy efficient, appropriately sized and adequately controlled;
- limiting the heat loss from pipes, ducts and vessels used for the transport or storage of heated water or air;
- limiting the heat gains by chilled water and refrigerant vessels, and by pipes and ducts that serve air conditioning systems;
- providing energy efficient artificial lighting systems and adequate control of these systems; and
- providing to the building owner or occupants sufficient information about the building, the fixed building services, controls and their maintenance requirements so that the building can be operated in such a manner as to use no more fuel and energy than is reasonable.

3.3. BER Targets and Results

Expected target results of the BER assessments for typical spaces are outlined in Table 5, based on the specifications outlined above. The exact specification, including technologies used, will be determined at detailed design stage. As previously noted in this report, to demonstrate that an acceptable primary energy consumption rate has been achieved, the calculated Energy Performance Coefficient (EPC) of a building should be no greater than the Maximum Permitted Energy Performance Coefficient (MPEPC). To demonstrate that an acceptable CO2 emission rate has been achieved, the calculated Carbon Performance Coefficient (CPC) should be no greater than the Maximum Permitted Carbon Performance Coefficient (MPCPC). Tables 3 and 4 give an over view of the inputs used in the DEAP and NEAP assessments.

DEAP Assessment Inputs		Value
Building Elements	External Wall U-Value (W/m²K)	0.18
	Door U-Value (W/m²K)	1.30
	Roof U-Value (W/m²K)	0.12
	Floor U-Value (W/m²K)	0.12
	Glazing U-Value (W/m²K)	1.30
	Glazing Solar Transmittance	0.71
	Glazing Frame Factor	0.70

DEAP Assessment Inputs		Value
	Thermal Bridging Factor (Default)	0.15
Water Heating	Option A: A Hot Water Heat Pump (Dimplex System)	
	Option B: An Exhaust Air Heat Pump (Comfortzone System)	
Lighting	% of low energy fixed lighting outlets	100
Internal Heat Capacity	Thermal mass category of dwelling	Medium
Distribution System Losses & Gains	Heating system control category	1
	Heating system responsiveness category	1
Pumps	Central heating pump qty.	Individual
	Pump electric consumption (kWh/yr)	50
	Heating system controlled by thermostat	Yes
Space Heating & Water Heating	Option A: A Hot Water Heat Pump (Dimplex System)	
	Option B: An Exhaust Air Heat Pump (Comfortzone System)	
Renewable & Energy Saving Technologies	Renewable system	Heat Pump / PV Array
	PV Array estimated power production	300

Table 3: DEAP Assessment Inputs

NEAP Assessment Inputs		Value
Building Elements	External Wall U-Value (W/m²K)	0.18
	Door U-Value (W/m²K)	1.30
	Roof U-Value (W/m²K)	0.12
	Floor U-Value (W/m²K)	0.12
	Glazing U-Value (W/m²K)	1.30
	Glazing Solar Transmittance	0.50
	Glazing Frame Factor	0.70
	Thermal Bridging Factor	0.15
Space Heating	Electric panel heaters	
Lighting	LED lighting throughout	
Renewable & Energy Saving Technologies	PV Array estimated power production	Value dependant on Building See Table 2

Table 4: NEAP Assessment Inputs

Building Type	Rating	Energy (EPC)	Carbon (CPC)	Renewable Requirement Achieved (RER)	NZEB Compliant
Apartments	BER A2 BER A3	< 0.3	< 0.35	✓	✓
Landlord Common Areas	BER A3	< 1.0	< 1.15	✓	✓

Table 5: Building Energy Rating Results

The results demonstrate full compliance for the Development with the requirements stipulated within TGD Part L: 2019 when using parameters described within this report in regard to U-values, air tightness M&E services and renewable allowance.

3.4. Estimated Annual Energy Consumption (Landlord and Common Areas)

The output from the SBEM calculations were used to quantify the predicted breakdown of energy consumption of the landlord common areas and a typical apartment.

The energy results show the landlord and common areas of the development are predicted to use 15.8 kWh/m2/year of electricity with the 29% of the annual energy consumption used to heat the common areas. Figure 3 breaks down the energy consumption monthly through the year.

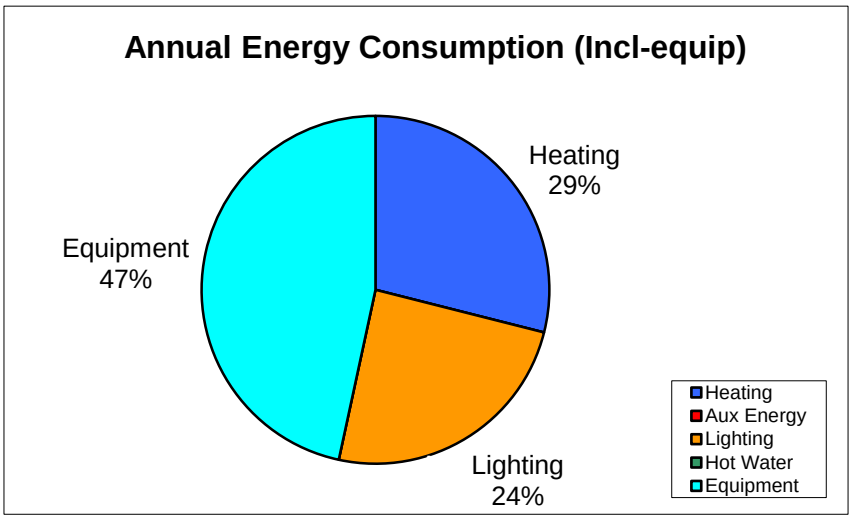


Figure 1: Landlord Areas - Annual Energy Consumption Including Equipment

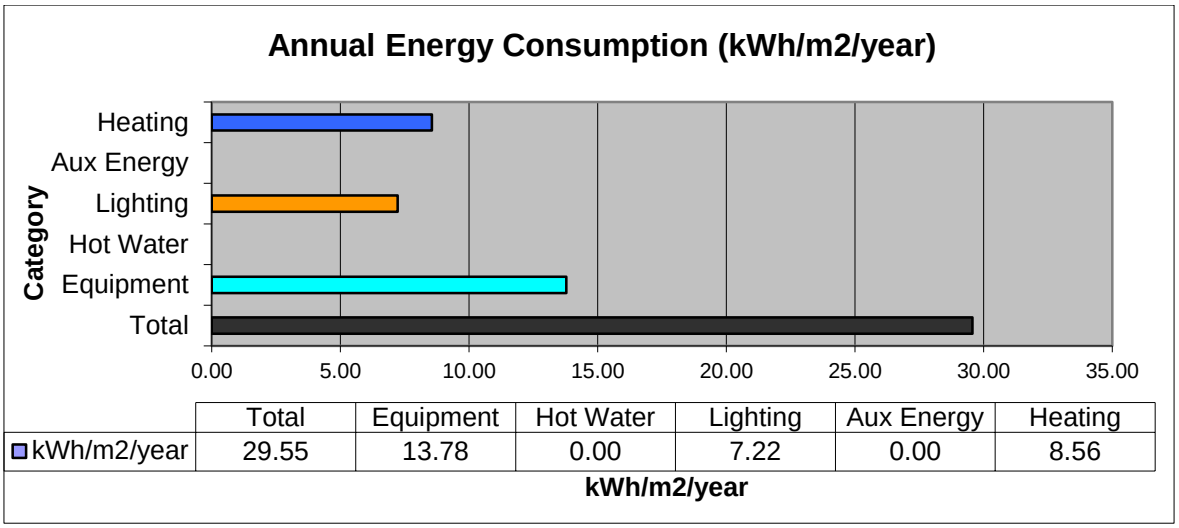


Figure 2: Landlord Areas - Annual Energy Consumption

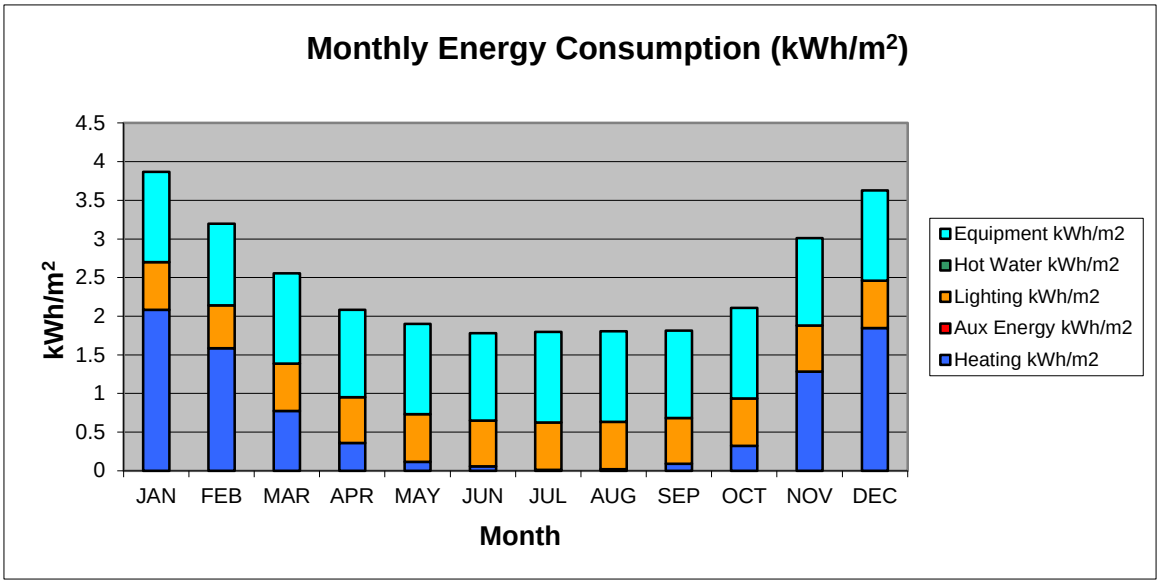


Figure 3: Landlord Areas - Monthly Energy Consumption

Energy results also show that a typical apartment is predicted to use 93.6 kWh/m2/year of electricity with the 33% and 45% of the annual energy consumption used for space heating and domestic hot water heating. Figure 6 breaks down the energy consumption monthly through the year.

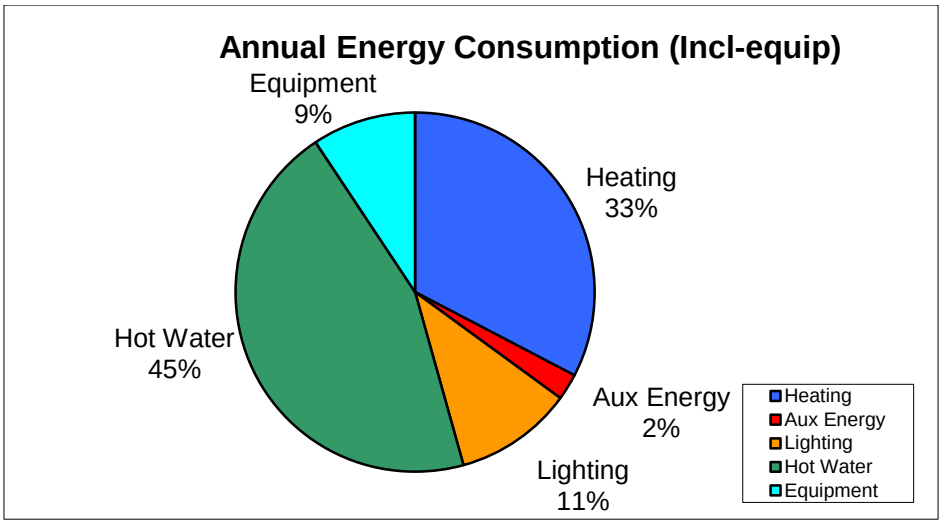


Figure 4: Typical Apartment - Annual Energy Consumption Including Equipment

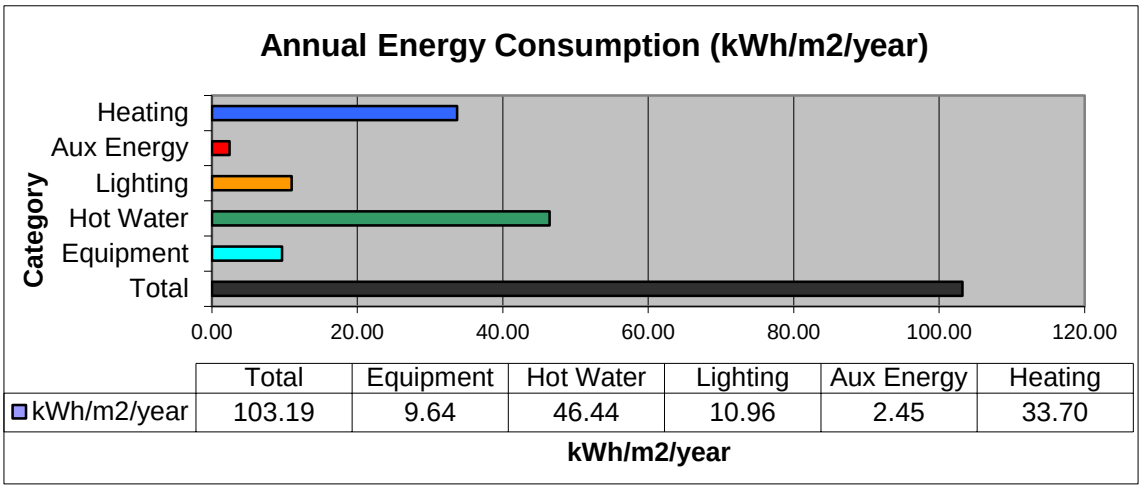


Figure 5: Typical Apartment - Annual Energy Consumption

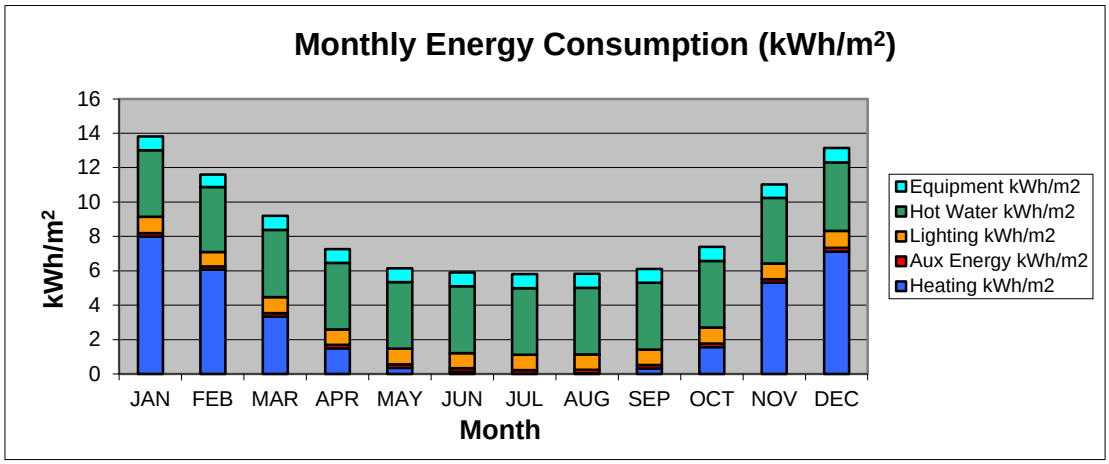
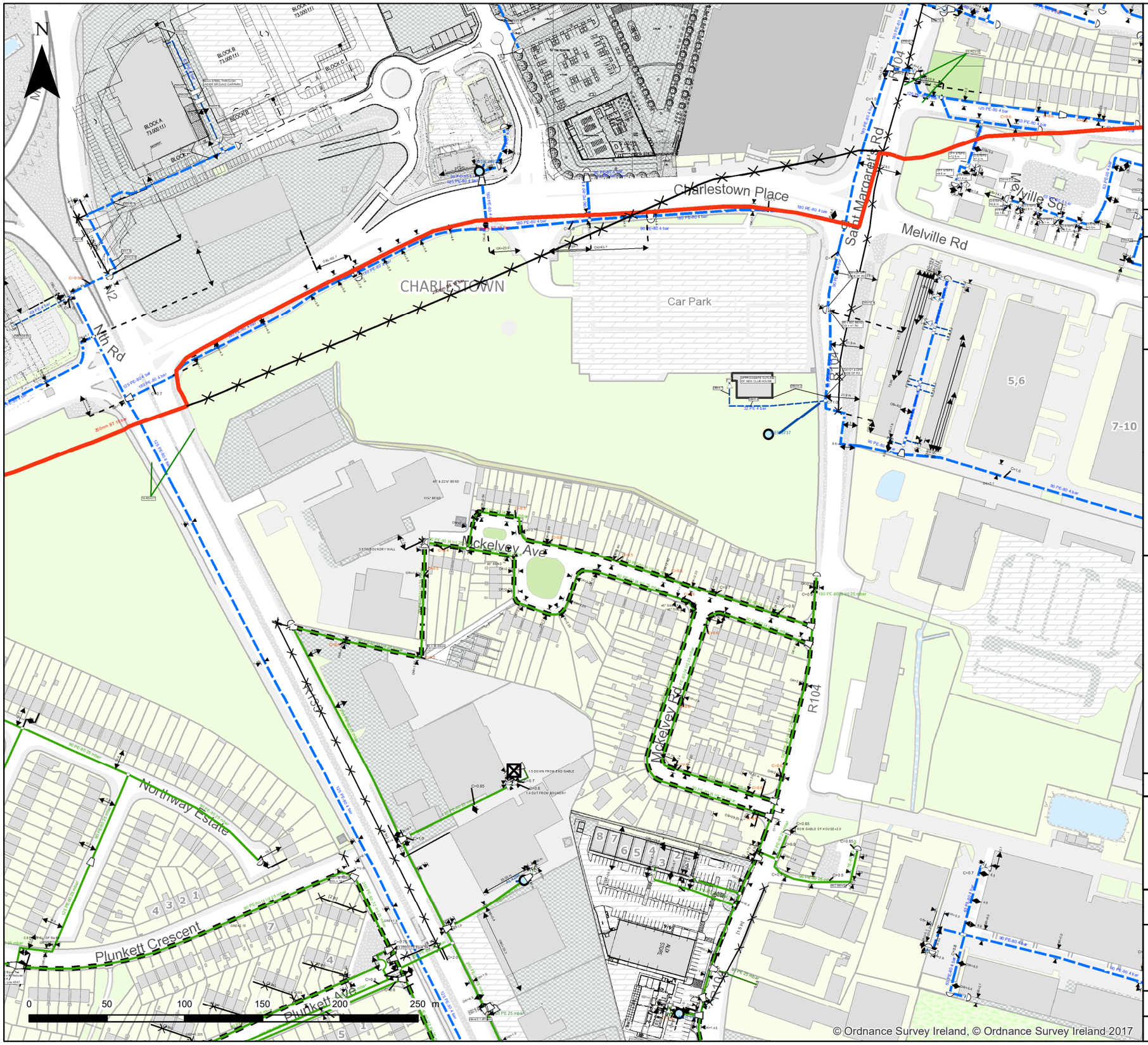


Figure 6: Typical Apartment - Monthly Energy Consumption

Appendix 1 : Utility Network Maps

- Gas Network Ireland
- ESB Networks
- EIR
- Virgin Media



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 1850 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 (1890 289 389) or can be downloaded at www.hsa.ie.

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

Aurora TELECOM

Aurora Telecom Queries - 01-8926166 (Office Hours)
Aurora_Network_Queries@gasnetworks.ie
Aurora Telecom Emergency Only 1850 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	CP Test Point		Protection (Slabbing)
	End Cap		Protection (Sleeve)
	Hot Tap		Reducer
	Installation		Service Terminator
	Valve		Tee
	Mains Verification**		Transition

** Please contact GNI on 1850-427747 for specific information

DIAL BEFORE YOU DIG 1850 42 77 47
In Emergency call 1850 20 50 50 Gas Networks Ireland

Gas Networks Ireland

GAS NETWORK INFORMATION

Description:

Location: 712690,740331

Plot Date: 19/01/2021 16:37	Scale: 2500 @ A3
Plotted By: 2548	Ref ID: *2548_19012021163733*

ESB Networks

TITLE: 20210120-024_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: 20-Jan-2021

** SCALE: 1:1500

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

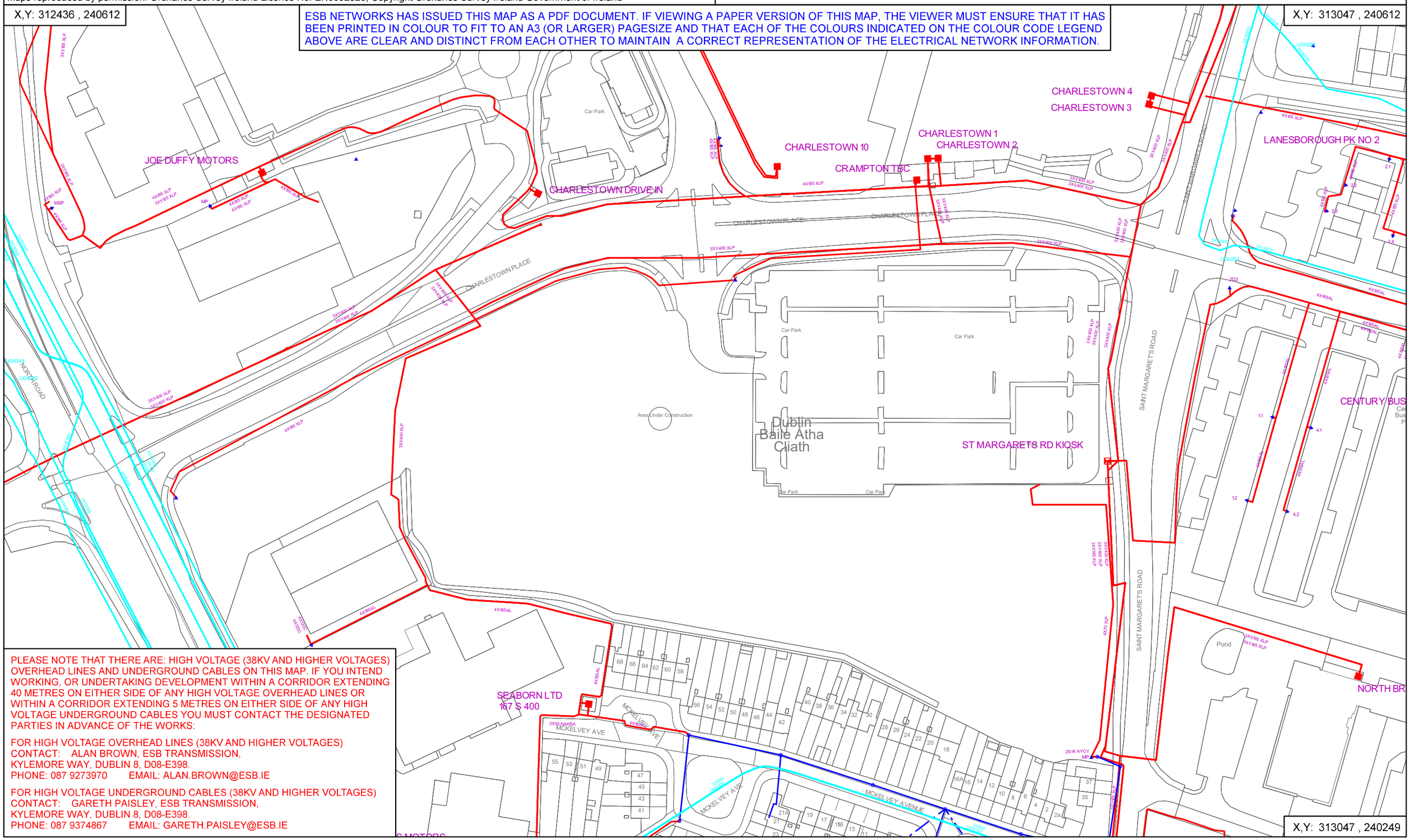
WARNING

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.

X,Y: 312436 , 240612

X,Y: 313047 , 240612

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.

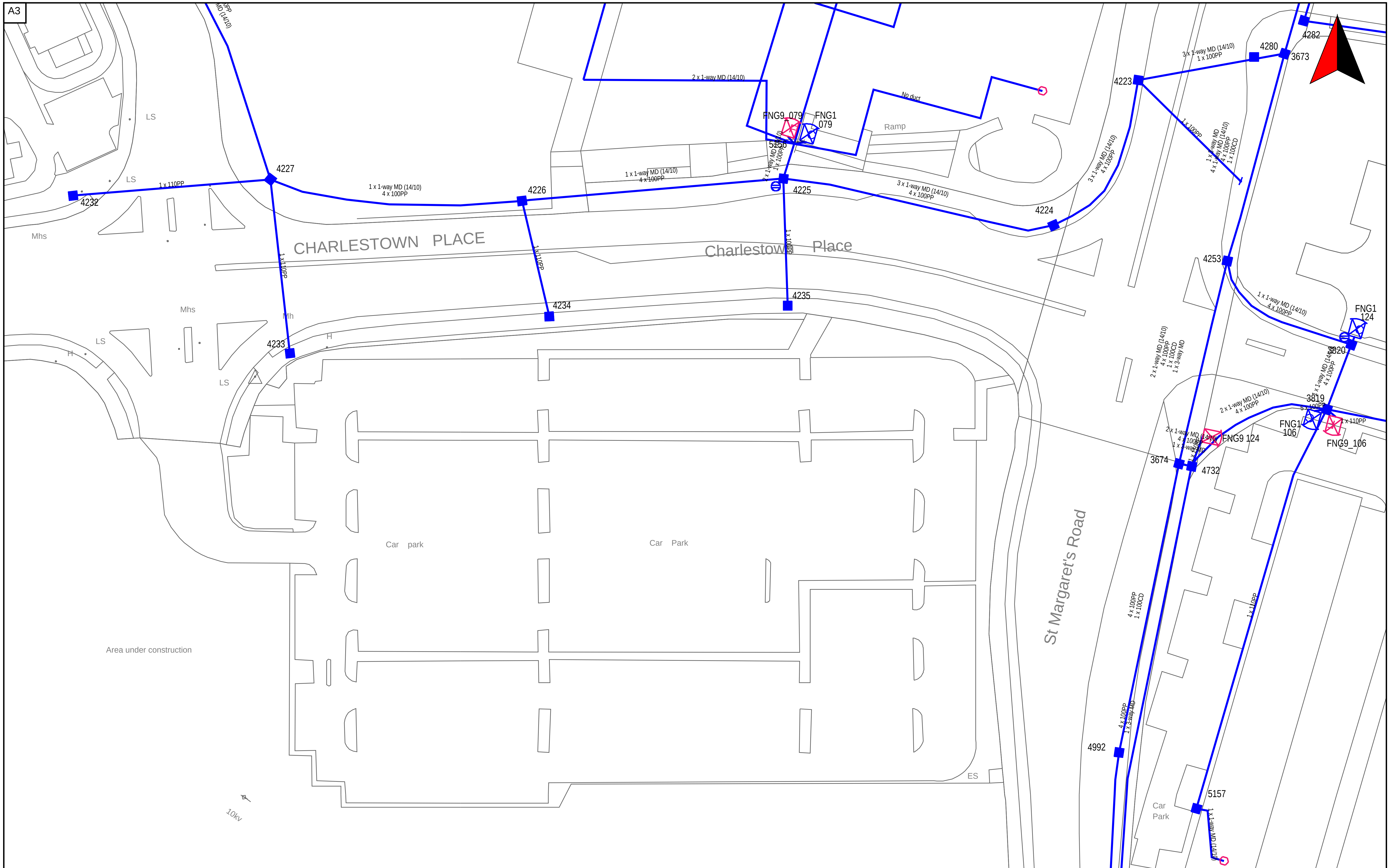


PLEASE NOTE THAT THERE ARE: HIGH VOLTAGE (38KV AND HIGHER VOLTAGES) OVERHEAD LINES AND UNDERGROUND CABLES ON THIS MAP. IF YOU INTEND WORKING, OR UNDERTAKING DEVELOPMENT WITHIN A CORRIDOR EXTENDING 40 METRES ON EITHER SIDE OF ANY HIGH VOLTAGE OVERHEAD LINES OR WITHIN A CORRIDOR EXTENDING 5 METRES ON EITHER 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: 313047 , 240249



PLANT REQUESTED FROM eircom emaps CBYD SERVICE

https://cbyd.emaps.eircom.ie/

Scale: 1:750

Irish National Grid Co-Ordinates
Centre XY: 312852 m, 240468 m

Date
27/01/2021

emaps CBYD

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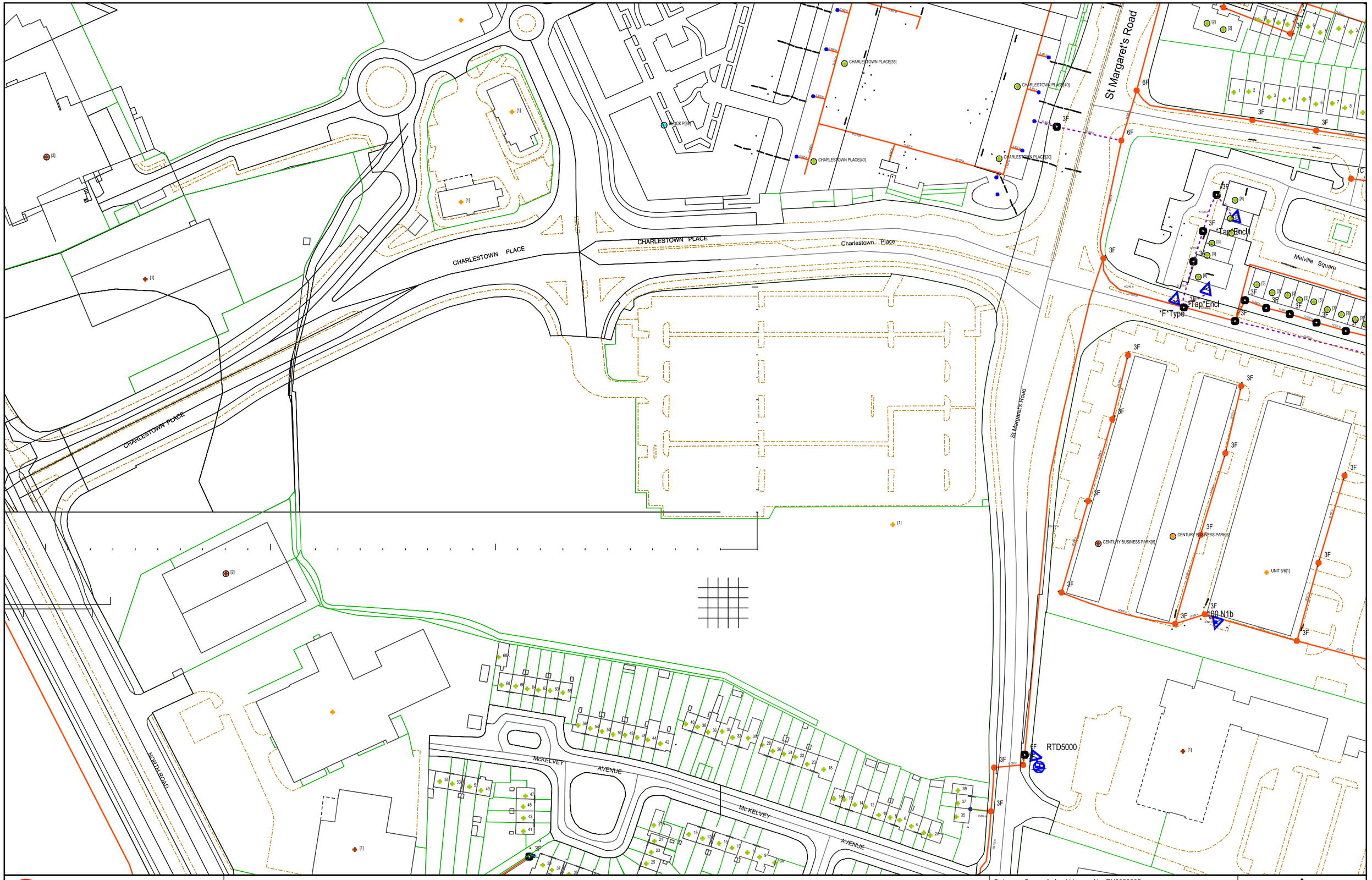


Unit 7, Westgate Business Park, Ballymount, Dublin 24.	PROJECT NAME DESIGNED BY:	Ordnance Survey Ireland Licence No. EN0023805 (c) Ordnance Survey Ireland and Government of Ireland Produced on: 27/01/2021

@ A3

Appendix 2 : Proposed Site Lighting and Services Drawings

- 20624-VCE-ZZ-XX-DR-E-1000 - Public lighting layout
- 20624-VCE-ZZ-XX-DR-E-1001 - External landscape lighting layout
- 20624-VCE-ZZ-XX-DR-ME-1000 - Site services layout, ESB, Natural Gas & Telecommunications

LEGEND:

EXISTING LIGHTING COLUMN

NEW CU–PHOSCO P852 3000k LIGHTING COLUMN
(12m HIGH ON MAIN ROAD & 8M FOR RESIDENTIAL)

MP EXISTING MINI PILLAR

Isolines

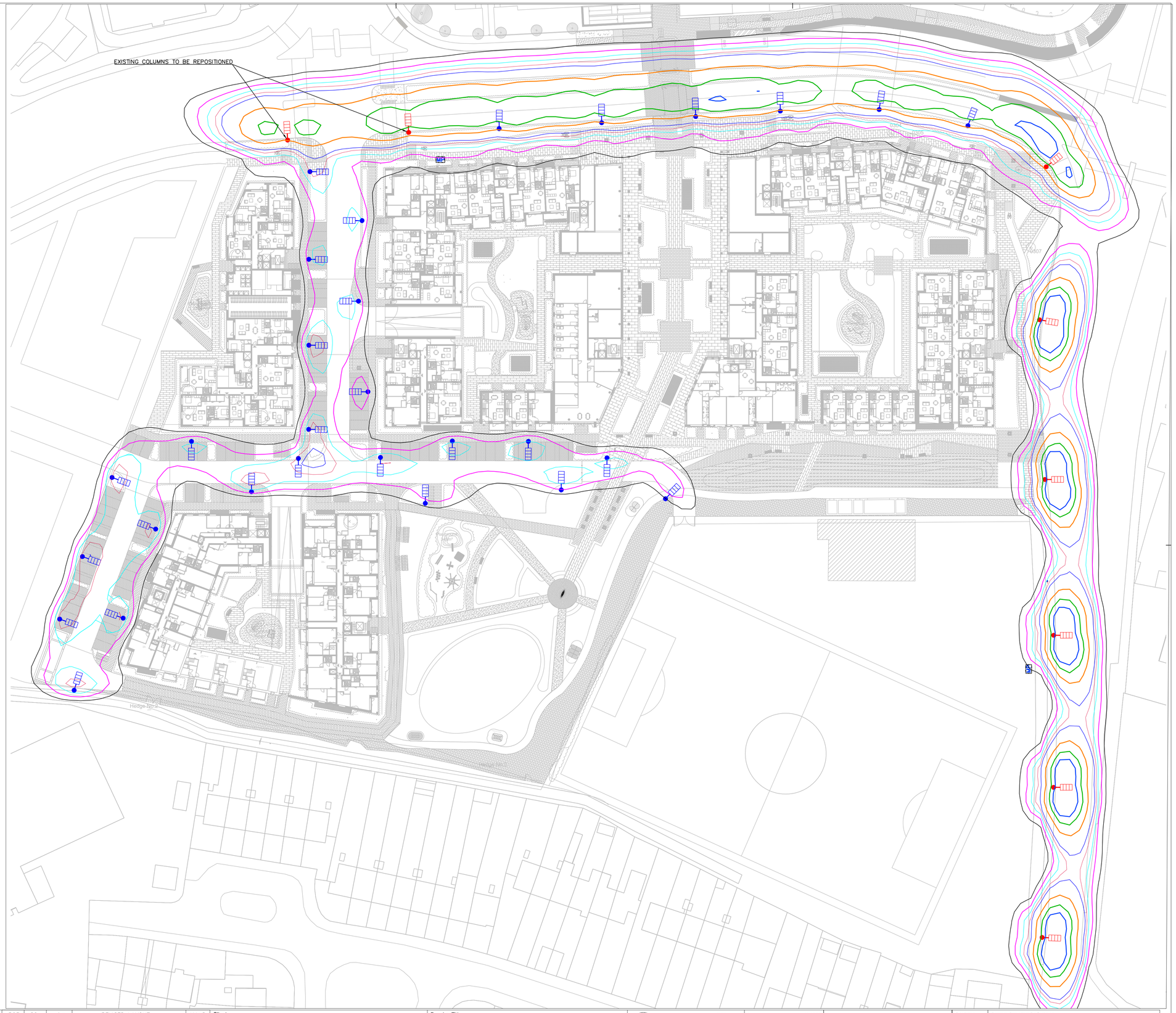
- 2.0 lx
- 3.0 lx
- 4.0 lx
- 5.0 lx
- 6.0 lx
- 10.0 lx
- 15.0 lx
- 20.0 lx

EXISTING COLUMN LUMINAIRE

EXISTING COLUMN LIGHTING

NEW CU–PHOSCO P852
PUBLIC LIGHTING LUMINAIRE

EXISTING MINI PILLAR



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Rev	Status	Date	Description	D.E.
P03	S2	May'21	REVISED LAYOUT	J.Mc.D
P02	S2	APR'21	SUITABLE FOR INFORMATION	J.Mc.D
P01	S2	JAN'21	SUITABLE FOR INFORMATION	J.Mc.D
P03	S0	NOV'20	REVIEW	J.Mc.D
P02	S0	SEPT'20	REVIEW	J.Mc.D
P01	S0	APR'20	REVIEW	J.Mc.D

Client
PUDDENHILL PROPERTY LIMITED

Project Title
CHARLESTOWN PLACE SHD

Drawing Title
PUBLIC LIGHTING LAYOUT

Dublin 01 4872300
Cork 021 2375080
Roscommon 090 6602380
Website www.varming.ie

Engineering for the Future

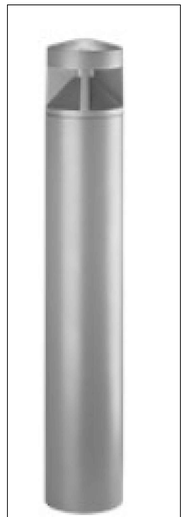
Varming Consulting Engineers Ltd.

Revision P03
Project Drawing Reference 20624-VCE-ZZ-XX-DR-E-1000
Status S2
Varming Project Number 20624
Date April 2021
Checked By D.W
Drawn By J.Mc.D
Scale 1:500@A1

Titleblock Revision: 2020_1

Type A Luminaire:

Diana Fisso LED Uplighter



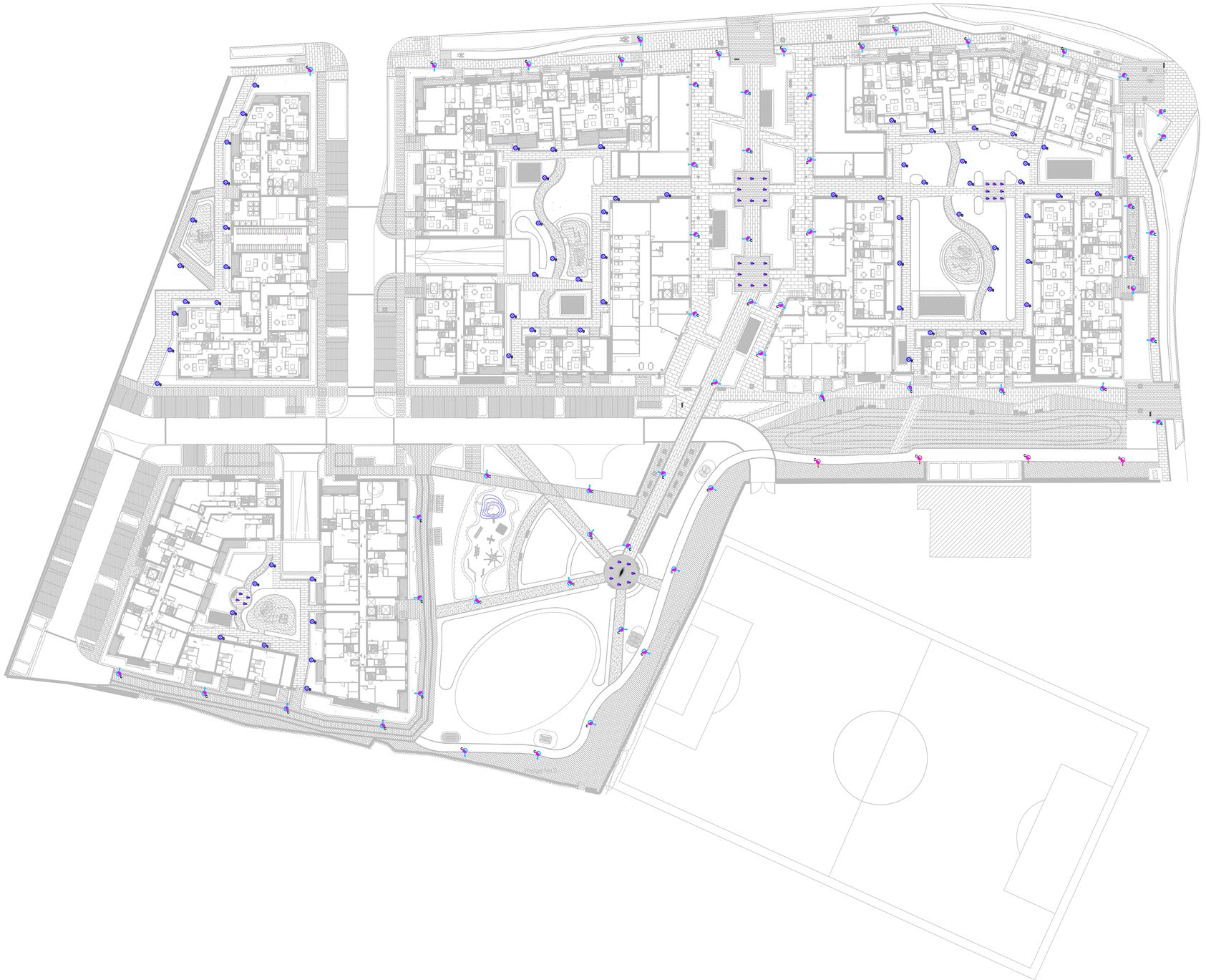
Type B Luminaire:

Glamox 034 3000k LED 1m Bollard

Type C Luminaire:

Phosco P853 R3B 8W 3000k
mounted on 6m column

Type C Luminaire C/W Louvre



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Rev	Status	Date	Description	D.E.
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P01	S2	JAN'21	SUITABLE FOR INFORMATION	J.Mc.D
P02	S3	AUG'20	FOR REVIEW	J.Mc.D
P01	S3	JUNE'20	FOR REVIEW	J.Mc.D

Client: PUDDENHILL PROPERTY LIMITED

Project Title: CHARLESTOWN PLACE SHD

Drawing Title: EXTERNAL LANDSCAPE LIGHTING LAYOUT

Dublin 01 4872300
Cork 021 2375080
Roscommon 090 6602380
Website www.varming.ie

Engineering for the Future

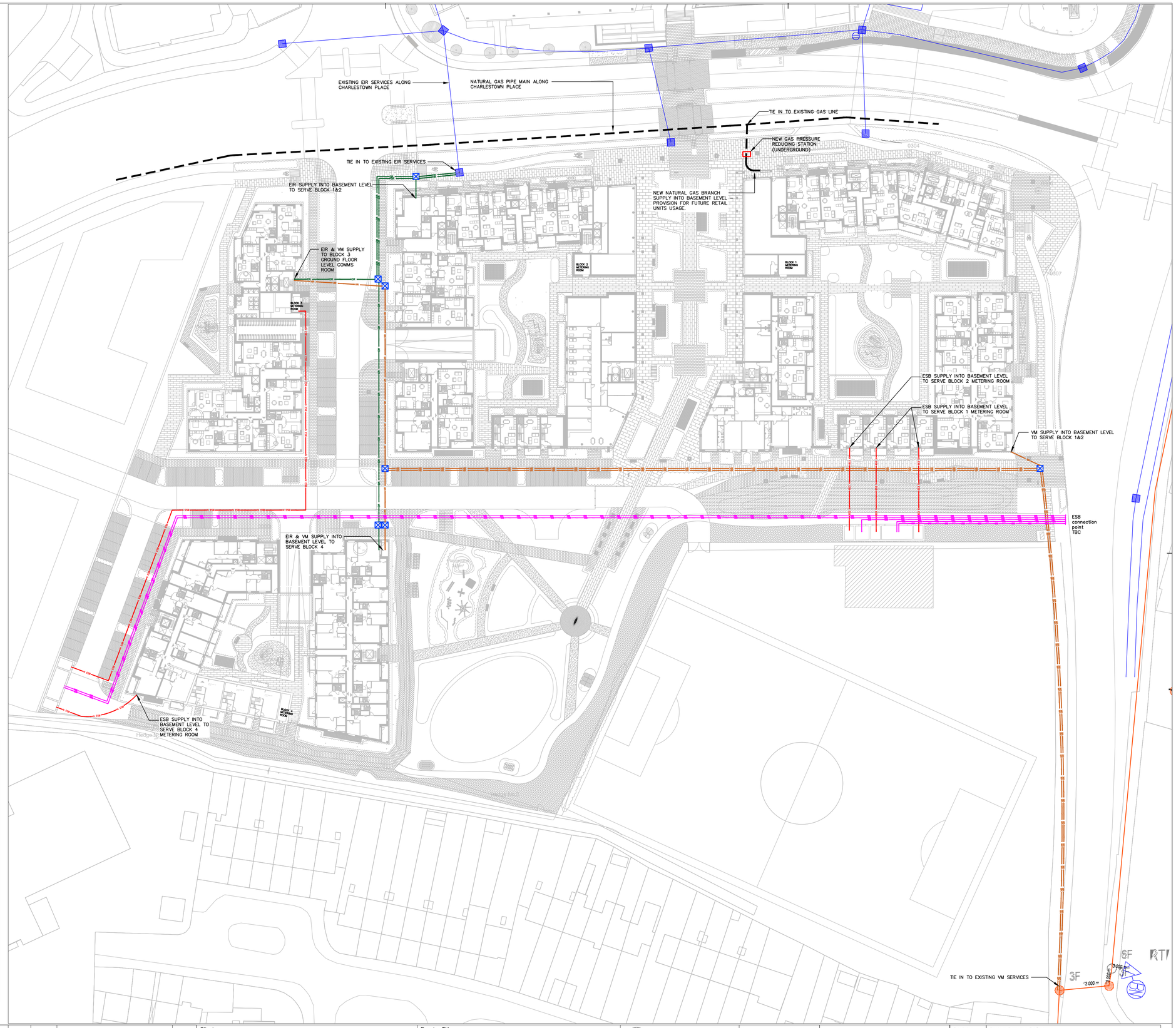
Varming Consulting Engineers Ltd.

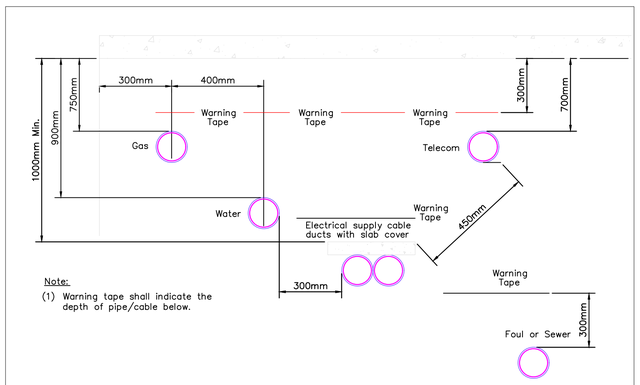
Revision	Project Drawing Reference		
P03	20624-VCE-ZZ-XX-DR-E-1001		
Status	Varming Project Number		
S2	20624		
Date	Checked By	Drawn By	Scale
APRIL 2021	D.W	J.Mc.D	1:500@A1

Titleblock Revision: 2020_1

LEGEND:

- N ESB — 1 NO. 160ø ESB PVC UNDERGROUND DUCT RED
- ESB — 2 NO. 125ø ESB PVC UNDERGROUND DUCT RED
- VIR — 1 NO. 110ø VIRGIN MEDIA PVC UNDERGROUND DUCT
- EIR — 1 NO. 110ø VIRGIN MEDIA PVC UNDERGROUND DUCT
- NATURAL GAS PIPE
- EXISTING EIR
- EXISTING VIRGIN MEDIA





Note:
(1) Warning tape shall indicate the depth of pipe/cable below.

TYPICAL – SITE SERVICES SHOWING SEPARATION DISTANCES

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P03	S2	May'21	REVISED LAYOUT	J.Mc.D
P02	S2	APR'21	SUITABLE FOR INFORMATION	J.Mc.D
P01	S2	JAN'21	SUITABLE FOR INFORMATION	J.Mc.D

Client: PUDDENHILL PROPERTY LIMITED

Project Title: CHARLESTOWN PLACE SHD

Drawing Title: SITE SERVICES LAYOUT ESB, NATURAL GAS & TELECOMMUNICATIONS

Dublin 01 4872300
Cork 021 2375080
Roscommon 090 6602380
Website www.varming.ie
Engineering for the Future
Varming Consulting Engineers Ltd.

Revision: P03
Project Drawing Reference: 20624-VCE-ZZ-XX-DR-ME-1000
Status: S2
Varming Project Number: 20624
Date: APRIL 2021
Checked By: D.W
Drawn By: J.Mc.D
Scale: 1:500@A1

Titleblock Revision: 2020_1

Appendix 3 : Proposed Roof Plans with PV Panels Layouts

- 20624-VCE-01-RF-DR-E-900 – Block 1 Solar PV requirement for landlord areas and apartments
- 20624-VCE-02-RF-DR-E-900 – Block 2 Solar PV requirement for landlord areas and apartments
- 20624-VCE-03-RF-DR-E-900 – Block 3 Solar PV requirement for landlord areas and apartments
- 20624-VCE-04-RF-DR-E-900 – Block 4 Solar PV requirement for landlord areas and apartments

12 NO. 320W PV PANELS TO SERVE LANDLORD CORE AREA.
1 NO. INVERTER FOR PV ARRAY

1 NO. 320W PV PANELS TO SERVE EACH APARTMENT.
33 NO. APARTMENTS FOR THIS CORE.
1 NO. MICRO INVERTER PER PV APT.

28 NO. 320W PV PANELS TO RETAIL AREAS.
1 NO. INVERTER FOR PV ARRAY

1 NO. 320W PV PANELS TO SERVE EACH APARTMENT.
49 NO. APARTMENTS FOR THIS CORE.
1 NO. MICRO INVERTER PER PV APT.

12 NO. 320W PV PANELS TO SERVE LANDLORD CORE AREA.
1 NO. INVERTER FOR PV ARRAY

28 NO. 320W PV PANELS TO SERVE CRECHE UNIT
1 NO. INVERTER PER PV ARRAY

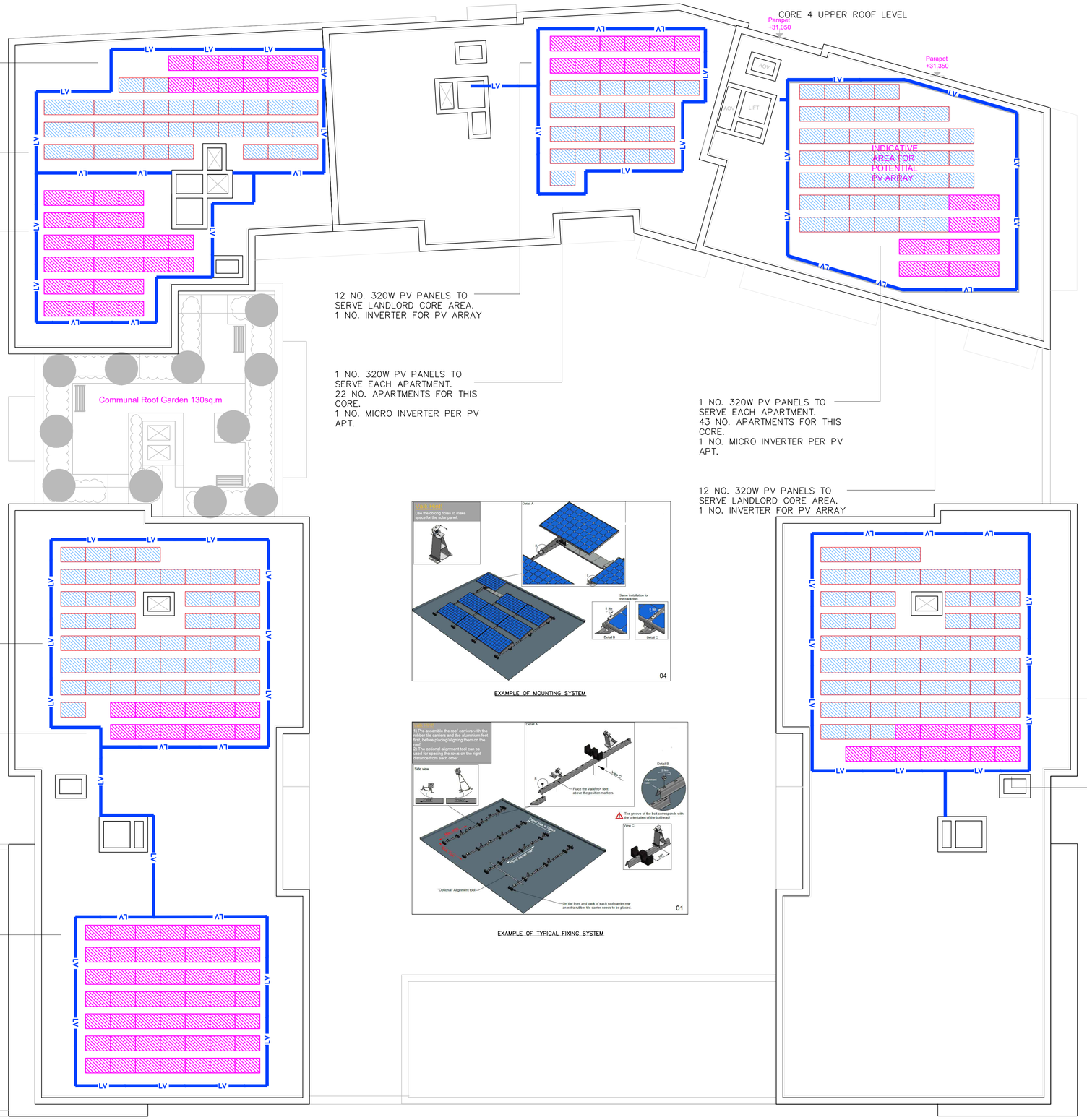
20 NO. 320W PV PANELS TO SERVE RETAIL/OFFICE UNITS.
1 NO. INVERTER PER PV ARRAY

LEGEND:

250mm LOW VOLTAGE CABLE TRAY — LV

320W PV PANEL FOR APTS

320W PV PANEL FOR LANDLORD



12 NO. 320W PV PANELS TO SERVE LANDLORD CORE AREA.
1 NO. INVERTER FOR PV ARRAY

1 NO. 320W PV PANELS TO SERVE EACH APARTMENT.
22 NO. APARTMENTS FOR THIS CORE.
1 NO. MICRO INVERTER PER PV APT.

1 NO. 320W PV PANELS TO SERVE EACH APARTMENT.
43 NO. APARTMENTS FOR THIS CORE.
1 NO. MICRO INVERTER PER PV APT.

12 NO. 320W PV PANELS TO SERVE LANDLORD CORE AREA.
1 NO. INVERTER FOR PV ARRAY

EXAMPLE OF MOUNTING SYSTEM

EXAMPLE OF TYPICAL FIXING SYSTEM

1 NO. 320W PV PANELS TO SERVE EACH APARTMENT.
53 NO. APARTMENTS FOR THIS CORE.
1 NO. MICRO INVERTER PER PV APT.

12 NO. 320W PV PANELS TO SERVE LANDLORD CORE AREA.
1 NO. INVERTER FOR PV ARRAY

General Notes

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B. ALL ERRORS & OMISSIONS TO BE REPORTED TO THE CONSULTING ENGINEER

C. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ARCHITECTS AND STRUCTURAL ENGINEER'S DRAWINGS.

D. REFER TO DOCUMENT REGISTER FOR DESCRIPTION OF STATUS CODES.

Rev	Status	Date	Description	D.E.
P02	S2	MAY'21	SUITABLE FOR INFORMATION	JMCD
P01	S2	JAN'21	SUITABLE FOR INFORMATION	M.O.R

Client: PUDDENHILL PROPERTY LTD.

Project Title: CHARLESTOWN PLACE SHD FINGLAS, DUBLIN 11.

Drawing Title: BLOCK 1 SOLAR PV REQUIRMENT FOR LANDLORD AREAS AND APARTMENTS (DIMPLEX OPTION)

Dublin 01 4872300
Cork 021 2375080
Roscommon 090 6602380
Website www.varming.ie

Engineering for the Future

Varming Consulting Engineers Ltd.

Revision	Project Drawing Reference
P02	20624-VCE-01-RF-DR-E-900
Status: S2	Varming Project Number: 20624
Date: AUGUST 2020	Checked By: B.D. / Drawn By: E.O.S / Scale: 1:150@A1

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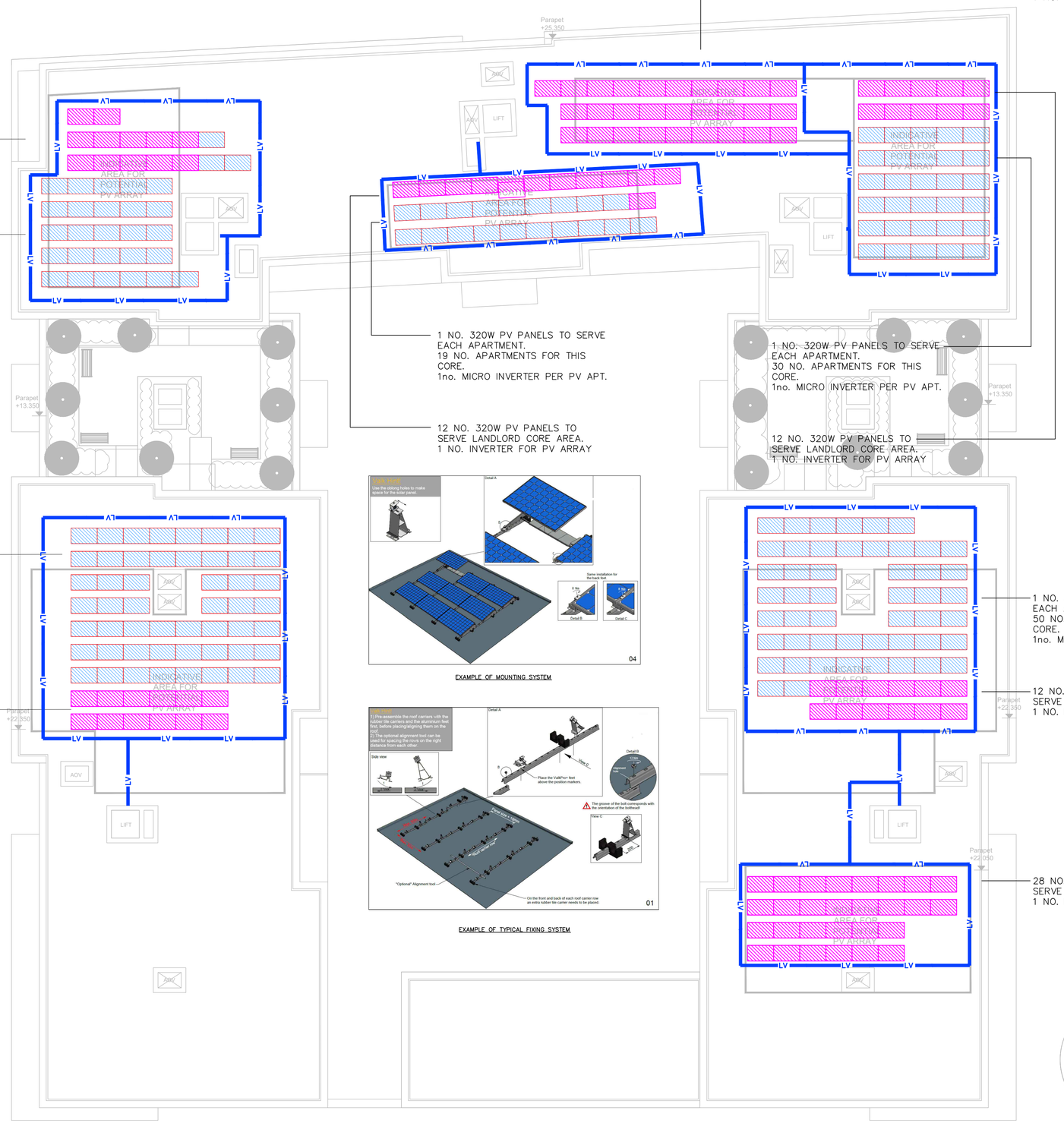
12 NO. 320W PV PANELS TO SERVE LANDLORD CORE AREA.
1 NO. INVERTER FOR PV ARRAY

1 NO. 320W PV PANELS TO SERVE EACH APARTMENT.
29 NO. APARTMENTS FOR THIS CORE.
1no. MICRO INVERTER PER PV APT.

1 NO. 320W PV PANELS TO SERVE EACH APARTMENT.
52 NO. APARTMENTS FOR THIS CORE.
1no. MICRO INVERTER PER PV APT.

12 NO. 320W PV PANELS TO SERVE LANDLORD CORE AREA.
1 NO. INVERTER FOR PV ARRAY



1 NO. 320W PV PANELS TO SERVE EACH APARTMENT.
19 NO. APARTMENTS FOR THIS CORE.
1no. MICRO INVERTER PER PV APT.

12 NO. 320W PV PANELS TO SERVE LANDLORD CORE AREA.
1 NO. INVERTER FOR PV ARRAY

EXAMPLE OF MOUNTING SYSTEM

EXAMPLE OF TYPICAL FIXING SYSTEM

28 NO. 320W PV PANELS TO SERVE RETAIL AREAS.
1 NO. INVERTER FOR PV ARRAY

1 NO. 320W PV PANELS TO SERVE EACH APARTMENT.
30 NO. APARTMENTS FOR THIS CORE.
1no. MICRO INVERTER PER PV APT.

12 NO. 320W PV PANELS TO SERVE LANDLORD CORE AREA.
1 NO. INVERTER FOR PV ARRAY

1 NO. 320W PV PANELS TO SERVE EACH APARTMENT.
50 NO. APARTMENTS FOR THIS CORE.
1no. MICRO INVERTER PER PV APT.

12 NO. 320W PV PANELS TO SERVE LANDLORD CORE AREA.
1 NO. INVERTER FOR PV ARRAY

28 NO. 320W PV PANELS TO SERVE HEALTH CENTRE.
1 NO. INVERTER FOR PV ARRAY

LEGEND:

250mm LOW VOLTAGE CABLE TRAY — LV

320W PV PANEL FOR APTS

320W PV PANEL FOR LANDLORD

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P02	S2	MAY'21	SUITABLE FOR INFORMATION	JMCD
P01	S2	JAN'21	SUITABLE FOR INFORMATION	M.O.R

Client: PUDDENHILL PROPERTY LTD.

Project Title: CHARLESTOWN PLACE SHD FINGLAS, DUBLIN 11.

Drawing Title: BLOCK 2 SOLAR PV REQUIRMENT FOR LANDLORD AREAS AND APARTMENTS (DIMPLEX OPTION)

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Cork 021 2375080
Roscommon 090 6602380
Website www.varming.ie
Engineering for the Future
Varming Consulting Engineers Ltd.

Revision	Project Drawing Reference
P02	20624-VCE-02-RF-DR-E-900
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Date: JUNE 2020	Checked By: B.D. / Drawn By: E.O.S / Scale: 1:100@A1

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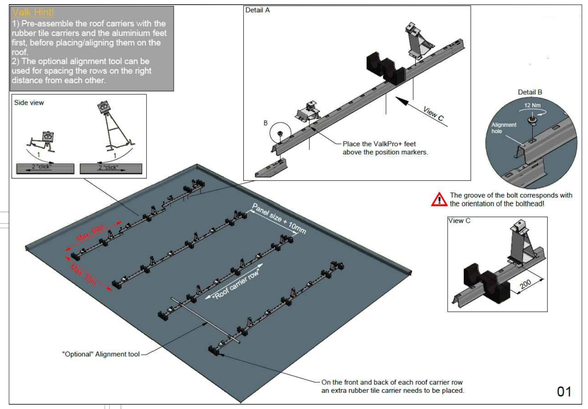

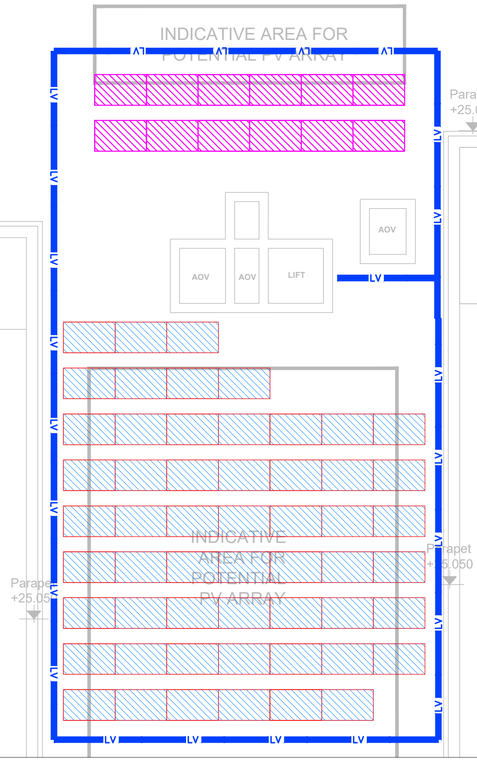

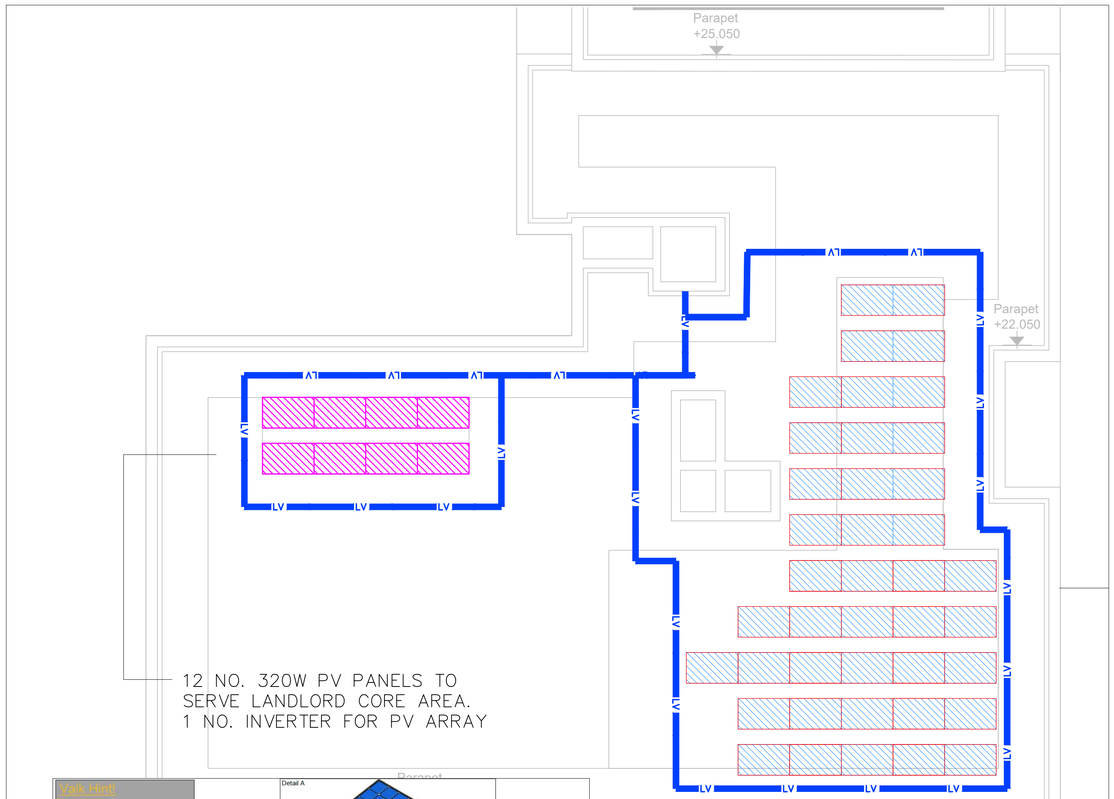

LEGEND:

250mm LOW VOLTAGE CABLE TRAY ━ LV ━

320W PV PANEL FOR APTS ▨

320W PV PANEL FOR LANDLORD ▨

Valk Hint!

1) Pre-assemble the roof carriers with the rubber tile carriers and the aluminium feet first, before placing/aligning them on the roof.

2) The optional alignment tool can be used for spacing the rows on the right distance from each other.

The groove of the bolt corresponds with the orientation of the bolthead!

Place the ValkPro+ feet above the position markers.

On the front and back of each roof carrier row an extra rubber tile carrier needs to be placed.

EXAMPLE OF TYPICAL FIXING SYSTEM

12 NO. 320W PV PANELS TO
SERVE LANDLORD CORE AREA.
1 NO. INVERTER FOR PV ARRAY

1 NO. 320W PV PANELS TO
SERVE
EACH APT
1 NO. MICRO INVERTER PER PV
ARRAY
55no. APT FOR THIS AREA

12 NO. 320W PV PANELS TO
SERVE LANDLORD CORE AREA.
1 NO. INVERTER FOR PV ARRAY

Valk Hint!

Use the oblong holes to make space for the solar panel.

Same installation for the back feet.

EXAMPLE OF MOUNTING SYSTEM

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P02	S2	JAN'21	SUITABLE FOR INFORMATION	JMCD
P01	S2	JAN'21	SUITABLE FOR INFORMATION	M.O.R

Client
PUDDENHILL PROPERTY LTD.

Project Title
CHARLESTOWN PLACE SHD
FINGLAS, DUBLIN 11.

Drawing Title
BLOCK 3
SOLAR PV REQUIRMENT FOR
LANDLORD AREAS AND
APARTMENTS (DIMPLEX OPTION)

MISO MEMBER
ENGINEERS IRELAND cpd ACCREDITED COMPANY
IHEEM
QUALITY ISO 9001:2015 NSAI Certified
HEALTH & SAFETY ISO 45001:2018 NSAI Certified
ENVIRONMENT ISO 14001:2015 NSAI Certified
BRE GLOBAL CERTIFICATION BIM10033

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Roscommon	090 6602380
Website	www.varming.ie

Engineering for the Future

Varming
Consulting Engineers Ltd.

Revision	Project Drawing Reference		
P02	20624-VCE-03-RF-DR-E-900		
Status	Varming Project Number		
S2	20624		
Date	Checked By	Drawn By	Scale
JUNE 2020	A.N.	M.O.R.	1:100@A1

Titleblock Revision: 2020_1

LEGEND:

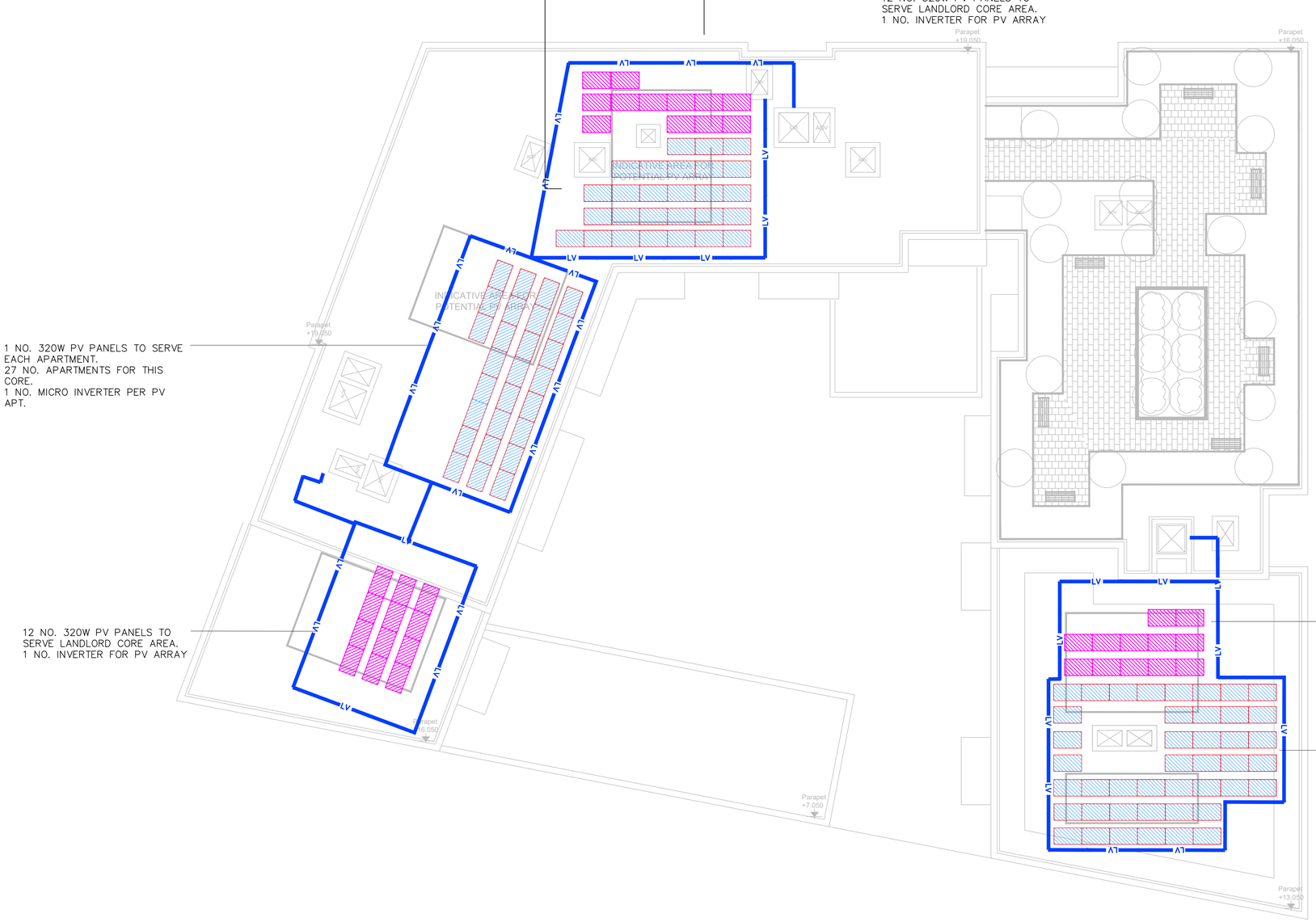
250mm LOW VOLTAGE CABLE TRAY — LV

320W PV PANEL FOR APTS

320W PV PANEL FOR LANDLORD

1 NO. 320W PV PANELS TO SERVE EACH APARTMENT.
27 NO. APARTMENTS FOR THIS CORE.
1no. MICRO INVERTER PER PV APT.

12 NO. 320W PV PANELS TO SERVE LANDLORD CORE AREA.
1 NO. INVERTER FOR PV ARRAY

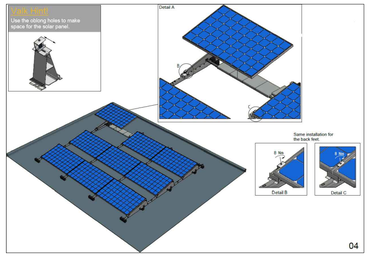


1 NO. 320W PV PANELS TO SERVE EACH APARTMENT.
27 NO. APARTMENTS FOR THIS CORE.
1 NO. MICRO INVERTER PER PV APT.

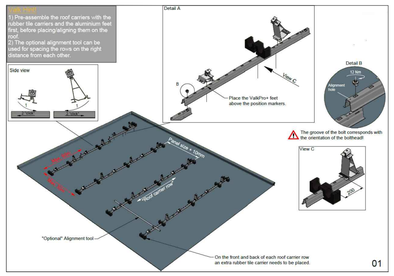
12 NO. 320W PV PANELS TO SERVE LANDLORD CORE AREA.
1 NO. INVERTER FOR PV ARRAY

12 NO. 320W PV PANELS TO SERVE LANDLORD CORE AREA.
1 NO. INVERTER FOR PV ARRAY

1 NO. 320W PV PANELS TO SERVE
EACH APT
1 NO. MICRO INVERTER PER PV ARRAY
43no. APT FOR THIS AREA



EXAMPLE OF MOUNTING SYSTEM



EXAMPLE OF TYPICAL FIXING SYSTEM

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P01	S2	JAN'21	SUITABLE FOR INFORMATION	M.O.R

Client: PUDDENHILL PROPERTY LTD.

Project Title: CHARLESTOWN PLACE SHD FINGLAS, DUBLIN 11.

Drawing Title: BLOCK 4 SOLAR PV REQUIRMENT FOR LANDLORD AREAS AND APARTMENTS (DIMPLEX OPTION)

Dublin 01 4872300
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Roscommon 090 6602380
Website www.varming.ie

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P02	20624-VCE-04-RF-DR-E-900
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