Clonburris Phase One

Mechanical & Electrical Engineering Report

South Dublin County Council

Project number: 60650394
CLON-ACM-XX-XX-RP-BS-000001

April 2022

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	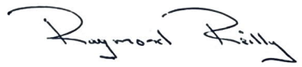		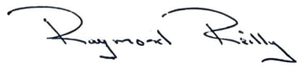
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1. Introduction

The Clonburris Phase One project is a proposal for to develop new dwellings, new community facilities and the development of three large open green spaces within the Clonburris Strategic Development Zone (SDZ).

The Phase One site of approximately 10 hectares is located to the south-west of the overall SDZ. The site benefits from close proximity to Kishoge railway station to the north with direct links into Dublin city centre and good access to existing cycle routes and bus networks. A large open space to the west pf the development will form a green spine running north-south providing wider connection to Griffeen Valley Park to the west of the site and the Grand Canal to the south.

The proposed works will comprise a mix of apartments, duplexes and houses and new community facilities in a mix of two, three four and five storey buildings. The scheme is set within a series of three large strategic open spaces providing local recreation and amenity spaces with links to existing and surrounding communities.

This report was generated for planning requirements and outlines the design intent and considerations to be taken regarding the Public lighting scheme within the proposed development of the Clonburris Phase One. Refer to Figure 1 below.

Figure 1: Proposed Development

2. External Design Criteria

The external design criteria are based on 2017 weather data published by ASHRAE. Summer and winter design temperatures are based on annual extremes, while the heat rejection plant design temperature (heat pumps and other mechanical cooling plant) is based on the 50-year extreme temperature.

Location	Clonburris, Dublin, Ireland
Elevation	59m (approx.)
Summer Temperature	24.3ºC Dry Bulb / 19.4ºC Wet Bulb
Winter Temperature	-5.3ºC (saturated)
Heat Rejection Plant	28.6ºC

3. Internal Design Criteria

Internal design criteria are based on CIBSE guidelines and Part L of the Building Regulations, as summarised in the table below. Humidity control will not be provided in any spaces within each building structure.

Space	Design Temperature
Circulation Spaces	Min. 18oC
Living Areas	Min. 21oC
Bedrooms	Min. 18oC
WC's / Bathrooms	Min. 18oC
Plant Areas	Not controlled

4. Ventilation Design Criteria

Ventilation design criteria conditions shall be based on CIBSE guidelines, Part F of the Building Regulations and BS: EN standards. The ventilation design criteria will be largely dependent on the system selected, e.g. continuous mechanical extract (CME) ventilation or mechanical ventilation with heat recovery (MVHR).

5. Noise Criteria

Space	Noise Rating
Circulation Spaces	NR40
Living Areas	NR30
Bedrooms	NR25
WC's / Bathrooms	NR40
Plant Areas	Not controlled

External plant will be selected so as not to exceed any planning condition requirements. Any future energy centre is likely to have a number of heat pump condensers placed upon the roof. As noted above any external plant will need to be carefully selected to ensure that the sound levels do not exceed those set as part of planning condition requirements.

6. Existing & Proposed Utility Connections

A gas infrastructure is evident around the existing buildings on site. It is proposed to decommission and remove the existing service, and to install a new sufficiently sized service to serve the future energy centre.
Discussions are on-going with Gas Networks Ireland regarding the route of the high-pressure transmission line running close to the east boundary line of the site.

For details of the water mains network please, refer to the Civil Engineering Report.

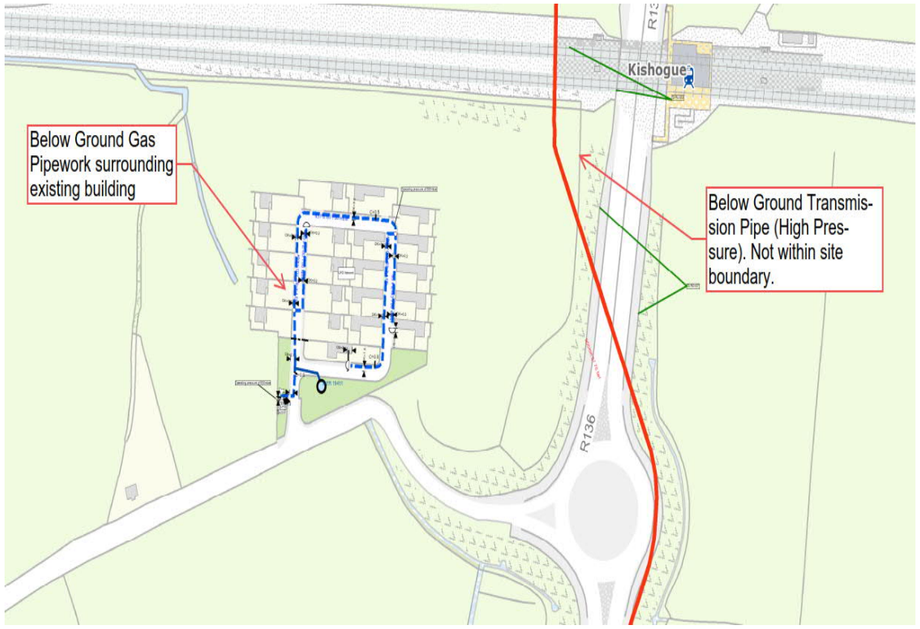

Figure 2: Existing Gas Networks

7. Electricity

The existing 20KV ESBN infrastructure traverses the proposed site at three locations, as identified in Figure 2 below.
Reference 1: Overhead MV lines traverse the site from west to north and drops into ground via a pole on boundary to the railway line. The cabling runs under the railway lines as indicated.
Reference 2: Overhead MV lines traverse the site from north to south. The cables continue overhead across the railway lines.
Reference 3: Overhead MV lines intersect the south east corner of the development. Based on the current redline boundary and proposed residential layout, it is proposed to retain, as indicated below. However, this is being assessed by ESB.

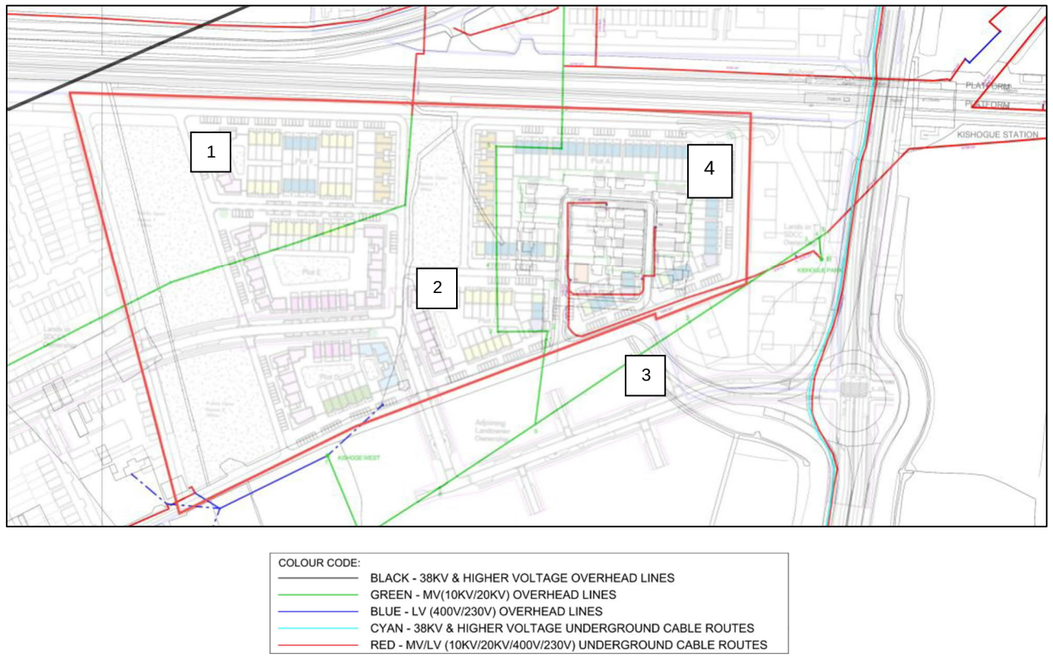

Figure 3: Existing ESBN 20kV Overhead Infrastructure

Following further preliminary discussions with ESBN in this regard, it was agreed in principle that this existing overhead infrastructure will be diverted underground and routed through the development as identified in Figure 3 below.
Reference 1: Cabling to be diverted underground from an existing pole on the site boundary, run via ducts through the proposed new roadway and connect to the existing ESB ducts at the railway boundary (subject to further ESB investigation & confirmation)
Reference 2: Cabling to be diverted underground from a new pole on the site boundary, run via ducts through the proposed new roadway and connect to the existing ESB pole at the railway boundary. It is assumed at this stage that this existing pole will be retained as the intention is not to run the cabling under the railway lines but maintain the route over the lines.
Reference 3: no works envisaged tough further investigation being carried out by ESB to determine if works are required.
Reference 4: the existing accommodation within this area is supplied via underground 4no. low voltage supplies which may need to be diverted / amended to suit the new roadway. This may result in loss of power during the diversion works.

Note: ESB have advised that if the diversion of OH lines are required then the cost for the first 500m is free on the understanding that the diverted cabling can being used to provide power to the development.

However, if it's a 'clean' diversion where the cables are not providing power to the development, then the Client is liable for the full cost of the diversion. ESB to investigate further but initial advice is that the total cost of the above diversions will need to be borne by the project.

ESB will require 160mm ducts for diverted cables, with 1No 160mm duct for each circuit.

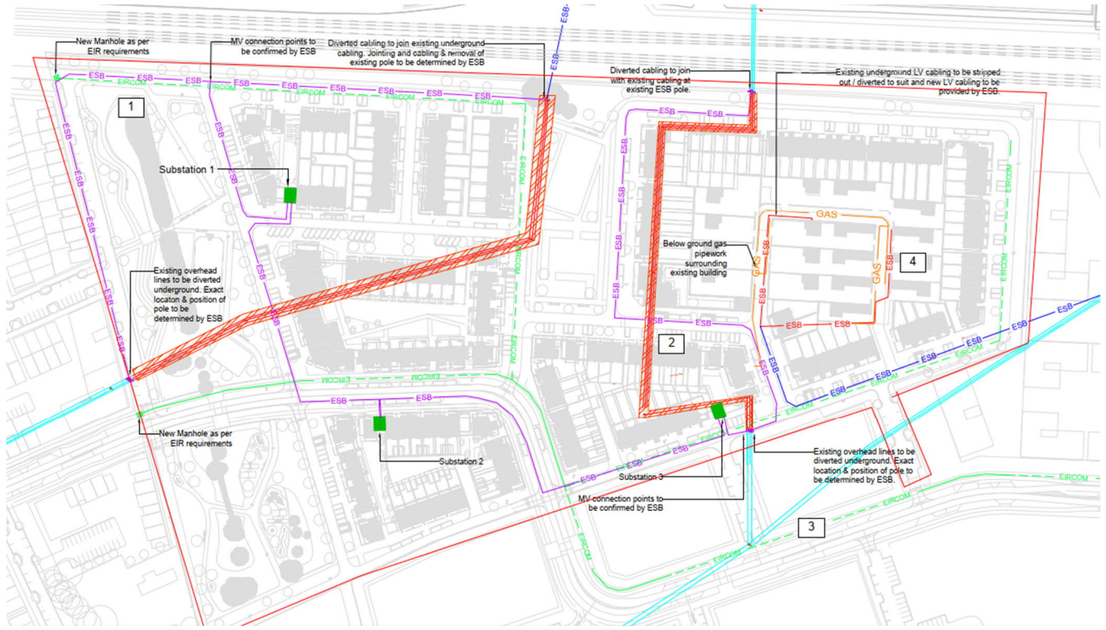

Figure 4: Proposed ESBN 20kV Underground Infrastructure

Based on initial discussions with ESB, 3no. 1000KVA transformer substations will be required for the development. The preliminary has been based on the following ESB project guidance:

Figure 5: Proposed ESBN Substation Locations

Maximum run from substation to ESB cut out – 400m
Maximum of 6 LV supplies can be provided from an indoor substation (1000kVA) and LV switchroom to be adjacent to the substation room.
Maximum 5 LV supplies can be provided from a kiosk type substation (630kVA)
Each LV supply can be a maximum of 200KVA

As a rule of thumb, each LV circuit will accommodate a maximum of 35 apartments or 24 houses
Meter rooms – ideal solution: located adjacent to the substation or with external access if part of residential block.
Meter rooms – ESB accepted compromise: An internal meter room will be acceptable at ground floor level if the room is located within 2m of the main entrance and ESB only need to access through 1 set of doors to reach the meter room.
Note that ESB have provided general guidance only and will not review the project in great detail until planning has been approved.

8. Information & Communications Technology (ICT)

The existing Eir infrastructure will be augmented to serve the new development. From the initial studies, the nearest Eir infrastructure is located at Thomas Omer Way, north of the development. Refer to Figure 6 below.
New ducts will be provided from Thomas Omer Way, down through the R136 to supply the new development. Further discussions will be carried out with Eir.

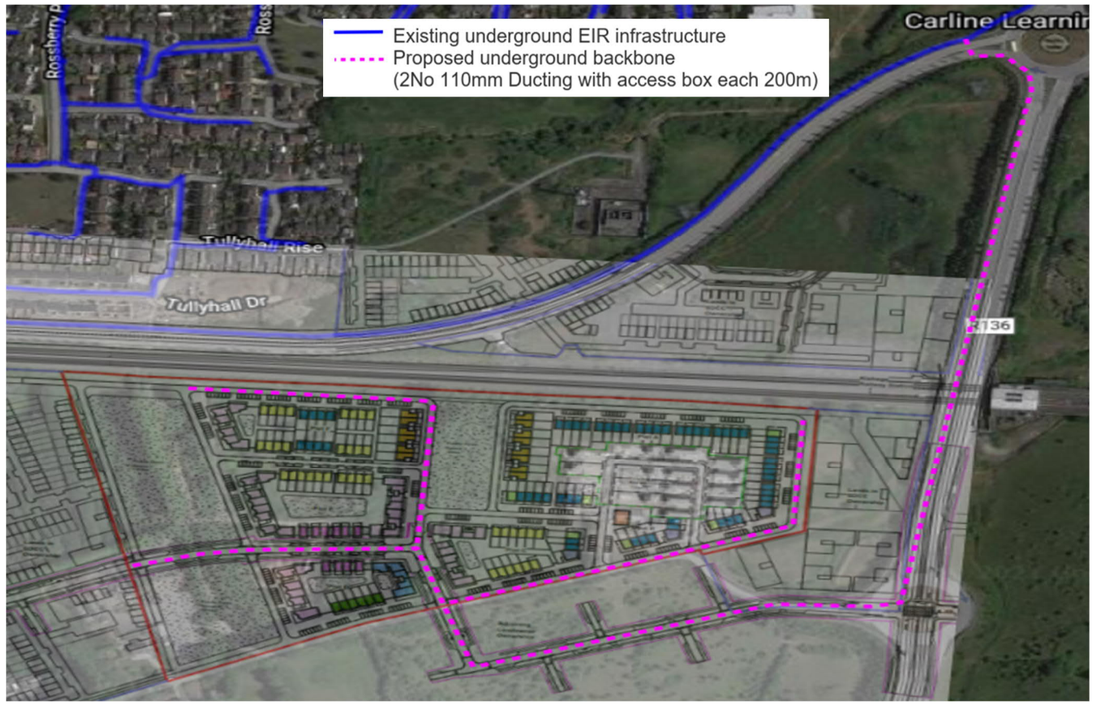

Figure 6: Existing Eircom Underground

9. Public Lighting

Refer to Public Lighting Report Ref: CLON-ACM-XX-XX-RP-EL-400001

10. Part L of the Building Regulations

Refer to Public Lighting Report Ref: CLON-ACM-XX-XX-RP-EL-400001

11. Heating, Ventilation & Water Services Strategies

Refer to Public Lighting Report Ref: CLON-ACM-XX-XX-RP-EL-400001

12. Electrical Services

The works at Clonburris residential development will comprise the following electrical services.

- Incoming MV/LV electrical supply (including diversions)
- Incoming telecommunications,
- Low voltage distribution switchgear, including sub-distribution centres
- Small power installation,
- Public and external lighting,
- Energy metering,
- General and emergency lighting, and associated control system,
- Specialist feature lighting,
- Renewable technologies,
- Fire detection and alarms systems,
- Security systems,
- Lightning surge protection,
- Mechanical plant, and
- Earthing and bonding

3.1 Incoming Electrical Supply

A new LV supply will be provided to each apartment block and sourced from the respective new sub-station strategically positioned on the site, whereas a new LV supply will be provided to each dwelling, and sourced from the local mini-pillar.

- The LV supply to each residential building will be at 400/230 V (+10%/-6%).
- The frequency of the supply will be 50 Hz (± 1%).

3.2 Low Voltage Distribution

Where required, LV electrical distribution centres (MDC) shall be positioned in the respective main electrical switchrooms at each apartment block while sub-distribution centres (SDC) will be provided in assigned cupboards at ground floor level. An additional consumer unit (CU) will be provided in each residential unit. The electrical wiring installations for the tenant fit out will be designed to comply with IS:10101 (2020); National Rules for Electrical Installations

Each MDC will be of Form 4 Type 2 construction, with internal segregation to enable safe working for connection of spare outgoing ways while SDCs and CUs will be Form 3. Type 1, 2 and 3 surge protection will be provided at all sub-distribution centres.

Sub-mains cabling will be provided from the SDCs and CUs to serve mechanical plant, lighting and small power distribution boards, and other fixed equipment. All outgoing ways will be provided with meters to meet the requirements of Building Regulations Part L. The sub-main cabling will generally comprise XLPE/SWA/LSF cables installed on heavy duty cable ladders/trays. All distribution centres will incorporate 20% spare ways.

For the housing & duplexes, dedicated recessed meter cabinets shall be provided.

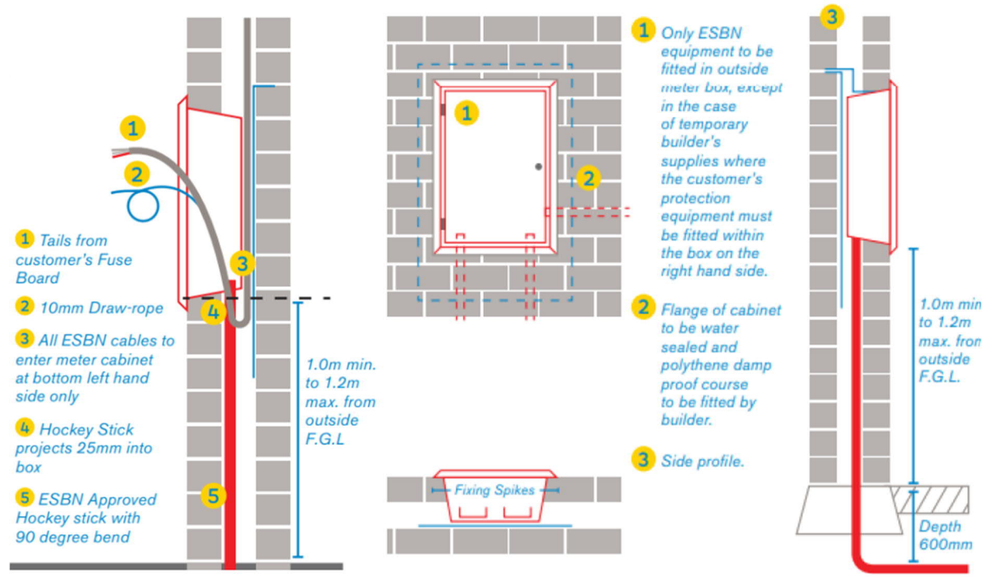

Figure 7: Typical ESB Meter Enclosure

Final circuits from all distribution boards will comprise either LSF insulated single-core cables in steel conduit/trunking or alternatively XLPE/SWA/LSF armoured cables installed within designated floor and ceiling voids. All cables used shall be from a BASEEC licensed supplier. MCBs will comply with BS EN 60898 with a short circuit capacity of 15KA minimum.

3.3 Standby Emergency Generation

It is not anticipated that standby emergency generation will be required at the development.

3.4 General Lighting and Control

General lighting will form part of the works and will consist of recessed and surface LED modular fittings to suit the proposed ceiling. The design will conform to CIBSE LG7 and IS EN 12464; (2011); Lighting of Workplaces.

To ensure that the latest LED lighting technology is installed, the procurement of the light fittings should be delayed as close to the installation date as possible. During the detailed design of the refurbished works, AECOM will work with Metworks to define a fitting that meets the aesthetic and technical requirements of the development.
The lighting installation will be served from lighting services section of the respective electrical distribution centres and consumer units located strategically in electrical risers and cupboards.

Switching of the circulation areas in each of the residential blocks will be provided by multi-sensors to provide occupation/absence control and daylight linking. The lighting control system will also facilitate a signal to the respective BMS out-station subject to the agreed heating and ventilation strategy.
External lighting will be specified to suit the architectural treatment and controlled by means of local PIR detectors/switches. The lighting control system will be commissioned to take cognisance of the occupant requirements set out in lighting control strategy document.

3.5 Emergency Lighting

Emergency and escape lighting will be installed throughout all areas to comply with IS 3217: 2013 and IS EN 1838. The emergency lighting system will be designed to maintain the specified lighting level for a minimum duration of 3-hours in communal. All emergency luminaires will generally be self-contained emergency packs within dedicated luminaires. Self-contained illuminated exit signs will be provided along exit routes in the refurbished space; the emergency lighting will form an integral part of the lighting control system.

3.6 Small Power

Dedicated distribution centres (SDCs) and consumer units (CUs) will be provided in strategic locations in the residential blocks and dwellings to serve small power outlets, socket outlets and fixed equipment.
In kitchenettes above kitchen worktop, high level isolators shall be provided to control low level single sockets outlets positioned under kitchen worktop for appliances. The position of all power outlets shall be in accordance with IS 10101 (2020).

3.7 Fire Detection and Alarm System

A fire detection and alarm system (FDAS) will be provided as part of the refurbishments works in compliance with IS 3218: 2013 Code of Practice for fire detection and alarm systems for buildings.

An analogue / addressable fire alarm system will be installed to an L2/L3 standard (subject to Fire Safety Certificate requirements) throughout the residential blocks and dwellings. The main fire alarm panel will be located in the ground floor entrance with repeater panels located adjacent to the main fire access point at each residential block.

The system will incorporate automatic detectors and manual break-glass call points to activate automatic sound warning and flashing beacons.

The fire detection system will be interfaced with various systems to initiate shut down, activation, opening and closing of the system in accordance with the fire cause and effect strategy.

In addition, the fire detection system will automatically release access-controlled doors to enable safe evacuation from the buildings to facilitate egress in the event of fire evacuation.

3.8 Security Systems, CCTV and Access Control

The security services requirement will be articulated in a security strategy document developed by AECOM in conjunction with the South Dublin County Council, and will include the following systems;

- Duress/Panic alarm
- Door access control at the entrances to each house
- Dedicated CCTV system externally and internally in circulation areas.

3.9 ICT Structured Cabling

A specification will be prepared based around passive infrastructure in the residential blocks, enabling the SDCSS to install active Local Area Network hardware and software to support their day-to-day business requirements.
The infrastructure shall comprise the following;

- Pathways (i.e. the routes and containment between residential spaces)
- Cabinets/Racks/Frames (i.e. to house cable terminations and equipment)
- Infrastructure (i.e. the physical structured cabling)

It is assumed that the South Dublin County Council will provide:

- Telecommunications circuits from their chosen supplier/s
- Firewalls & Routers
- Telephone system including handsets
- Servers
- LAN equipment (i.e. switches)
- PCs (desktop or laptop)
- Peripherals (printers, copiers etc.)
- WIFI Controller/s
- WIFI Access Points (structured cabling infrastructure design shall be provided by AECOM)
- Software
- Operating systems

The requirement for such systems will require further development and coordination.
Security systems shall be stand-alone and not share IT/AV containment.

3.10 Audio Visual System

On completion of the preliminary design space planning, the client's AV requirements for each residential unit will developed. Once the brief has been agreed, we will develop the scheme into a detailed design that will include an in-depth assessment of all relevant technologies / standards and solutions that are likely to satisfy the technical and operational requirements. High level designs and concepts for each area will be developed along with detailed functional descriptions of how the proposed systems will operate from a user perspective.

The scheme design will also cover the key Architectural and fit-out integration issues including room layouts / configuration options / issues. The scheme design will enable the client to take a balanced view on which areas of technology will be suitable for adoption for the project and which may need to be accommodated in the future.

3.11 Electric Vehicle Charging

Ground mounted robust stainless steel posts of charging stations will be provided in public locations with an energy demand of 7.2kW (Load TBC).

Figure 8: Electric Vehicle Charger Unit