Scenario:

A circuit, as shown in **figure 1**, is to be installed to supply electric vehicle supply equipment (EVSE) purchased by the owner of the property **(details below)**, the (EVSE) is to be located on a domestic driveway mounted onto a solid oak purpose made post.

PRODUCT OVERVIEW

Home Series chargers

UNTETHERED MODEL | HOME 7 | HOME 7 PLUS | HOME 22 PLUS

FINISHES	**PRODUCT ATTRIBUTES** Materials of front panel. Powdered coated diecast aluminium Materials of lid. CNC anodised aluminium* Accoya timber finished in water based stain* Plastic ASA-PC finished in anthracite Colours: Up to 107 combinations of colours and finishes*
ATTRIBUTES	**PRODUCT ATTRIBUTES** Dimensions (mm) H: 286 x W: 196 x D: 111 Operating Temperature: -25°C to 50°C Weight: 3.3 kg IP Rating: IP54 enclosure Standby Consumption: <2.0W 3 Year manufacturer warranty
TECHNICAL	**CHARGING** Number of phases: 1 and 3 phases Charging Current: 1.4 - 7.4 kW (6A to 32A Per Phase) Connection: Type 2 socket 207-253v ~ 50/60Hz 32A 230v/400v 3N ~ 50/60Hz 32A Home Load balancing Solar charging Multi chargepoint load management Accuracy of built-in energy meters (+/-2%)
SAFETY	**PROTECTION SYSTEMS** Built-in RCD for residual current imbalance protection RCD-30mA Type A 6 mA DC according to IEC 62955 Integrated overload protection according to BS EN IEC 61851-1:2019 Loss of PEN protection according to BS 7671: 2018/A1:2020 Impact resistance: IK08 Fire class: UL94 Insulation class: Class 2 Welded contact detection Thermal protection system Locking type 2 socket Fail safe wireless load management*
CONNECTIVITY	**WIRELESS CONNECTIVITY** Bluetooth Low Energy 4.0 Wi-Fi 2.4 GHz b/g/n connection Smart Home system wireless support* S&P App Open API * Not available on Home 7

SIMPSON & PARTNERS

[Simpson & Partners EV Charger (simpson-partners.com)]

The circuit is to be wired using Doncaster Cable Ultra EV/Cat5e three-core steel wired armoured 90 °C thermosetting XLPE insulated cable with copper Class 2 conductors.

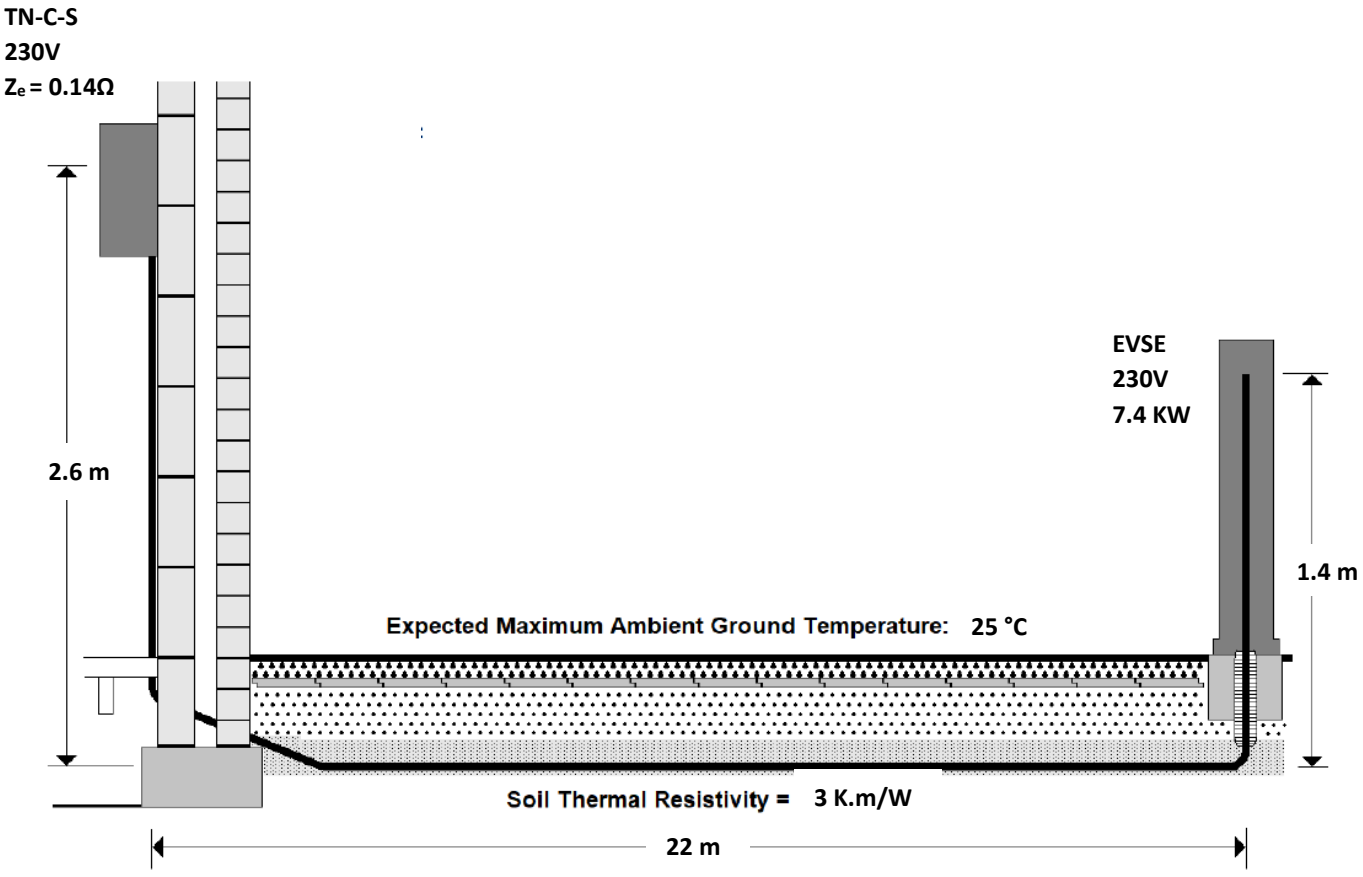
(See Doncaster Cable Data Sheet)

One core of the cable is to be utilised as the cpc.

The installation is supplied via a public low-voltage distribution system.

The cable is to be fixed directly to a masonry wall for part of the route and is to be installed directly in the ground at a depth of 0.5 m prior to entering the EVSE.

Figure 1



1. Determine the:

a) design current (I_b)

b) **minimum** nominal rating and type of protective device (I_n).

2. Determine the:

d) reference method used to calculate the current capacity of the circuit live conductors

e) appropriate rating factors and their values.

f) minimum current carrying capacity, in amperes, that the cable must be capable of carrying.

3. Select a suitable cable for current-carrying capacity including the:

vii. appropriate table and column number

viii. tabulated value of current carrying capacity I_t

ix. **minimum** cross-sectional area.

4. Determine the:

c) voltage drop for the circuit.

d) **maximum** permissible voltage drop in volts, to the EVSE terminals.

5. Determine the R_1+R_2 for this circuit at full operating temperature.

6. Determine for this circuit the:

a) total earth fault loop impedance

b) maximum permissible earth fault loop impedance (Z_s).

7. Determine, in respect of thermal constraints, for this circuit:

a) the prospective earth fault current at the extremity of the circuit

b) the actual disconnection time.

c) the value of k for the protective conductor.

d) compliance in respect of Regulation 543.1.3.

8. State a suitable type of RCD that can be used to protect this circuit, to comply with manufacturer's instructions and BS 7671 (2022).

9. Verify from the manufacturer's technical guidance documentation compliance with Regulation 722.411.4.1 of BS 7671 (2022) including NOTE 1.

10. list any other considerations to ensure compliance with BS 7671 (2022).