BRISTOL CITY COUNCIL

NEIGHBOURHOODS HOUSING DELIVERY

PLANNED PROGRAMMES

SPECIFICATION FOR
The Communal upgrade of the electrical systems
At Redwood House and Willow House
The Groves,
Bishport Avenue,
Hartcliffe,
Bristol,
BS13 0RS

Works to be done for Bristol Council under the superintendence:
Housing Delivery- Service Director
The Bungalow
Brislington Depot
Sandy Park Road
BRISTOL
BS4 3NZ

Engineer: ***I PARKER, M&E Section***
Reference: M&E/IP/Bishport 2019

CONTENTS

Appendices

PART 3

ELECTRICAL SERVICES INSTALLATION

STANDARD TECHNICAL REQUIREMENTS

INDEX

PART 4

DESCRIPTION OF WORK

ELECTRICAL SERVICES INSTALLATION

INDEX

PART 3

Standard Technical Specification

ELECTRICAL SERVICES INSTALLATION

3.1 COMPLIANCE WITH REGULATIONS, REQUIREMENTS, STANDARDS AND CODES OF PRACTICE

The installation required under this Specification shall comply with the following:-

1. The Institution of Electrical Engineers Wiring Regulations (BS7671) 18th Edition.
2. Guidance Notes on the Wiring Regulations issued by the Institution of Electrical Engineers.
3. All relevant Regulations.
4. All Statutory Regulations.
5. All requirements of Electricity, Water and Gas Companies.
6. All British Standards and Codes of Practice, Health & Safety at Work Act, etc.
7. All Chartered Institution of Building Services Engineers Codes of Practice for Design, Installation, Commissioning and Maintenance.

3.2 STANDARDS OF WORKMANSHIP AND CONDITIONS OF INSTALLATION

Workmanship shall be of the highest standard consistent with first class practice.

At the time of hand-over the condition of the works shall be as new.

Where apparatus is installed in situations likely to cause rusting or other forms of corrosion all necessary precautions to counteract deterioration shall be taken.

The Contract Administrator reserves the right to reject any part of the works not complying with the foregoing requirement. All necessary remedial work shall be carried out without delay to the programmed completion date and at no additional cost.

3.3 CONDUIT SYSTEMS

Steel Conduit

Steel conduit shall be used in all cases except where otherwise specified in Part 4. This shall be heavy gauge, screwed and welded. The minimum size of conduit shall be 20mm external diameter. All conduits shall bear the manufacturer's stamp guaranteeing it to be to British Standard.

For interior and exterior installations except where otherwise specified in Part 4, steel conduit shall be galvanized Class 4 inside and out.

In all locations where galvanized conduit is used conduit boxes, elbows, adaptable boxes, etc, shall be fitted with neoprene gaskets on none emergency systems.

Conduit shall in no circumstances be buried in the ground.

Where two or more conduits are run together, they must be installed symmetrically, i.e., all bends, sets, etc, must be installed exactly the same.

The conduit installation shall be electrically and mechanically continuous throughout and all terminations shall be made in conduit boxes, adaptable boxes, switch and socket outlet boxes or in the enclosure of electrical equipment.

All conduit accessories shall be of the same finish as the conduit specified for the system.

All conduits shall be free from rust and other defects and protected from mechanical damage or weather. All sharp edges, burrs, tallow and cutting compound shall be removed after screw threads are cut. All vice marks, and rust shall be removed and together with exposed screw threads paint cold galvanized where the galvanising has cracked or flaked to prevent corrosion occurring.

Wherever possible conduit runs shall be concealed by running in false ceilings or ducts. Where surface conduit is unavoidable the layout of the conduit system shall be as neat and unobtrusive as possible. All Conduit and boxes are to be securely fixed directly to walls or ceilings, run close to ceilings, door frames and internal corners of walls. There is to be no spacing off the walls or ceilings of the conduit or boxes unless specified in Part 4.

All necessary precautions shall be taken to ensure that building finishes are not adversely affected due to the presence of the conduit.

Surface conduits shall be installed throughout in horizontal and vertical runs and where several conduits follow similar routes, a single conduit or trunking is to be installed.

Surface conduits shall be fixed and supported by means of spacer bar saddles with 3mm minimum thickness spacer bars except where the surface is rough concrete or similar in which case heavy gauge distance saddles shall be used.

At all bends a saddle shall be placed 225mm each side of the bend. Fixings to the structure or tray shall be securely made with a minimum of No.8 wood BRASS screws in conjunction with non-disintegrable Philplug or Rawlplug composition or plastic inserts where fixed to the structure, or M4 brass screws with brass nuts. Fixings made to plaster finish or building boards shall be made with purpose made fixing devices. All saddles are to run the same way. If manufacturer's recommendations require a higher standard this is to be followed.

Where conduits are attached to steel work clips shall be provided individually designed for the size of the conduit and the size and section of the steel member. The fixings shall be adequate and secure to ensure a properly supported installation. Where necessary intermediate supports shall be provided.

Inspection bends, tees or elbows shall be allowed; with circular conduit boxes or adaptable boxes with removable covers.

However no conduit will terminate into the back of a conduit box as below.

This will not be acceptable; conduit will be formed round beams, etc. Using pot bends for externals 90 degree bends as per image.

Fixing screws to conduit boxes and adaptable boxes, covers and saddle clamps shall be brass for galvanized conduit systems.

Bends made on site shall not deform the section and shall be free from distortion, rippling or flattening. Not more than two right angle bends will be allowed in any conduit run without the provision of a draw-in box.

Where concealed in the structure conduits shall be adequately fixed by crampets of the correct size at l.0m minimum intervals to prevent movement during building operations.

In all cases efficient measures shall be taken during construction to seal boxes and fixings against ingress of plaster etc., and all conduit systems shall be dried out by drawing a cloth swab through before wiring commences.

On **vertical runs boxes** shall be positioned at intervals **not exceeding 5.0m** and shall be fitted with cable supports to relieve stress on the cables.

Conduits shall be installed with the ends closely butted inside conduit couplings.

All conduits shall terminate in threaded spouts in conduit boxes or in clearance holes in adaptable boxes, switch boxes and enclosures conduit system via conduit boxes. No conduit threats are to be visible. The conduit system shall be terminated in a circular conduit box and the item of equipment

will be connected via this box to the conduit system. However, between Luminaires and the boxes, heat proof flex is to be installed, concealed within the system, no cables are to be visible.

Where terminating conduit in clearance holes, provide a coupling serrated washer and brass male thread bush for each termination.

In concealed conduit installations the faces of all outlet points shall be level and flush with the finished surface.

On long runs, due consideration shall be given to expansion or contraction and suitable provision allowed to prevent damage to the systems or structure. Where conduit systems cross building expansion joints, provision for expansion and contraction shall be provided to prevent damage to the system or the structure.

Running couplers/runners shall not be installed unless agreed with contract Administrator.

For connection of the conduit system to items of equipment where vibration may occur such as motors, valves, or heating equipment, etc. a minimum length soft 500mm watertight PVC sheathed, flexible metallic conduit shall be used to connect the conduit system to the equipment terminal box. The conduit system shall be terminated in a circular box and the flexible conduit shall be fixed at each end with watertight heavy glands. The size of the flexible conduit shall not be less than the conduit system size. A PVC insulated stranded copper protective conductor shall be connected from the solid conduit system to the machine and run inside the flexible conduit. The protective conductor shall be attached to a fixed earth screw provided within the circular box. A circuit cable shall terminate in a fixed "Klippon" screw clamp connector in the circular box and connections from the connector to the equipment shall be in flexible cable which shall be not less than 300/500 volt grade insulation.

Conduit systems shall be placed at a minimum of 150mm from insulated hot water and heater pipes and equipment. This spacing to be increased to 225mm where pipes and equipment are not insulated. Conduit runs shall be prevented from coming into contact with runs of any of the other services.

Intermediate conduit boxes for other than power and lighting systems shall be labelled accordingly with a Traffolyte label red lettering on a white background screwed to the box.

All conduit/adaptable box lids are to be fixed by Torx Security Stainless Steel Screws, not self-tapers in all Public Areas.

All treads shall be suitably painted for protection without destroying earth continuity with a cold galvanising solution.

Plastic Conduit

Not applicable to this contract. Plastic Conduit will not be permitted.

3.4 CABLE TRUNKING SYSTEMS

Steel Trunking

For multiple cable runs and where otherwise specified in Part 4, cable trunking and associated fittings may be used, which shall be manufactured from prime galvanised steel to BS EN 10346-2009. The gauge of the metal is to be a minimum of 1.00mm for 50x50 to 100x50 and 1.2mm for sizes above.

The trunking system shall be formed with smooth interior and no projecting screws, provided with coupling sleeves and copper bonding earth links, which shall be tinned and fitted with division plates as required. In vertical runs, barriers shall be provided at 3.0m intervals to prevent air at the top from attaining an excessively high temperature. Covers shall prevent dust-entering trunking and shall be fixed to the trunking by screw or M6 tamperproof Torx fixings.

Where alterations or adaptations to trunking or fittings are necessary to suit the specified conditions of use, details must be submitted to the Contract Administrator for approval before any work is carried out and the internal diameter of the trunking is to be maintained at all times.

Trunking and fittings specified for external use will be designed for external use and manufactured to IP54, to prevent the ingress of water, with an outward returned flange on the body with an overlapping lid, which is fitted with a neoprene gasket on both sides along its entire length. When installed the gasket is compressed between body and lid by security screws, which fix into captive bushes on the outward flanges.

Where vertical runs exceed 4.5m appropriate supports shall be provided i.e. vertical ties for cables. 90° angle sharp bends shall not be used. At constructional or trunking expansion joints the trunking shall be provided with a sliding coupling and flexible earth continuity tape.

Where trunking is fixed direct to structure the fixing screws shall be brass or zinc coated round head.

Maximum deflection for suspended trunking between supports shall not exceed 6mm when full load is applied.

Trunking systems shall be placed at a minimum of 150mm from insulated heating, hot water service pipes and equipment. Where run adjacent to gas or piped water services, contact shall be avoided. Where heating pipes are not insulated the spacing is to be 225mm.

All trunking shall be provided with the manufacturer's cable retaining clips in sufficient quantities to retain all cables in a satisfactory manner, **no other materials are to be used.**

Where the trunking passes through a structure it is to be fixed directly to the wall, with a short piece of lid riveted to the trunking and the Lid is to protrude a maximum of 40mm from the structure on each side. Also a Fire Barrier is to be fitted within the trunking once the cables have been installed.

Trunking must never be run over the top of skirting, the skirting must be cut as required.

Where conduit serves an item of equipment that is to be fed from the front of the trunking, a short piece of lid is to be riveted to the trunking and the conduit to protrude from this fixed lid.

All trunking is to be securely fixed directly to walls or ceilings, run close to ceilings, doorframes and internal corners of walls. There is to be no spacing off the walls or ceilings of the trunking unless specified.

All internal diameters of the trunking are to be maintained at all times, no couplers or bushes are to be used to connect between trunkings.

All trunking lids are to be fixed with security screws as Housing Standard, Torx Round Head Tamperproof Stainless Steel Screw, not self-tapers. **Note care to be taken NOT to over tighten Torx screw as this may indent the lid**.

All connections/joints between trunkings, shall be provided with manufactures earth links. Which must be visible for inspection by the Contract Administrator.

All bends manufactured on site, are to be secured with M5 Torx nuts and bolts, rivets are not to be used in any circumstance.

Lid is to be installed on a run of more than two pieces of trunking, so that the lid crosses the trunking joints, the lid must always overlap the joint between the trunking bases and fixed with screws as required.

Any cut lids are to be secured at each end, both sides, the same distance from the end of the lid as manufactured, with security screws as manufactured end.

All cut trunking shall be suitably painted for protection without destroying earth continuity with a cold galvanising solution.

All open trunking ends must have grommet strips fitted or other type of protection for the cable.

Plastic Trunking

Not applicable do this contract. Plastic Trunking will not be permitted.

3.5 CABLES FOR CONDUIT AND TRUNKING SYSTEMS

Stranded conductors shall be used in all cases with a minimum size of 1.5mm^2. Cables shall be installed on the loop-in system and no joints shall be made in the installation of these except at termination points.

Cables in flexible conduit supplying equipment subject to vibration shall be multi-stranded flexible conductors, with not less than 300/500 Volt grade insulation.

Single stranded conductors shall not be used.

All cables shall be coloured to the requirements of I.E.E. Regulations/British Standard with no exceptions, the cables shall be continuously colour identified. Sleeve colour identification will not be accepted.

There are to be no cable joints within the trunking system for any reason, all joints in any cable, is to be carried out within an appropriate conduit/adaptable box, with a din rail and labelled as required. Also where Fire Proof cables are used, porcelain connectors are only to be used, for the jointing of these cables.

Any cables installed within trunking or conduit <u>MUST</u> not to be taped or cable tied together for any reason.

LSHF Insulated Cables

Only Low Smoke and Halogen Free (LSHF) or Fire Proof insulated cables shall be used for any wiring system under the Contract, otherwise specified in Part 4. Cables shall not be installed unless the temperature is above 0^{o}C. Also must conform to BS7211 and be BASEC approved.

3.6 MINERAL INSULATED COPPER SHEATHED CABLES

Mineral insulated copper sheathed cable (M.I.C.S) with copper conductors shall be installed in locations where continuous high temperature and/or high atmospheric moisture occurs, such as boiler houses, plant rooms, etc. or where otherwise specified in Part 4. The cables shall run on the surface and be rated as "Exposed to touch".

Unless required otherwise in Part 4 all M.I.C.S. cable shall be PVC sheathed, with appropriate accessories, except in locations where continuous high temperatures occur. Up to three cables may be run fixed to the structure except where corrosion is likely to occur and all runs of four or more

cables shall be run on galvanized cable tray. Copper sheathed cables are to be installed on galvanized tray and the tray shall be painted with red oxide to prevent electrolytic action.

A minimum conductor size 1.5mm^2 shall be employed.

M.I.C.S. cable shall not be buried except where specified or approved by the Contract Administrator.

All M.I.C.S. cables shall be installed in accordance with the manufacturer's recommendations using stripping, crimping and potting tools manufactured by the cable manufacturers. All cable shall have an insulation resistance after installation of infinity measured on a 500 or 1000 Volt Tester as applicable to grade used.

Where M.I.C.S. cables are installed, only electricians who have received instruction from the makers shall be employed for the installation and connection of these cables and if required, shall produce the necessary proof of compliance with this requirement.

Where more than one M.I.C.S. cable is installed side by side, they are to be fixed by a single clip.

Railway tracks will not be acceptable.

If two cables are run together, they are not to be run round conduit boxes as photo. If two cables are run together one is to be installed under the box or a 4 Core or more is to be run so this does not happen.

Clips and/or saddles for M.I.C.S. cable fixing shall be of the same manufacture as the cables and fixed with round head brass screws and non-disintegratable Rawlplugs or Philplugs where necessary at intervals from a corner 80mm, and from the spout of a conduit box 160mm, and at a maximum of 220mm on a straight run vertical or horizontal. However the spacing off the clips is to be equal between both ends of the cable, and symmetrical. Clips that are nailed are not to be used. Cables installed externally are to be run in cement joints or under windows, so the cable has the lease impact.

No M.I.C.S. cable is to be connected directly to any Light fitting, unless specified in Part 4. This will be achieved by terminating the M.I.C.S. in a conduit box and then connecting heatproof flex between the M.I.C.S. cable and Light fitting.

Where M.I.C.S. cables are specified, connections to motors and other items of apparatus liable to vibration shall be carried out as described for flexible connections to the conduit system with cables of a suitable rating for the temperatures involved as described under the cable sections. Connections between the M.I.C.S. and flexible systems shall be made with porcelain terminal blocks.

All cables shall be 'Light Duty' 500 Volt grade for single-phase circuits and 'Heavy Duty' 750 Volt grade for three phase circuits.

All terminal ends of the cables shall be sealed to prevent the entry of moisture, the seal being a screw-on type.

Where cables terminate in the metal case of equipment designed for conduit entry, a screw-on pot type seal shall be employed enclosed in a universal gland.

All terminations shall be suitable for operation at ambient temperature applicable for the temperature at which the cable will be operating. Identification shall be provided by means of purpose made marking and insulating sleeves.

Where PVC covered cables are installed all terminations, glands, unions, etc. shall be of the same manufacture and be complete with appropriate size of PVC shroud.

Where single core M.I.C.S. cables are installed measures must be taken to minimise eddy currents.

M.I.C.S. cables shall be installed with the same regard to segregation of services as for conduit systems, including separation from heating systems.
Due to the low surge strength of M.I.C.S. cable, B.I.C.C. Surge Diverters type R.R.N. shall be installed on all contactor operated circuits, major cable runs and fluorescent lighting circuits.

Only sheathed cables are to be used with either Orange or White sheath, depending on environment, in all installations. Except for Fire Alarms, where Red Sheathed cable must always be used.

3.7 FIRE PROOF CABLES

Where specified in Part 4, this cable to be used where essential services are to be maintained. Must comply with **BS7346-6** and be to **BS8519:2010**, **Category 2** survival time, Also demonstrate they have the same level of fire resistance as required in **BS8491** Must be BASEC and LPCB approved.

3.8 PVC INSULATED WIRE ARMOURED PVC SHEATHED COPPER CONDUCTOR CABLES (PVC/SWA/PVC)

The use of these cables will not be permitted within any properties, however may be used for external supplies only. Must be BASEC approved.

Also allow to run a separate C.P.C. with all armoured cables or additional core within all armoured cables. The C.P.C. cable is to be the same size as the phase conductors and is to be labelled as the armoured cable. The C.P.C. is to terminate as the supply cable within the equipment/item, each end and not connected to the trunking

3.9 XLPE INSULATED, LSHF EXTRUDED BEDDED STEEL WIRE ARMOURED, LSHF SHEATHED COPPER CONDUCTORS (XLPE/LSHF/SWA/LSHF)

Where specified in Part 4 cables shall be stranded copper conductors, XLPE insulated, low smoke and zero halogen (LSHF) bedded, wire armoured and LSHF sheathed overall to BS6724, BS6425 part 1, BS4066 Part 2 and BASEC approved.

These cables can be used within a property, when supplying Non-Emergency D.B's or equipment. Maybe also used with externally installations also.

Also allow to run a separate C.P.C. with all armoured cables. The C.P.C. cable is to be the same size as the phase conductors and is to be labelled as the armoured cable. The C.P.C. is to terminate as the supply cable within the equipment/item, each end and not connected to the trunking

3.10 LOW SMOKE AND HALOGEN FREE CABLES

Where specified cables shall be stranded copper conductors, low smoke and halogen free (LSHF) to BS7211, bedded and the sheathed overall to BS6724, BS6425 part 1, BS EN 50266, reduced flame propagation to BS EN 60332-3-24, Acidic gas emission to BS EN 50267-2-1 (less than 0.5% acid gas), BS EN 61034-2 low smoke emissions and BASEC approved to the full range of BS8436 and additionally tested for 600/1000 Volt rating. Also where 360° metal screen cables are used they are also to comply with EMC standards.

This type of cable is the only other type that may be used within a property and only for non-essential circuits within that property only.

3.11 INSTALLATION OF XLPE/SWA/LSHF, FIRE PROOF CABLES, ETC

The cables shall be 600/1000 Volt grade and shall be installed in complete lengths with no joints permitted except at termination points.

Cables shall terminate at the terminal boxes, Distribution Board or accessories by means of a brass gland as manufactured by the maker of the cable or approved by the cable manufacturer for use with their cables. All cable glands shall be fitted with the approved shrouds. SWA must also be earthed as manufactures requirements. Allow terminate an earth fly lead to the SWA banjos with brass nuts and bolts as required.

Where cable cleats are used, they must be a metallic cable cleat, as the Phoenix Fire Survival Cleat, as manufactured by ETS Cable Components.

If cables are run on cable tray, the cable must be secured with stainless steel cable ties or cleats. This must be able to support the cable on the tray.

3.12 CABLE SUPPORTS

All necessary cable supports shall be provided. Where installed in common runs with a Mechanical or a Plumbing Installation "Unistrut" or similar cable supports shall be employed. On all other runs, unless otherwise specified in Part 4 supports shall be by "Unistrut" or similar support system.

Spacing and fixings shall be such that where a number of cables are run together, the fixing shall be that required of the smallest size of cable in the run.

Cables installed in open positions shall be cased to a height of 1.8m from the floor. Sheet not less than 2.0mm shall be used for this purpose and be galvanized finish.

Cable trays shall be mild steel, hot dip galvanized, purpose made with returned flanges. PVC covered trays shall be used where chemically corrosive atmospheres are present. Cable trays shall be rigidly supported at centres not exceeding 1.2m. All cable trays shall be bonded to earth with the appropriately sized cable and shall be electrically continuous.

Cable trays shall be fixed to the structure with sufficient clearance to allow securing of cable fixings. Screw fixings shall be brass.

Generally cables are to be fixed using metal tie wraps to any cable tray only, plastic ties shall not be used.

Where groups of cables are run they shall be fixed to purpose made galvanized cable trays using metal fixings. The fixing centres must not exceed 450mm for copper conductor cables.

Where four or more cables pass through a structural element, a cable transit manufactured by Hawks Cables or equivalent shall be used.

Other cables shall be adequately supported to prevent sagging or mechanical stress and the clamp shall be applied with only sufficient pressure to grip the cable and not be in contact with the armour.

SWA cables shall be cleated using metallic LSF CLEATS, PVC cleats are not applicable to this contract and will not be permitted.

3.13 BURIED CABLES

No cables are to be buried direct into the ground, all cables are to be run through an polyethylene orange duct with twin wall construction, to EN50086.2.4. Standard. The duct shall be buried at a minimum depth of 600mm from the surface to the top of the duct and the ground level is to be maintained. If the level drops within one year this is to be made good at no cost the Council.

Ducts installed within grass areas, the grass is to be re-seeded after the installation of the duct.

For cables running under roadways or in the ground where concrete or similar finishes encase the cables, provide suitable ducts buried 1000mm under the ground and measured from the surface to the top of the duct, this is to enable installation and withdrawal without disturbing the surrounding finish. The ducts shall be of ample diameter to allow the cables to be installed or withdrawn and have a minimum size of 100mm overall. Where changes of direction occur in duct runs, draw pits shall be provided. Any duct run under any road is to be surrounded in concrete.

All ducts shall be sealed at both ends against the ingress of moisture, vermin, etc.

Joint positions, changes of direction and straight runs at intervals of 15 metres shall be marked by means of a 600 x 600 mm internal chamber size Jointing Chamber, as BCC, Neighbourhoods Specification, with indented lettering on the lid, as appropriate. The lid shall be installed at finished ground level.

The Contractor is responsible for the application to the Statutory Undertakers to identify the locations of their buried services in the vicinity of the proposed works locations and for any detecting of the cables, pipes, etc with a CAT. This does not negate the obligation of the Contractor to carry out excavation in safe manner. The cost of this and applications under the current issue of the New Roads and Street Works Act shall be deemed to be included in the Contract price.

Where cables are externally fitted they must be adequately guarded against acts of vandalism or accidental or malicious damage. Where the consent of the Highway Authority is required under Section 50 of the New Roads and Street Works Act 1991 to lay apparatus under a street, the Contractor shall obtain such license at their own expense.

All ducts must have electrical warning tape positioned just under the surface of the ground, once the ducts have been covered. This is to warn others of the present of an electrical duct under the ground.

While any trenching works are taking place, it is the responsibility of the contractor to keep all roads, paths, etc, clear of mud, spoil, etc and all these areas must be cleaned at the end of each day or more as required.

3.14 **FLEXIBLE CABLES**

Where required or specified in Part 4 flexible cables shall be used with a minimum conductor size of not less than 0.75mm and no longer than 400mm long. Also cables are to comply with BS5839-1: 2002 Cat 2, BS7629-1, BS 6387 CWZ, BS8434-1, and BASEC approved. Type of cable for connection of essential circuits. Standard heatproof cable can be used where connection is for non-essential circuits.

The type of insulation to be used is dependent on the temperature and moisture conditions in the locations of utilisation and for this purpose the insulation used shall conform to that as described under the cables to be used for conduit systems.

Cable used must also be Low Smoke and Halogen Free.

3.15 LOW VOLTAGE SWITCH FUSES, DISTRIBUTION BOARDS AND SWITCHBOARDS

All switch-fuses, switches, Distribution Boards (D.B's) and panel boards shall have Voltage, current and short circuit performance ratings suitable for their installation in the distribution system. The manufacturer shall be as specified in Part 4.

The layout of all switchboards shall be submitted to the Contract Administrator for approval of layout before manufacture by the manufacturer specified.

The maximum height to the middle of any D.B, switchboard must not exceed 1.5m, from ground level.

All D.B's are to have heavy gauge (2mm) top and bottom removable flat gland plates are required for both 'A' and 'B' type boards. To ensure rigidity of construction boards should be manufactured with welded case end or similar and not rely on Gland plates for torsional stiffness.

The distribution board door when locked using optional padlock or barrel lock kits shall cover all devices including the front cover retaining screws to prevent unwanted access.

A removable neutral link shall be provided as part of the neutral bar assembly.

A clean earth facility to convert the standard earth to clean earth shall be available on TPN (type 'B') boards and as an option on type 'A' distribution boards. Where required Functional and Clean Earth accessories shall be available on Type B boards to accommodate a range of applications.

The manufacturer shall ensure that every Type 'B' distribution board busbar assembly is subjected to a 2.5kV flash test during assembly.

TPN (type 'B') MCB D.B's shall be capable of being linked out for single phase operation using a purpose made Busbar shorting bar supplied by the manufacturer.

It shall be possible to close the distribution board door when the outgoing MCBs/RCBOs are padlocked in the 'ON' or 'OFF' position.

MCB D.B's shall comply with BSEN60439-3. D.B's shall have a common neutral bar with sufficient connection terminals for each single fuse way. A one piece-blanking module shall be used to blank off unused ways in the D.B. cover and also shroud the corresponding busbar stab. Also all DB's are to have built in Isolation Switches.

All fuses shall be of a type and rating specified. They will be H.R.C. type cartridge fuses. Rewireable fuses are not to be used.

MCBs must be compliant with BSEN60898 and BSEN60947-2. MCBs should be manufactured to a nominal modular width and dimension.

Miniature circuit breakers (MCB's Icn to BSEN60898) and MCB/RCD's shall have a minimum prospective short-circuit capacity RMS symmetrical amperes of 10,000 amps.

MCB mechanisms are required to be trip free to prevent the MCBs being held in the 'ON' position. A fool proof Positive Contact Indicator is required to provide assurance of the isolation function. The MCB Dolly should be capable of being locked in the 'ON' and 'OFF' position with optional locking device.

Combined Single Pole MCB/RCDs (RCBOs) must comply with the requirements of BSEN61009. In order to provide economic use of distribution board space the single pole RCBO should not take up in excess of one single wide module.

MCBs shall be self-positioning when clipped to the Busbar system and shall be capable of being individually removed from the Busbar.

All MCB D.B's shall be sized such as to provide 25% of the board as spare ways for future connection of sub-circuits by others.

Miniature circuit breakers shall be used for final circuit distribution. In all cases the back-up protection of the circuit feeding the final circuit D.B's shall be an H.R.C. fuse or MCCB within the Panel Board, which shall be so rated to give satisfactory discrimination and short circuit protection.

Spare miniature circuit breakers (MCB's) shall be provided with a minimum of two of any one rating and these shall be stored in a suitably sized adaptable box located adjacent to the main switch panel. The box shall be labelled "SPARE MCB's", as Clause 3.23. with a clear cover.

All Panel Boards, D.B's, Switch Fuses, Bus Bar Chambers and Isolators are to have coloured discs fixed to the outside of the equipment to identify the Phase of the equipment.

Also fit Voltage indication labels to all D.B's, Panel Boards, Switch Fuses, Bus Bar Chambers and Isolators as BS7671, 514-10-01.

Provide and fix circuit charts, A4 size in a picture frame adjacent to each D.B, circuit charts to show clearly the name of the circuits, load and the equipment connected thereto, complete with MCB ratings. Circuit charts shall be typed and placed in a clear plastic encapsulated envelope fixed inside a picture frame with clear plastic front, not glass.

The Phase, Neutral & Earth cables for each individual circuit are to be connected to the same way within the D.B, so that the Fuse way and the corresponding connections on the Neutral Bar & Earth bar are the same.

Within all Panel Boards, D.B's each cable is to be identified with the individual circuit reference, Phase Colour and D.B. by means of coloured plastic sleeves, not clip on. Brown, Black or Grey. This is also to be done within the connection units, switch fuses, socket outlets, lights, adaptable boxes, etc. these are to identify D.B, Phase by colour and circuit reference.

The Labelling of the D.B's and circuit charts shall be carried out as instructed by the following **example** or if otherwise specified in Part 4. Those shown are not actual loads or cables sizes.

DISTRIBUTION BOARD 'X' (2 WAY TP&N), Supplied from: Main Panel cct 4L1,2,3
Supply cable size/type: 25mm² 6181B, PCC: 2.3ka, External ELI: 0.10Ω

No.	Rating	Phase	Load	Items Served	No.of Points	Ref	Cable Size
1	16A	3	10A	Washing Machine No.1	1	1L1	4
2	16A	3	10A	Washing Machine No.1	1	1L2	4
3	16A	3	10A	Washing Machine No.1	1	1L3	4
4	10A	1	5A	Tumble Dryer	1	2L1	2.5
5	6A	1	1.5A	Lighting Laundry	3	2L2	1.5
6				Spare		2L3	

If when a new D.B. is fitted and existing old type Red & Black cables are reconnect. The D.B. must be fitted with a Warning label as required by BS7671 Regulation 514.14.1.

Also all D.B's and Panel Boards are to be installed correctly, none are to be turned so that they fit within a certain position.

3.16 BUSBAR TRUNKING/CHAMBERS

Busbar trunking installations shall have Voltage, current and short circuit performance ratings suitable for the distribution system for which they are installed.

Busbar shall be manufactured from hard drawn, high conductivity grade copper conductors fully insulated and supported at intervals necessary to retain the Busbar systems integrity.

Busbars shall have bolted joints provided in such a manner as to allow the removal of any single length with the minimum of disturbance to the adjoining lengths.

A fully rated neutral Busbar and half size earthing bar shall be incorporated into each Busbar system.

All fixings shall be electroplated. Fully shuttered tap-off positions shall be provided at 500mm minimum spacing on the face of the Busbars.

All Busbar Trunking/Chambers are to have coloured discs fixed to the outside of the equipment to identify the Phase's in the Chamber.

Also fit Voltage indication labels to all Busbar Trunking/Chambers as BS7671, Regulation 514-10-01.

3.17 LIGHTING SWITCHES

Unless otherwise specified in Part 4 all lighting switches shall be 10 Amp inductive rating, with metal boxes to suit the system. Cover plates shall be metal, of the type specified in Part 4. All lighting switches shall be mounted so that their centres are 1m above finished floor.

Lighting switches for exterior use shall have a minimum IP rating of IP56.

Switches are to comply with BS EN60669-1: 2000, indicator units BS 5733: 2010

Multiple switch boxes may be used provided that only one phase is connected to all switches or phase barriers are fitted, and warning labels fitted to the switch.

Fixings to interior surfaces of the building shall be carefully and securely made by means of non-disintergrateable Rawlplug or Philplug, with brass round head wood screws of a minimum of No.8 size. Fixings external to the building shall be with equivalent plugs.

Where pull-cord switches are specified in Part 4 for use in bathrooms or similar locations these shall be mounted with break-rings so that the edge of the break-ring is not more than 25mm from the adjacent wall.

Within all switches each cable is to be identified with the individual circuit reference, Phase Colour and DB by means of coloured plastic sleeves, not clip on. Brown (L1), Black (L2) or Grey (L3).

Grid switches are to have a 20-year guarantee, the earth terminal capacity is to be able to fit a 16mm^2 cable, so exceed the current standards and the grid frame is to be made from pre-galvanised steel. Grid modules 'clip fit' to the frame without any requirements for a special tools. They can be moved, removed or replaced whilst the frame is fitted to the box. Also with top access terminal screws.

Switches used must NOT have to be de-rated when used with fluorescent or inductive loads.

All metal boxes are to be fitted with earth fly leads and connected to the earthing system.

3.18 LUMINAIRES

Supply Luminaires and lamps as specified in Part 4. All fittings shall be supplied complete with lamp holders, fixings, suspensions, down tubes, lamps and all accessories to render the installation complete in every respect.

All LED luminaires are to have white illumination.

Fixing screws to structure shall be brass/Zinc Coated and four fixings per Luminaire.

The Luminaires are to be fed via fire resistant flex, concealed within the wiring system. No other cable is to be installed within the Luminaires and **the fire resistant flex is to be kept to a minimum length no more than 400mm** or as specified in **Clause 3.14**.

Luminaires which form part of the Emergency Lighting System, the connections used to terminate the wiring between the fire resistant flex and fire proof cables, must be porcelain or of a fire proof construction. Plastic terminal blocks and crimps must not be used. If the lighting does not form part of the Emergency Lighting System or the Emergency Luminaires are self-contained type, then plastic terminal blocks may be used. Crimps must not be used for any connections for any reason on site.

All Luminaires that form part of the Emergency Lighting System self-contained units, must have a green dot fitted to the outside of the luminaire body, not the diffuser.

No cables are to be left exposed between the Luminaires and the structured cabling system. All lights are to be fed via conduit boxes, to the side of the Luminaires or as specified. No Luminaire is to be mounted onto surface conduit.

No types of crimps are to be used to connect cables together. All connections must be done via screw type terminal connectors.

All cables within the conduit box are to be identified by D.B, circuit and phase.

The Luminaire is not to be wired through as part of any structured trunking/conduit or cable system. **There should only be one entry and one flex into the Luminaire.**

Where the Luminaire is installed in a false ceiling, it is to be fed via a plug-in ceiling rose, with cord grip of a type, which prevents the weight of the Luminaire, etc. being taken on the terminals. Heatproof or Fire resistant flex is to be kept to a minimum length.

All new and existing Luminaires are to be installed symmetrically, with the lamps facing the same way, on each floor up the block, stairs and room.

All Luminaires are to have a unique reference number to the side of the luminaire and never on the diffuser. This can be done via a stick-able label, i.e. Dymo type tape.

Allow too stencil a unique reference number to the side of all the existing and new Luminaires, also the emergency bulkheads. Number must be able to be viewed from both sides in the lift lobbies, lift room, roof area, tank room, calorifier room, down the flat lobbies both sides, within the stairs viewed from the main landing, all store rooms, bin rooms, the chute rooms, viewed from the access door into the rooms, outside luminaires viewed from the ground both sides, etc. All numbering is to be the same each floor, but changing the floor number to each floor and the stairs are to be numbered from the bottom to the top of the stairs in order.

For example the lights fittings are to be labelled up on all floors as follows.

Lights on ground floor communal walkways – G/1 ,G/2 ,G/3 etc.
Outside lights on block – O.S/1, O.S/2, O.S/3 etc.
Lamppost – H1,H2,H3,H4 etc. (Lamppost should already be labelled).
Stairs – S/1, S/2, S/3 etc.
Tenant stores – Ground floor stores – T.S/G1, T.S/G2 etc.
First floor – T.S/1
Second floor – T.S/2
Third floor – T.S/3 etc all the way to Tenth floor – T.S/10.
Switch room – S.W/1, S.W/2 etc.
Lift motor room – L.M.R/1, L.M.R/2 etc.
Plant room – PL.R/1, PL.R/2 etc.
Tank room – T.R/1, T.R/2 etc.
Laundry – L/1, L/2, L/3 etc.
Bin room – B.R/1, B.R/2 etc.
Chute rooms – CH.R/1, CH.R/2, etc.
Lights on first floor communal walkways – 1/1, 1/2. 1/3, 1/4 etc.
Lights on Second floor communal walkways – 2/1, 2/2, 2/3 etc.
Up to tenth floor – 10/1, 10/2, 10/3 etc.

Emergency lights code should be recorded with the numbers in each light fitting with a description of where they are fitted for the lighting manufacture to commission the shelf test system on completion of rewire.

For example :

Light	Light code	batch number	Location
10/1	11112222256	4556231098	10th floor outside of lift.
2/4	11125555774	4556231098	2nd floor outside of flat 9

Allow to silicon round the base edge of all Luminaires. White silicon on white fittings and white ceilings. All other fittings for example conduit boxes and surfaces use clear silicon.

All Luminaires are to be supplied with fuse terminal. Also Non High Frequency Luminaires are to be fitted with Power Factor Correction.

3.19 SWITCH SOCKET OUTLETS, SWITCHED FUSED CONNECTION UNITS AND FUSED CONNECTION UNITS

These shall be provided as specified in Part 4.

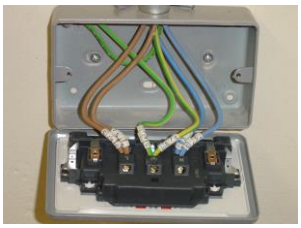
Unless specified in Part 4 or where the building does not permit, all switch socket outlets, switched fused connection units and fused connection units shall be mounted 450mm above finished floor level and provided with suitable boxes for the installation system.

All switched fused connection units controlling heating, door entry, TV Amp, cooling or ventilating equipment shall have neon indicators, and are to be labelled.

Metalclad DP sockets are to be metallic power coated with scratch resistant material, high impact resistant, specifically designed back box to ensure neat and exact fit, 3-pin “child resistant shutter system” which will only allow access to the electricity supply, when all 3 pins of a British 13 Amp plug are in position. Also all switches must be double pole and the switch must be able to be operated with a gloved hand. The terminal screws are to be backed out and captive terminals are upwards facing to make installation easier.

All RCD socket outlets are to comply with BS72288: 1990 and BS EN 50082-1: 1998. Double sockets are also to comply with BS EN 61543: 1996 and BS EN55014-1. Also the sockets are to be fitted with a active control circuits. Plus all the same requirements as a standard socket.

Within all Isolators, Switch Fuses, Connection Units, Socket Outlets, etc each cable is to be identified with the individual circuit reference, Phase Colour and D.B, by means of coloured plastic sleeves, not clip on.



All items controlled by switched fused connection units and fused connection units shall be connected with three core cable having flexible cores and rated at for the item connected.

All switch fuse and fused connection units are to be fitted with the correct fuse, for the item it is supplying.

Fixing screws to structure or conduit system shall be brass/Zinc coated round head screws and have four fixings per item.

No sockets or connection units are to be wired through as part of a structured conduit or cable system, they are to be feed via conduit boxes or trunking.

All metal boxes are to be fitted with earth fly leads and connected to the earthing system.

All labelling is to comply with **Clause 3.23**. However socket outlets are only to have the DB, circuit ID and phase label fitted, as not serving any equipment.

All electrical accessories are to comply with the general requirements for electrical accessories, Specification BS 5733: 2010.

3.20 CONTACTORS

All contactors used must have a DC rectified coil for silent running, **A.C. coils are not to be used.**

Fit Voltage indication labels to all Contactors as BS7671, 514-10-01.

Also label each contactor, advising item serving in traffolyte. Then the DB fed from, Circuit ID and phases in Dymo tape or similar. Also fix coloured discs to the outside of the contactor to identify the Phase or Phases.

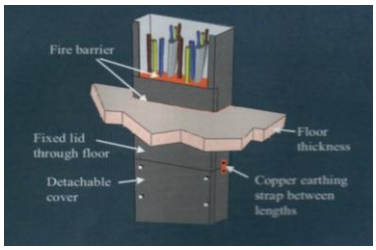
The contactors are to be enclosed within enclosures, which are to IP55.

3.21 EARTHING

The earthing installation shall comply with I.E.E. Wiring Regulations, BS7671 current Edition. Wherever possible the termination supplied by the Electricity Supply Company shall be used for earthing purposes and permission obtained in writing from the Electricity Supply Company.

3.22 FIRE STOPPING

Where the installation passes through elements of building construction which have a fire or smoke rating, the openings remaining after passage of the wiring system and the internal parts of the wiring system shall be sealed to maintain the degree of fire or smoke resistance of the building element. Such as Fire Cushions, Expanding Fire Seal, etc. **NOTE all fire stopping MUST have 1 hour rating/protection.**



This is then to be labelled both sides of the item advising of a Fire Barrier as below, nut and bolted to each side of the barrier. Label must be level.

Also allow to fire stopping as per Electrical Engineers Wiring Regulations (BS7671) 18th Edition, for example behind lights fitting.

3.23 LABELING

The exterior of all equipment including switch-fuses, switches, isolators, Panel Board, Bus Bar Chambers, Distribution Boards, contactors, starters, time switches, photo cells, photo cell override switches, connection units, DP switches, control panels, adaptable boxes, etc. shall be labelled as below and with the identity of the equipment the device is serving or being used for and in accordance with a schedule which shall be submitted for comment by the Contract Administrator and 3 weeks before the programmed completion date.

All labels shall identify what the device is for and shall be fixed by brass round head screws to the wall or device and consist of 5mm Black characters engraved on White traffolyte background, or engrave the device with the required information.

Also fit a label to each accessory and luminaire indicating the D.B, circuit ID and phase the devise is fed from. This can be done via a stick-able label, i.e. Dymo type tape.

Dyno tape type labelling is not to be used, to identify an item of equipment or accessories, ie Photo Cell over Ride switch, Bus Bar Chamber, Heaters, D.B's, Contactors, Switch Fuses, Isolators, socket override switches, etc, unless specified.

All sub-circuit cables feeding Isolators, switch fuses, D.B's, etc. Which are run on the surface, are to be labelled as required, with a traffolyte label, indicating what it is supplying. **Labels are to be fitted within the switch room and at the final point of connection of the cables, they are to be attached to the cables with clear tie wraps, both ends of the traffolyte label**, which must be visible. Corresponding labels at each end of the cable. Labels are to be large enough to be seen from the door of the switch room. Dymo tape type labelling is not to be used.

Each Earth Cable within the switch room connected to the earth bar is to be fitted with a traffolyte label, both end of the cable. The labels are to be attached via clear cable ties at each end of the label, indicating what the cable is for, i.e. MAIN EARTH, WATER, GAS, LIGHTNING PROTECTION, FIRE RISER, etc, or as is required. Dyno tape type labelling is not to be used.
For Fire Alarm Services, a label "FIRE ALARM" (white characters engraved on red traffolyte) shall be installed to each piece of equipment supplying the fire alarm, each conduit box lid or length of trunking cover. On the local Isolation adjacent the Fire Alarm Panel fit a label "Fire Alarm Do Not Turn Off" (white characters engraved on red traffolyte).

For Fire Stopping, a label "FIRE BARRIER" (red characters engraved on white traffolyte) shall be nut and bolted to each side of the barrier as required.

Supply and wall mount within each room containing a D.B. an emergency resuscitation treatment notice. This is to be screwed to the wall via Brass Round Head screws.

All labelling of devices is to comply with BS7671, Regulation 537-02-09.

All signs and labels installed must be level. If not they will be installed again.

3.24 **COMMISSIONING**

The entire installation shall be commissioned to the satisfaction of the Contract Administrator.

3.25 **ACCEPTANCE TESTS AND OPERATING INSTRUCTIONS**

On completion, the installation shall be tested to the satisfaction of the Electrical Services Engineer including:-

1. All tests required to comply with BS7671 (current IEE Regulation) and Guidance Notes/British Standard.

2. The necessary Primary and Secondary injection tests on relay and protective systems.

3. Functional and operational tests on electrical installation.

4. Operation of the Self-Contained Emergency Lighting.

5. All tests required on Lightning Protection Systems.

6. Any tests required to complete the Fire Alarm system.

7. Any other tests required to complete the installation.

The tests shall be carried out prior to being offered to the Contract Administrator as a completed installation and sufficient time shall be included in the programme as to allow these and the following Contract Administrator tests to be carried out during the period prior to the programmed completion date.

All notices to WPD for connection and testing shall be served and all charges shall be paid. Any additional charges incurred by re-testing shall be paid.

On satisfactory completion of the tests the Contract Administrator shall be provided with the following in duplicate.

1. Forms of Completion and Inspection Certificate as prescribed in the I.E.E. Regulations/British Standard and a complete set of tabulated test results for the entire installation.

2. Any Completion Certificates that may be required by the Electrical Supply Company.

3. The tests results and Completion Certificates, for any other tests carried out to complete the installation, ie Emergency Lights, Fire Alarm System, Lightning Protection, Generator, Street Lighting, etc. and any Building Regulations Part P requirements.

On completion of tests and receipt of the Completion Certificates, the Contract Administrator will inspect the installation and carry out any testing which he may require, including if necessary requesting any tests previously carried out to be repeated in part or in entirety at no additional cost.

If following a request to carry out acceptance tests the installation is not in a sufficient state of completion for these tests to be carried out, the Contract Administrator shall have the right by issue of an Instruction to recover the costs of any abortive visit or visits.

Provide all necessary labour, test equipment and associated apparatus to carry out all tests including those required by the Contract Administrator and if required produce calibration certificates for test equipment on request.

Provide, prior to the Contract Administrator inspection, a schematic diagram of the main distribution system on a A3 sheet within a plastic film in a glazed hardwood picture frame, screwed to the wall of the switch room.

Provide suitably qualified staff to instruct the Contract Administrator as to the operation of the installation.

3.26 DELETERIOUS MATERIALS

The following deleterious materials shall not be used:-

Chloro-fluoro Carton (CFC) Gases.

Asbestos.

Materials which are generally comprised of mineral fibres either man made or naturally occurring, which have a diameter of 3 microns or less and a length of 200 microns or less or which contain any fibres not sealed or otherwise stabilised to ensure that fibre migration is prevented.

Any insulation product containing urea formaldehyde.

Other substances generally known to be deleterious at the time of installation.

3.27 SAFETY MAT

Electrical Safety Mats are to be fitted complete with edging strip, in front of all electrical equipment, Distribution Boards, Panel Boards, Bus Bar Chambers, Generators, etc.

The mat is to conform to BS921/1976, non-slip surface and must have a safe working voltage of 450 volts and have a min thickness of 6mm.

The mat sides are to have metal/plastic edging strips fitted as is required, unless if the edge is against a wall and so is not a tripping hazard.

3.28 **MAKING GOOD**

After all works are completed, all surfaces will be made good to that of the surrounding area, including painting.

All paints are to have a 0 rating for fire safety.

3.29 **CONTRACT ADMINISTRATION**

3.29.1 The contractor is to take careful consideration of the following points and will be deemed to have priced accordingly.

3.29.2 Form of contract. The Council is to follow the procedure set out in the Financial Regulations and for the purpose of this contract the contractual conditions, clauses, procedures and liabilities of the JCT Intermediate Building Contract 2016 Edition shall apply.

3.29.3 Preliminaries. The contractor will be deemed to have included for the above access arrangements in his unit prices and also for liaising with the HSE and other statutory bodies as required. He is also to include for the supply of normal equipment, hand tools, etc. required to complete the works. The contractor will provide a TLO and a Full time Site Supervisor and a secure compound including a site hut, telephone, welfare facilities and storage for materials, plant and equipment. Welfare facilities will include one toilet for 1-6 operatives or two toilets for 6-25 operatives. Use of existing toilets connected with the laundries or community rooms will not be permitted. Toilets to be provided with hot & cold running water, soap and hand drying facilities. Welfare facilities will also include a rest room with suitable seating for all operatives, a supply of potable water, drinking vessels, and means of boiling water and heating food. There should also be a first aid kit. If the site hut is positioned in a grassed area the turf must be replaced on completion if it has died. The site huts and facilities cannot be located on the car park in front of the main entrance due to loading restrictions to this area; another suitable location is to be agreed with the project engineer.

3.29.4 Construction (Design & Management) Regulations 2015. The contractor is reminded that these regulations will apply to the contract. BCC will appoint a Construction Health & Safety Co-ordinator (H&SC) for the project and the contractor will accordingly need to participate with the preparation of various method statements and risk assessments as well as general record keeping for the preparation of the CDM file. If as part of their fire procedure the contractor erects a fire assembly point the sign must read “contractor’s fire assembly point”.

3.29.5 Interim valuations, Under current ‘Right-to-Buy’ legislation, a proportion of the cost of the work to communal areas as well as the cost of carrying out the works to a flat itself can be claimed back from the leaseholders. The contractor is to use a excel spreadsheet based on the Tender Analysis Form 1 as the job progresses, stating which sections have been claimed for on each invoice, as a percentage of the works completed. This is to enable clear and transparent cross checking for all parties should. Separate invoices should be prepared for each block.

3.29.6 Direct Supervision. The contractor will employ and retain on site at all times a Site Supervisor / TLO / Project Manager who will maintain a site diary, keep and collate all site delivery notes, dockets, asbestos clear sheets Etc.

3.29.7 Insurance and procurement compliances. All site personnel are to have CSCS cards appropriate to their level of operation. The contractor is to demonstrate it has a robust H&S policy in place and the current rates of insurance:

Employers Liability - £10 million
Public Liability - £5 million
Professional Indemnity Insurance – £100,000

3.29.8 Policy. The contractor will be expected to work in line with BCC standard policies regarding Lone Working, Equalities and Harassment. All contractor’s site staff must have had a suitable Disclosure and Barring Service (DBS) (previously the Criminal Record Bureau CRB) check carried out, and if required this is to be made available to BCC. It is the contractor’s responsibility that only suitable staff are employed on this site. BCC reserve the right to ask the contractor to exclude from site any staff deemed unsuitable for the location and works to be undertaken.

3.29.9 Making good. The contractor is to allow for all making good any damage caused to the communal areas & any other areas they are working in. Also residents flat or the residents property or coming to a mutually agreed financial compensation agreement with the resident whereby the contractor pays for any damage. This is to include any damaged caused to decorations due to any drilling, etc.

3.30 **Tender Submission**

The contractor is to complete all sections in the table of itemized costs, tender analysis, etc. Tenders that include tables with sections priced as “included elsewhere” or similar phases may not be accepted.

All external or specialist labour used is to be employed by the main contractor on a sub-contract basis. This includes any asbestos removal, fire safety, Utility works, BGlobal works and reinstatement work related labour.

The actual number of emergency light fittings will only be known when the properties have been surveyed, the design completed to BS5266 and the works completed.

The contractor is to allow a contingency as set out in the Tender Analysis Form 1, which is to be brought forward and included in the total tender sum. The contingency sum has been broken down per block.

Site Visits are a mandatory requirement failure to attend site will deem your bid non-compliant. Slots will be scheduled per Contractor. Please note this will be the only opportunity for site visits and that no other dates will be available. To arrange this contact Ivan.Parker@bristol.gov.uk directly.

Any drawings are representative only and are intended to be read and not scaled from.

The tender submission is to be returned via PROCONTRACT.

3.31 **Contract Lead-In, Access Arrangements & Site Staff**

Following the appointment of the successful contractor, a pre-contract meeting will be held between the Main Contractor, the Contract Administrator, the H&SC and any other interested parties. During the meeting, a contract lead in period will be agreed. Before work begins on site the contractor is to provide an acceptable programme showing timescales and likely sequences of works. This must be updated regularly. The contractor is to ensure adequate resources are available to undertake the work within the allotted time scale.

The contractor will if possible be provided with a key, fob or pass code to allow access to the communal areas and will be supplied with the contact details of the caretakers, wardens or other responsible staff. If car park passes are required a maximum of 2nr will be issued. The contractor must park so as not to cause inconvenience to residents. The contractor will be expected to keep the on-site staff informed about which areas work is about to be undertaken in. Consideration should be given by the contractor regards installing a whiteboard within the communal area which can be updated regularly by the contractor to inform residents of works areas and other pertinent information.

BCC tenancy conditions require occupiers to be given notice of works taking place and that they will have free access to the communal areas. So at the start of the works the contractor will inform all residents about the purpose and start dates of the works. The contractor will ensure that residents are kept informed of all work update, shutdowns, etc. by lettering each resident, communal noticed will not only be relied on. The residents must be given normally a week's notice of works taking place.

Past experience indicates that although the vast majority of the tenants will be co-operative a very small proportion may fail to for whatever reason. If and when it becomes clear that a resident is not

likely to co-operate in this respect, the contractor is to inform the Contract Administrator who will arrange for occupiers to be contacted formally, pointing out their duties.

All site based staff employed by the electrical contractor, asbestos removal contractor and building contractor are to carry ID and be provided by their employer with liveried work-ware / high-viz vest for ease of identification. No operatives should entry a resident flat.

3.32 **Asbestos Testing and Removal**

All asbestos removals, sampling, air testing etc. is covered in the specification of works & should be allowed for within the site specific Asbestos check and removal. With regards to these works, it is our intention to remove any asbestos associated with the works within the communal areas or rooms; however not necessarily to remove all asbestos.

3.32.1 Testing of previously untested or doubtful materials. The contractor is to use a UKAS accredited asbestos testing laboratory to carry out any further tests. All work is to be done in consultation with the Contract Administrator. All test certificates are to be retained and forwarded to BCC. Panel products are to have a water absorption test undertaken as described in the Control of Asbestos Regulations 2012. If the test reveals that the material consists of a semi-cementatious material, it may be removed using partial containment measures, reducing cost and most importantly reducing disruption to the residents.

3.32.2 Asbestos removal is to be carried out under fully controlled or semi controlled conditions as applicable. Transfer routes through communal areas etc. to be clearly marked before commencement. Prior to removal, the following will be required.

i) Contractors up to date full asbestos removal licence.
ii) Contractors up to date hazardous waste carriers licence.
iii) Copies of the relevant completed consignment notes.
iv) Method Statement / Plan of Work and Risk Assessments
v) A copy of the HSE notification form ASB5.

3.32.3 Disposal is to be in accordance with the Special Waste Regulations 1996. Re-occupation air tests to be carried out by an independent UKAS accredited analyst and forwarded to BCC. Works to be carried out in line with Asbestos: The Surveys Guide and relevant HSE approved codes of practice (L143). Some low level, non-licensed AMC removal e.g. drilling of Artex may be carried out in accordance with The Control of Asbestos Regulations 2012. The regulations state such work is to be carried out by a competent person in accordance with the appropriate HSE Asbestos Essentials task sheet. However, it is BCC policy that all asbestos removal, including non-licensed removal is carried out by a licenced contractor.

3.33 **Fire Safety Survey**

Upon entering communal areas, stores, etc. and after the removal of any existing fire stopping or asbestos components detected, the contractor is to carry out a full survey to identify instances where separation between compartments has been compromised and to undertake the necessary remedial works. In the case of communal areas the survey is to be carried out per floor and will be deemed to

include all communal spaces like Community Room, Kitchen, Laundry, WC's, Stores and Tenant Storage Areas etc..

These are to be replaced as required and the Fire Safety Compliance Certificate is to be completed and returned to the contract administrator with the O&M Manuals.

3.33.1 Instances where service penetrations e.g. trunking, conduits, cable trays, etc. floors or walls, either within ducts or exposed, have not been properly fire stopped, externally or internally.

3.33.2 A visual inspection to confirm that the physical construction of the flats continues to provide the required one hour fire protection from adjacent compartments. Although this work is not expected to be very time consuming or problematic, the contractor will need to check that subsequent alterations to the structure have not adversely affected fire safety and that the original inherent fire separation is still intact. This will involve checking any new installations as part of these works and any existing systems used for the new installation, i.e. inside existing trunking that the fire stopping is present, any holes in the walls have been made good to the existing standard, etc. At the end of the works the contractor is to provide visual evidence that the Fire Stopping has been carried out as required, a photograph record to be taken and supplied with the Fire Safety Compliance Certificate within the O&M Manuals.

3.34 **Remedial and Associated Works**

3.34.1 Fire stopping to fill large gaps

It is assumed the contractor will fill large gaps with cementation material e.g. concrete/intumescent aggregate to be certified as tested to comply BS 476 part 22 or a proprietary intumescent board e.g. Promat Promaslab, Hilti CP 670 Fire Safety Board or Glasroc F Multiboard, suitably "buttered" with intumescent mastic around the edge to achieve an effective bond with the surrounding substrate. Where a batt is installed this should in installed within the hole not piled up over and covering the hole. Any holes of a size and position where someone could put their foot through then the fire stopping material must be capable of taking a person's weight.

3.34.2 Trunking

Any trunking are to be checked and cleaned; if required, intumescent fire rated stopping installed within the trunking or replacement with fire rated stopping.

3.34.3 Minor repairs

The contractor is to allow for making good any damage caused by the works being carried out. The method of repair may involve the cementing, plastering, fire stopping, repainting areas damaged by the works carried out or just the touching up or complete redecoration of the areas where the works have been carried out.

3.34.4 Reinstatement

The contractor is to allow for removal and subsequent re-fixing of fixtures and fitting removed to allow the installation of the new emergency lighting to proceed. This particularly applies to the reinstatement of disabled adaptations which must be refixed as soon as possible.

3.35 **Data Protection**

The contractor must ensure that they, their staff and their sub-contractors comply with the GDPR May 2018.

SECTION 4

DESCRIPTION OF WORK

ELECTRICAL SERVICES INSTALLATION

PART 4

Description of Work

ELECTRICAL SERVICES INSTALLATION

Please note that where individual products have been specified, a similar supplier with equal or improved quality may be substituted by prior approval by the Contract Administrator; please see Tender Analysis Form 2.

4.1 EXTENT OF WORK

The works described in this Specification shall comprise the following Electrical Services associated with Redwood House and Willow House.

1. Incoming Electricity Supply and main panel to new location (currently generator room).
2. Builder works and fire stopping.
3. Removal of generator, associated switch gear and cabling.
4. Distribution Installation and distribution boards.
5. Building Sub-main cabling.
6. Installation of LED dimmable lighting.
7. Installation of LED emergency (dimmable in normal state) lighting.
8. Rewire of ALL lighting and power final circuits.
9. Installation of LED street lighting to carpark.
10. Earthing and bonding.
11. TV Trunking upgrade.
12. Testing and commissioning.
13. "As Fitted" drawings and maintenance manual.
14. Removal of the any redundant electrical equipment, containment and cabling found during these works.

The Electrical Services installation shall comply with the standard technical requirements of this Specification, 18th Edition IEE Wiring Regulations (BS 7671: 2019) or current addition, all other relevant British Standards, as BS8519:2010, BS7698-12, BS5266-1:2016, Building Regulations Part P, etc. and shall be executed to the satisfaction of the Contract Administrator.

Also all Disposal Notices of all old equipment, cables, cardboard, etc. Must be supplied before final payment can be made.

The Contractor is to arrange progress meetings as required, on site for the duration of the job.

If any item is fitted to a surface other than the existing solid surface, it must be fitted on a fireproof surface, as required.

Where required the Contractor is to allow for working outside the normal working hours of the day, as no extra payment will be allowed where this may be required, i.e. Laundry, etc.

4.2 SITE LOCATION

The site is defined as Redwood House and Willow House, The Groves, Bishport, that is located in Hartcliffe Bristol BS13 0RS
It is proposed to rewire all the existing building electrical supplies at the above high rise blocks internally and externally, as required.

Tenders should visit site to acquaint themselves with site conditions, existing services or any other matters likely to affect the Tender. (For example investigate existing trunking; trunking must be continuous through floors and walls.)

Any claims, the cause of which can be attributed to failure to comply with this requirement will not be permitted.

4.3 DRAWINGS

The Electrical Contractor shall not proceed with the installation of any section of the works until he has submitted the relevant drawings and Programme.

No claims shall be entertained due to the Electrical Contractor having to remove and reinstate due to lack of co-ordination on his behalf in the first instance.

4.4 RESIDENT CONSULTATION

Bristol City Council Neighbourhoods have a policy to liaise with Resident associations and individual Residents affected by any works being carried out within their building or around the site.

The Electrical Contractor will be required to attend meetings, to advise the residents of the works taking place. The Contractor is to schedule times for this to be done during the day and evenings as required to inform all the residents.

The Contractor is to write to all Residents and put up Notices in all communal areas, notice boards, communal entrance doors, laundry, etc. a couple weeks prior to any works commencing on site, Access required to tenant stores, advising occupants of the works being carried out, the Health and Safety issues, the site contact, telephone number, **also note that you will not require access to their flats** and that they should not allow anyone access who say they are working for you. The Contractor is to provide a copy of the proposed letter to the Contract Administrator 2 weeks before works are to take place.

The Electrical Contractor will be required to deal with day to day Resident enquires and liaise with Residents affected by any works carried out, i.e. drilling, access, etc. mutually acceptable times are to be agreed. The Contractor will be able to use Council Electricity, only in connection with works being carried out as part of this Tender.

All Residents are to be given a minimum of 48 hour's notice of any loss of communal supplies in an emergency. However, planned works, 1 weeks notice is the normal time given to Residents. This must be done via letters to each flat and notices put up in communal areas, notice boards, as required.

Also the Contractor is to letter each Resident of any disruptions happening as part of the works, which will affect the Residents, i.e. lamp post works in the car park, blocked stairs, lifts turned off, communal TV turned off, communal electrical shut down, etc. They are to be given at least 2 week's notice before the works take place.

Any letters and notices for the Residents, a copy is to be given to the Contract Administrator at the same time.

Notices are also to be fitted to any room doors in which electrical works are being carried out, i.e. switch rooms, generator room, laundry, calorifier room, community room, lift rooms, etc. advising of no access until works are completed and who to contact in and out of hours in an emergency. The Contractor is to arrange convenient times when works can be carried out in all rooms which the tenants have access to. This may have to be carried out, when the rooms are not being used, i.e. out of hours. This is to be allowed for as required, as no extra payment will be allowed for if it is later found that the rooms cannot be worked in during normal working hours, i.e. the laundry, etc.

4.5 GENERAL HEALTH AND SAFETY

Where the Electrical Contractor's employees or Sub-Contractors are working within communal areas, there must be appropriate signage (Men Working) and barrier off all locations used, as required.

Under no circumstances should any materials, equipment, etc., be stored or left on site within the lift rooms, switch room, community room, office, boiler room, etc., the contractor shall allow for external site storage for the duration of the contract, if required, (location to be advised and agreed with the Contract Administrator).

The contractor is to provide a Health & Safety Plan for all works carried out on site, this is to include for the delivery and installation of the materials. The working in the walkways, stairways, within the mains switch room, lift room, on the roof, etc. and any works by Sub-Contractors. No works are to proceed until this has been submitted to the Contract Administrator.

No Unauthorised Persons are to be allowed within the main switch room, lift room, Plantroom, generator room, office, roof, etc. while works are being carried out and the door is to remain locked at all times.

The Electrical Contractor's employees are expected to work in an organised manner, create no hazards by incorrect working methods, and to leave the workplace in a clean and orderly condition. If in the Contract Administrator's opinion this requirement is being ignored, he may at his discretion suspend the works, employ other workmen or cleaners and set off any extra costs to the Electrical Contractor, as set out in the contract.

All Electrical Contractors staff will be dressed in a tidy manner, preferably wearing clothing that identifies them as employees of the company.

All Electrician's working on site must hold an ECS (Electrotechnical Certification Scheme) card, approved to work as an Installation Electrician and have passed the Health & Safety Assessment (CSCS). If they do not meet these requirements they are not allowed on site. All cards are to be shown to the Contract Administrator before anyone starts on site and photo copies sent to the Contract Administrator.

The installation shall be carried out and supervised directly by skilled operatives, who may be assisted by apprentices or semi-skilled staff where appropriate. No more than one per skilled operative.

It will not be acceptable for work to be carried out where no skilled persons are present and any such occurrences may result in the Electrical Contractor having the works suspended and any extra cost for employing others to complete the works and any extra costs will be taken off the Electrical Contractors payment.

All electrical works are to be carried out as required in the Electricity at Work Regulations.

When working on any electrical circuit, it MUST be made and proved dead before working on the circuit and the MCB MUST is locked off, with a warning notice of Electrician Working on Circuit.

Any works within ducts, etc., must be carried out as Bristol City Council's Policy on Confined Spaces, which can be accessed from Bristol City Councils Web site.

Where access ducts are to be removed, they must be replaced at the end of each day and complete with all screw fixings. No open raiser ducts are to be left open when operatives are not in attendance. They **MUST** be kept closed at all times and only open when working in them, they must also be barried off.

The main contractor is to CAT walls, floors and the ground before doing any drilling/digging for buried cables/services within the ground or the fabric of the building. The CAT scanner to be in calibration and end user to be suitable trained. Repairs to any damage building services will be charged to the Electrical Contractor, as set out in the contract.

Safety shoes/boots and PPE are to be worn at all times, while on site as per risk assessments and method statements etc.

Hard hats to be worn as required and **signs are to be displayed at all times on all access routes to the working area, so as to advise all residents and visitors to the property of the Dangers**.

The Contractor is to provide an site Foreman for the duration of the works, who is to be on site at all times, to co-ordinate the workforce, sub-contractors, Health and Safety, etc., on site, as is required. They are also to be the point of contact for other Contractors working on site, Estates Staff, Caretakers, Residents, etc. Also if they are off, due to illness, holidays, etc., there must be someone on site to take over these duties, during this period.

At the end of each day the Contractor is to ensure that all the existing communal lighting is working correctly internally, externally, back-up Generator is available and that all lamps are working, before leaving site. Any and all cost incurred in calling out another contractor out of hours, will be borne by the Main Electrical Contractor.

The Contractor is to provide an out of hours Emergency Contact name and number for the duration of the contract and any time extensions. This is to be provided to the Contract Administrator before any works start on site.

Where the installation passes through elements of building construction which have a fire or smoke rating, the openings remaining after passage of the wiring system and the internal parts of the wiring system shall be sealed to maintain the degree of fire or smoke resistance of the building element.

The contractor is to arrange for a site-specific asbestos survey and supply all results to the Contract Administrator as required.

The contractor is to provide self-contained Welfare Facilities as required for the duration of the works taking place. These are to come with their own power and water supplies integral to the units.

4.6 BUILDERS WORK

The Electrical Contractor shall allow for the builder's works within this Tender, as necessary to allow the completion of this installation.

All decoration and making good works will be carried out by our (Bristol City Council) prefer contractor to meet our fire requirements. However please allow a window of time for the said decorating contractor to decorate the switch room before any new switch gear is installed.

The electrical contractor must take care when removing any electrical equipment and containment. I.E. using a knife to cut around the electrical equipment to break the decorated finish.

Allow to remove the old Generator room metal framed wall & door and replace to make new Block work room Enclosed switch room within Redwood House and Willow House using the following material or equivalent.

Blocks: ARC standard dense, Work size: 215mm x 440mm x 75mm.

Wall starters/connectors: Manufacturer and reference: Expanded Uni-Starters

Material finish: Galvanised steel. Size(s): To suit wall width. Prepare joint and apply sealant

Joint Reinforcement for block work: Manufacturer and reference: Expamet Exmet.
Material: Galvanised steel, Width: 40-50 mm less in width than wall or leaf. Lay as BS 8000: Part 3, Clauses 3.1.3.8.

Damp Proof Course: Manufacturer and reference: Ruberoid Permabit bitumen polymer or equivalent approved.

Sand and Mortar: To BS 1200 unless specified otherwise. Sand for face work mortar to be from one source, different loads to be mixed if necessary to ensure consistency of colour and texture.
Lime Base Mortars: Use ready-mixed lime: sand to BS4721. Coloured mortar, where required, to be made using a proprietary coloured ready-mixed lime: sand, colour to approval where not specified. To be mixed 24 hours in advance. Mortar mix to be 1:1:6 cement/lime/sand.

Cement for Mortar: When not specified otherwise, to be Portland cement or Portland blast furnace cement, to class 42.5 or 52.5, manufactured and supplied under the BSI Kite mark scheme for cement. All cements must comply with the appropriate British Standard.

Door and door frame: Supply and fit softwood door frame and lining.
All frames to be fixed, wedged, plugged and screwed back to walls. Finish with fitted architrave.
Supply and fit fire door, 44mm thick, internal quality sold core door with half hour.

These are to be faced both side with internal quality, painting grade plywood, with hardwood lipping to both long edges to suit opening.
Contractor to include for all necessary ironmongery including min 4 high quality stainless steel hinges, dead knob pull, Briton door closer etc. Allow to fit a new security deadlock within the new door, as required. Make good floors, walls and ceiling around the site new frame inside and out, as required. Within the new doors allow to fit new door furniture a Yale deadlock case, with 4A711 Cylinder and thumb turn inside the room. Allow to fit a FD30 fire door ironmongery pack kit and combined intumescent / smoke seal strip or half batwing surface mounted combined strip.

On each door to a room containing an electrical D.B. fit a ridge plastic 3mm, Danger of death sign (100mm long/100mm high), ridge plastic 3mm, Electrical Switch Room sign (200mm long/100mm high) and a rigid plastic 3mm, No Unauthorised Persons Allowed Beyond This Point sign (200mm long/100mm high). As above and example below

Within the room fit a ridge plastic 3mm, Regulation 15 sign (200mm long/150mm high).

Fix each with a min of four brass cups and screws one to each corner, colour to match sign, brass or white. Also with an adhesive to the back of the sign, as required. <u>All signs are to be level</u>.

Allow to dispose of all debris from site and supply all waste management invoices with final Invoice when finished on site for payment.

Within the main switch room (Old Generator room), all other local switch rooms (Lift motor room, Laundry, Calorifier room/Plantroom and under stairs switch room allow to fit 1 No new galvanised metal file holder, similar to the existing holder within the main switch room. The new holders are to be sized to hold a lever arch file, as that for the new O&M Manual in the main switch room. Fit the new metal holders on the back of the new doors to the switch rooms or adjacent clear wall. Ensure all new holders are large enough to hold the size of the O&M Manual, so it can sit level within the new holder. Holders must be installed level, with a min of four brass round head screws one to each corner.

4.7 EXISTING SERVICES

The Electrical Contractor shall include within the tender price to remove the following existing services within the block: -

i) Existing Distribution Boards, bus bars and controls.
ii) Existing Wiring, internal and external.
iii) Existing electrical services (lighting/power, etc.) within all the refurbishment areas.
iv) Existing Generators and control equipment.
v) Existing self-contained emergency lighting.
vi) Any other existing wiring, lighting, equipment and accessories not stated, to complete the Tender.

The Electrical Contractor should survey all existing services to be removed. As no claims shall be entertained due to the Electrical Contractors failure to do so.

Also allow for the existing circuits to be maintained at all times, while the works are being carried out, i.e. Lights, Lifts, TV, Laundry, etc.

No works are to be carried out within the Lift Motor room or on the Lift supplies, without first contacting Stanah lifts who will have to disconnect the Lift controls and reconnect when works are complete. **Stanah contact details can be obtained from the Contract Administrator** and no works are to be carried out within the Calorifier room without first contacting Glevum, Nick Blake Tel: 0789626920. Any costs incurred for these, must be allowed for by the electrical contractor within their Tender or will be deducted from the Tender price, if ordered by others.

Allow when carrying out any electrical shut downs, which may affect the Lift Supplies and TV Amp, that they are isolate as required at the switchfuse, connection unit, before re-energizing the mains supplies & circuits. Then once all power is restored, then switch the switchfuse, connection unit on. Also check a property on the Communal TV system, to ensure all the TV Channels are back on. If there is any problems contact Otis for the lifts or Avonline (Nick Evans Avonline Tel: 0797008300) for the TV's. Orders will have to be placed if the contractors have to attend site, this will be at the electrical contractor's own expense.

4.8 MAIN SWITCHGEAR

The existing Mains, Busbar chamber, Distribution Boards, Switch-fuses, etc. within the Main Switch Room and all other Rooms, are to be removed. This is to be done before the new Panel Board, D.B's, trunking, etc., are installed within the rooms. While any works are being carried out allow too install temporary boards to maintain all the existing circuits, as required.

Allow to renew the main tails from the WPD METER (Contact Haste contact Bethany Lord at Bethanylord@hasteltd.co.uk or Phone: 01530517960 option 4 EXT: 7967) to the main switch within the under stair switch room. The new panel board and general Distribution boards are to be relocated to the new main switch room (old generator room) where possible.

The Electrical Contractor shall install new cable/s; from the electricity supply position/new main switch to the main MCCB panel board as required. These cables shall be installed on galvanized MRF metal cable tray or within galvanized metal trunking system, between the Meter and panel board position, as required.

Install and connect, New MEM/Eaton **OR EQUIVALENT TO BE AGREE WITH the Contract Administrator,** MCCB Panel Boards, allow triple pole & Neutral Main switch, with triple pole ways, Three Pole (TPS) Plug on MCCB, main Incoming device same rating as the existing incoming mail fuse, fix as required. Size Panel Boards as required to supply all Electrical Equipment on site with at least 25% spare ways.

The main MCCB shall have a minimum fault rating of 33KA and shall have adjustable characteristics to provide discrimination with outgoing sub-main devices. 120mm^2 4 Core max on incoming terminals.

Outgoing MCCB devices shall have a minimum fault rating of 16KA single phase and 25KA triple phase, with standard/adjustable type circuit breakers. 70mm^2 4 Core max outgoing terminals.

The Panel Board is to have the correct Neutral and Earth terminals for each single phase way, no Neutrals or earths are to be doubled up.

The MCCB Panel Boards are to comply with BS EN 60439 and have a degree of protection of IP4X. Busbar fault rated 25KA-1 sec, Busbar ratings 250Amps.

All the existing D.B's are to be replaced with new MEM Memshield 3 Metal Clad D.B's, which shall be provided with integral on-load isolators and shall comply with BS 5486: Part 12. Within the 3-Phase D.B's the integral isolator is to be a **Four-pole** type only or as specified in Part 4. Except the D.B. within the Lift Motor Fuse Board within the lift room.

The Electrical Contractor shall install new cable tails, size as required, to the new main fused switch (within the under stair switch room) which in turn will feed the new MCCB panel board with in the new switch room (old generator room). These cables shall be installed on galvanised metal cable tray or enclosed within galvanised metal trunking system, between the Meters and the new panel board positions. All must be fixed via metal straps/cleats.

All open trunking ends must have grommet strips fitted or other type of manufactured protection for the cable.

Where new D.B's are connected to trunking, this is to be done via open slots and not via bushes or couplers. Allow to fit a cable trunking interface kit as required between the D.B and trunking. Also ensure the D.B. and trunking are earthed bonded together.

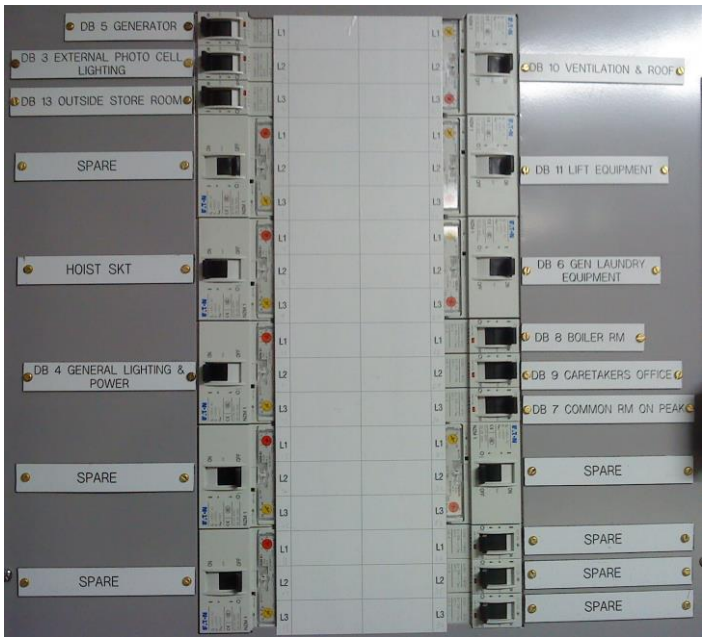
Also allow too remove existing equipment and accessories within the switch room, as required.

Any costs incurred from the supply company, etc., for any works carried out by them, must be allowed for by the electrical contractor within their Tender.

All ways/circuits used are to have traffolyte labels fitted within the panel boards to identify what the MCCB is serving, these are to be fixed with brass nuts and bolts, as required.

Also leave a MCCB spare for each type and size used in this installation, either on a spare way within the Panel Board or mounted on a din rail within a single plastic box, large enough to hold all the spare MCCB's. Label box if fitted, Panel Board MCCB's, as **Clause 3.23**.

Any costs incurred from the Utility Companies, Supply Company, BGlobal, WPD etc., for any works carried out by them, must be allowed for by the electrical contractor within their Tender, as no extras will be allowed for if it is found that any of these are required to attend site and it has not been allowed for by the electrical contractor.



Label all cables within the Panel Boards and item of equipment supplied, same reference each end, as **Clause 3.15**.

Panel Board MCCB's to be same size as existing switch-fuses.

Label all equipment, accessories as **Clause 3.23**.

Fix Voltage indication labels to all equipment, Panel Boards, Phase Disc, D.B's, Switch-fuses and Isolators as BS7671, 514-10-01.

The maximum mounting height to the middle of any Distribution/ panel boards must not exceed 1.2m, from FFL, final position to be agreed with the Contract Administrator.

Sub-main circuits to include: General lighting and Power distribution board, Lift 1, lift2, Lift motor Room lighting & power Distribution board, Lift & lift shaft lighting and power Distribution board, Distribution board, Surge protection at ground floor and roof level, Boiler/plantroom or Calorifier room lighting and power Water tank room (roof) distribution board, Laundry room Power supplies, BMU Power exchange unit, External lighting distribution board, CCTV distribution board, boiler / mechanical panel, Fire alarm Panel, Smoke vent system, 2x 63 amp future car charger supplies and Hoist supply But NOT limited too.

Also contact WPD about the possibility of fitting new 3 Phase surge protection to each mains riser supplies to the flats, if possible. Wire via Switch-fuses to the Surge protection as required within the ducts.

Allow to supply and fit Modular Distribution Type 1 Surge Protection is to be installed for protection the mains supply and lightning within the main switch room (main panel board) and lift motor room. (Lift Distribution Board). This is to be installed as required as close as possible to the point of supply by the meter on the electrical 3-phase supply via a new 3 Phase 63Amp MEM Switch-Fuse.

Also install Type 2/3 surge protections/arresters to any sub distribution boards feeding electronic circuits and electronic equipment. For example LED lighting distribution board and LED light monitoring equipment.

All Surge protection installed should be manufactured by DEHN UK LTD or equivalent.

Allow to install the surge protection units as per manufacture instructions.
Tony Male is the contact for DEHN Surge protection devices.
Tel: 07419925673 Email: tony.male@dehn.co.uk
The protection must have status indication, i.e. full protection, reduced protection, no protection or no power plus warning of high neutral/earth voltage present and must be single modules. Ensure unit is fixed within a clear box. If only a brass bush and lock not are used, then a female bush must be used to cover the thread end. Old Surge protection unit to issue back to the contact administrator. For final earth connections terminal connect to light protection at ground floor and roof. Please contact Dawson Steeplejacks Ltd 01934 876665, dawson@dawsonsteeplejacks.co.uk

Also leave a MCCB spare for each type and size used in this installation, either on a spare way within the Panel Boards or mounted on a din rail within a single plastic box, large enough to hold all the spare MCCB's. Label box if fitted, Panel Board MCCB's, as **Clause 3.23**.

Also allow too remove all existing equipment, cables and accessories within the generator rooms, switch rooms, Plantroom, calorifier room, etc. as required, if no longer in use.

Also label all items of equipment new and existing, etc. as **Clause 3.23**.

Allow to supply complete layout plans for all floors, lift room, roof area, communal internal/external lighting, office, stores, community room, library, emergency lighting, New main switch room, switch rooms, Laundry, main switch room, computer room, ducts, calorifier room, garages, etc. Identifying the location, phase and circuit of all equipment, accessories, lighting, power, etc., installed on site. The plans are to be supplied with the O&M Manual A1 size for ground floor, 1st Floor, Typical floor, roof area and external area for each block. Also they are to be supplied on a Disc in AutoCAD LT 2014 format. The electrical contractor is to supply all layout plans necessary to complete this as required. Also an complete Asset list of all electrical items, equipment, accessories, types, manufactures, numbers, etc. on a Microsoft 2010 Excel spread sheet as required. Final Payment will be withheld until this is supplied or these works will be issued to another contractor to complete at the main contractors expense, if not supplied two weeks after the handover date.

4.9 SUB-MAIN AND FINAL DISTRIBUTION

From the new MEM/Eaton MCCB panel board run new **6181Y PVC/PVC** cable tails and/or **XLPE/LSHF/SWA/LSHF** sub-main cables to the Distribution Board's (D.B's) positions, control panels, switch-fuses, etc. within the switch rooms and at various locations on the site. A separate C.P.C or additional core within all armoured cables of the same size as the phase conductor, shall be installed with all cables for each supply and terminate as the phase conductor within the Panel Board and item of equipment, as required

Where cables are supported on a vertical cable tray, they shall be fixed at max, 450mm centres using metal tie wraps.

The new D.B's and fused switch are to be located in the following positions,

Main Switch Rooms:

3 Phase General Power D.B, 3 phase General Lighting D.B and External lighting single phase D.B.

Laundry Room:

General Laundry Power & Lighting D.B. and Laundry Equipment D.B. via 100AMP Contactor and 25mm cable.

Lift Motor Room:

Lift 1 fused switch, Lift 2 fused switch, Lift Services Power/Lighting D.B, Lift Motor room Power & Lighting D.B. and Roof Power/Lighting D.B.

Water Tank Room

Water Tank Room Power & Lighting D.B.

Boiler/ calorifier Rooms:

Plantroom/ Boiler panel fused switch, 3 Phase Boiler Room General lighting and Power.

All Distribution Boards/Consumer Units are to be installed and sized as **Clause 3.15**.

All labels are to be traffolyte and as **Clause 3.23**, no other form of labelling will be acceptable.

Where new D.B's are connected to trunking, this is to be done via open slots and not via bushes or couplers. Allow to fit a cable trunking interface kit as required between the D.B and trunking. Also ensure the D.B. and trunking are earthed bonded together. Allow install new 6x6 Galvanised Metal Trunking around all new D.B's and Panel Board within the New Switch Room, as required.

The Contractor is to make themselves a where of all wiring within the block, if any other circuits are found when works start, which must be rewired and connected, this will be done at no charge to the Council.

The New D.B's are to be as Plans supplied. The plans are a guide only and the Contractor my find circuits and not allowed for, which must be rewired and connected as required, at the Electrical Contractor's expense. Any changes are to be noted on the as fitted drawings.

Please note making good in **Clause 3.28 and 4.26**.

At the Panel Board and each Distribution Board (D.B), position a typed circuit list A4 size, to be completed to identify the individual circuit reference, description of the connected load, MCB Size, **actual connected load current**, number of points served and cable size, as **Clause 3.15**. This shall be

fixed to the wall adjacent to the Panel Board and D.B's within a clear laminated wallet, within a A4 picture frame with Perspex front, not glass.

Within all D.B's each cable is to be identified with the individual circuit, coloured phase reference (Brown L1, Black L2 & Grey L3), by means of plastic coloured sleeves, not clip on. Only the Circuit reference numeric sleeve white with black number and Alphabetic letter phase D.B. marker is to be used on cables. This is also to be done within the connection units, switch fuses, socket outlets, Luminaries, adaptable boxes, etc. these are to identify D.B, Phase by colour and circuit reference. Label all equipment as **Clause 3.23**. The cables are to be coloured Brown for Live, Blue for Neutral and Yellow/Green for Earth, for single phase circuits. Three Phase circuits are to be coloured Brown, Black and Grey or all brown with L1, L2 and L3 Cable Markers for Live conductors, Neutral and Earth as single phase circuits and as required in BS7671.

Also allow to install layout drawings of the blocks in each switch room which that switch room supplies including the Community Room, computer room, switch room, stores, generator room, garages, laundry, etc. Fix the layout plans to the wall adjacent to the D.B's and also supply an A3 line plan showing the Mains/Panel Board/D.B's/Circuit layouts, location of Luminaires served by the boards, cable sizes and their circuit identity within the communal areas. Drawings are to be as the layout of floors, rooms, etc, of the buildings, be A3 size laminated sheets, held within A3 wooden frames and with clear Perspex front, not glass and fixed to the wall with a minimum of two screws top and bottom. All plans are also to be supplied to the Contract Administrator in AutoCAD 2014 dwg format.

All Contactors used are to have silent running coils. The contactors are to be fitted within enclosures, which are IP55. As the MEM example enclosure below ref: **428ALCDPR**. The lighting D.B's are to be controlled by 2 Pole contactors, those controlled via photocells and override switches.

All contactors are to be provided with an override switch via a new MK Metalclad Double Pole (DP) Grid Switch with Neon. Engrave/Label switches and contactors as required. Neon to be light when lights are on override. As example below.

Final circuit wiring between D.B's, small power outlets, etc. shall be carried out using **XLPE/LSHF/SWA/LSHF or 6491B Low Smoke and Zero Halogen** (LSHF) insulated cables for none emergency equipment. **Fire Proof SWA**, **MICC** Sheathed or **Fire Proof** cables are to be used for all essential emergency equipment and emergency lighting circuits. A separate C.P.C. of the same size as

the phase conductor and the same grade of cable shall be installed with all cables for each circuit. Except MICC that has its own earth. The cable, which is to be used to connect the new & existing Luminaries to the new wiring system, is to be Fire Resistant Flex, no other cable is to be installed within a luminaire, as **Clause 3.18**. All Fire Proof cables are to comply with **BS8519:2010**, be of **Category 2** survival time, Also can demonstrate they have the same level of fire resistance as required in **BS8491**.

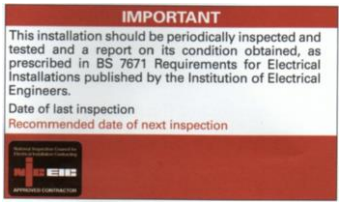
Allow to fit new traffolyte labels, screwed to the fronts of all the D.B's, isolators, switch-fuses, panel board, contactors, switches, etc as required. As **Clause 3.23** or engrave as the switches, identifying what the D.B. is for and it's number.

All D.B's, Panel Board, Switch Fuses, Isolators, contactors and junction boxes are to have coloured discs nut and bolted to the outside of the equipment to identify the Phase of the equipment on site.

Also fit Voltage indication labels to all existing and new Panel Board, D.B's, Switch Fuses and Isolators as BS7671, 514-10-01.

Fixing screws to the structure of the building for conduit boxes/trunking systems, switch boxes, etc, shall be via brass/Zinc coated round head steel screws and have four fixings per item. **No Counter sunk screws are to be used**.

All D.B's are to be fixed directly to a wall and each is to be fitted with a Periodic Inspection Notice, with the **Companies Name, Date Tested and Re-Test Date, of Five Years.** As below.



Install new Health & Safety Shock procedure signs, which are compiled by qualified first aid practitioners. These are to be fitted as required in all areas where a D.B. is fitted, ie, in the new generator room, each switch room, each lift room, calorifier room, tank room, each digit TV equipment by the lift access, etc. All signs are to be fixed with screws adjacent the D.B. or on the wall adjacent entrance the door within the room or on the back of the door within the room, where a D.B, etc is installed. However in the calorifier room fit adjacent the 3 Phase D.B. Sign to be as example. Which is to be held within a snap frame, supplied by the sign manufacture. Sign and frame can be obtained from Safety First Aid at www.safetyfirstaid.co.uk. Remove any existing signs.

Within the proposed new switch room, switch rooms, Plantrooms, calorifier room, lift motor room tank room, in front of the digital TV equipment in the access areas to the lift rooms, etc. Install an electrical safety mat in front of all the D.B's, Switch-fuses, Isolators, control panels, also to all sides of the new generator, etc, if not already fitted, as **Clause 3.27**. Allow to fit edging strips as required between the rubber mats and concrete floor.

Allow to replace the existing Photo Cell on the block and install a new Royce Thompson V16 or equivalent, Photo Cell is to fitted on the face of a PVC adaptable box, adjustable lux level Light Sensor, to control the external lighting, Manufactured by Royce Thompson, guaranteed for a minimum period of 10 years, switch on point 70 LUX, to control the External Photocell/Gen Fed Lighting D.B. Locate sensors as required. The new adjustable sensor is to be adjusted and commissioned by the Electrical Contractor as required. Fit the sensors on an adaptable box off the wall, which is to be IP65 rated or above. Ensure the box is coloured to match the colour of the wall it is fitted to and sensors are sealed with silicone as required. The position of the sensors is not to be affected by any surrounding lighting. Adjacent to sensor fit a traffolyte label, identifying sensor, i.e. EXTERNAL LGTS The contactors, which are to be used with each photocell, must have a DC rectified coil. Label the Contactors EXTERNAL LGTS IN traffolyte, as required. Also allow for override switches adjacent to each Contactor, type used must be of MK Metalclad Grid Switch design or equivalent, with DP switch and neon light, within the same switch. The switches are to be installed within the Electrical Switch Room. Label each as required, O/R SWITCH EXTERNAL LGTS.

Please note making good in **Clause 4.6 and 4.23**.

4.10 TRUNKING/CONDUIT/CABLE TRAY INSTALLATION

The Electrical Contractor is advised to liaise with WPD with regards to rooting of individual flat supply cables, within the fabric of the building. As it is apparent that these cables may be in positions where the contractor may wish to drill and install trunking drops. Also allow too CAT the area before any drilling. Under no circumstances will Bristol City Council be liable for any costs incurred, or compensation claims from individual Residents for loss of supply or indeed WPD reinstatement costs should their cables be damaged.

Allow to investigate the possibly of a new route for install the main 2 compartment galvanised metal trunking to feed the communal staircase and lobbies lighting and power. Route and size of trunking to be agreed with contract administrator. This trunking will replace the main trunking riser within the stair core.

Any costs incurred for the builders works associated with the trunking install must be allowed for by the electrical contractor within their Tender.

If existing wiring routes in conduit/trunking or within the fabric of the building can be utilised fully it is to be done so; however, if existing systems are found to be blocked/damaged, multi runs, to small or not accessible, then the Contract Administrator will require that the existing systems are linked to the new installation or completely replaced with new galvanised metal conduit/trunking depending on the number of circuits. This will be carried out at the Electrical Contractor's expense. This may mean the replacing of the existing door entry trunking/conduit with new larger compartmented trunking to allow for the installation of the new cables and existing; also all works required to the existing cables must be allowed for or where new routes are installed. If the contractor does not allow for this at the time of the tender and later realise that new or the existing have to be replaced, this will be done at the Electrical Contractors expense. The City Council will not be liable for any extra expense to the Electrical Contractor for not allowing for this within the Tender. All trunking is to be manufactured from prime galvanised steel to **BS EN 10346-2009**. The gauge of the metal is to be a minimum of **1.00mm** for 50x50 to 100x50 and **1.2mm** for sizes above, as the FLYTEC Systems. Also the depth of the trunking is not to be altered along the access decks, but can be made wider if required.

No allowance will be given to the pulling in of cables to the new Conduit/trunking, as this would be covered as part of the rewire by the Electrical Contractor.

Trunking installed or used on site is to be compartmented, where more than one type of cable is installed, i.e. mains, door entry, TV, BT, Virgin Media, etc. They must be segregated as required.

NEW TV/extra low voltage TRUNKING INSTALLATION (FUTURE FIBRE CONNECTIONS).

Allow to remove all TV/ extra low voltage trunking's on each level and replace with one trunking. ALL TV/extra low voltage Trunking (TV trunking to include but NOT limited to TV, BT, Virgin Media, fire alarms etc), size to suit the present TV systems **PLUS 2 number fiber optic cables per Apartment/FLAT plus 25% spare capacity. NOTE where the trunking passes through a structure it is to be continuous, Allow for builder work as the TV trunking currently stops and is butted up to the timber door frame work**. **Any costs incurred for the builders works associated with the trunking install must be allowed for by the electrical contractor within their Tender. BCC will free issue 5x3x2 Galvanised metal adaptable boxes for each flat for the final TV connections. Note the adaptable can't be used as a wire way unless agreed will require Contract Administrator.**

All **trunking** to be fixed directly to the wall where possible. A short piece of lid is to be fixed to the trunking with rivets and the lid is to protrude a maximum of 40mm from the structure on each side. Also a Fire Barrier is to be fitted within and around the trunking once the cables have been installed, such as the Fire Cushion ref: CP651N, Expanding Fire Seal ref: CP660, etc**.** tested to BS 476: Part 20: 1987 or equivalent. **NOTE all fire stopping MUST have 1 hour rating/protection**

All containment will be Galvanized metal no PVC containment to be allow as part of these works.

All new trunking installed is to have the same internal diameter the whole length of the trunking, **no bushes are to be installed between trunkings or D.B's**. The trunking is to be installed as **Clause 3.4**. The Conduit is to be installed as **Clause 3.3**. The conduit/trunking installation shall be electrically and mechanically continuous. There are to be no breaks in the systems through walls, floors, etc. all are to be continuous.

Cable Pin Rack to be installed on vertical trunking risers as per BS7671.

All new trunking/conduit lids are to be fitted with Security Screws as Housing Standard, Torx Round Head Tamperproof Zinc-plated Steel Screw, not self-tapers. All manufactured bends are to have a Gusset front with square back to the wall, where possible. All bends manufactured on site, are to be secured with brass lock nuts and bolts, **rivets are not to be used in any circumstance**. **Note: Flytec do offer a site measuring and advice service.**

All site manufacture bends will require Contract Administrator approval.

All trunking installed in back of house areas is to be fixed to the walls via Galvanized slotted unistrut channel. The unistrut will in turn be fixed using Brass or Zinc Coated Round Head Screws, no other type of screw is to be used. The trunking will be fixed to the unistrut with M6 Galvanized roofing bolts, M6 Galvanized penny washers and M6 channel nuts.

Only galvanised metal conduit/trunking is to be used in connection with this site, no other materials are to be installed, i.e. Kopex, **plastic**, unless specified. Only spacer bar saddles are to be used with the conduit. **The new conduit/trunking is to be run in ducts out of view, run close to ceiling edge with walls, corners and side of doorframes**. No conduit/trunking is to be installed across the middle of the ceilings or walls, nor where someone's hand can get behind it, nor are conduit boxes to be installed off the wall. All must be fixed directly to a wall or ceiling. All conduit installed within the fabric of the building must be continues, with no breaks, even when connecting to trunking, running through walls, floors, etc.

All new cables run as part of this installation, i.e. **LSHF** or **Fire Proof** single Cables and **Fire Resistant LSHF** white Flex, must be enclosed within galvanised metal conduit/trunking, with no joints within the trunking or as instructed by the Contract Administrator and as **Clause 3.5**.

No surface trunking/conduit is to be installed within the entrance lobby area, or within the block, until all new routes have been agreed by the Contract Administrator.

Ensure all connections/joints between trunkings and D.B's, are provided with manufactures earth links or earthed via 10mm^2 **6491B** cable, via a nut and bolt as required. Which must be visible for inspection by the Contract Administrator and where a nut and bolt is used is to be labelled.

All trunking shall be provided with manufacturer's cable retaining clips in sufficient quantities to retain all cables in a satisfactory manner, type, depending on the size of the trunking, **no other materials are to be used for retaining the cables within the trunking.**

No allowance will be given to the pulling in of cables to the new Conduit/trunking, as this would be covered as part of the rewiring.

Also allow too install existing cables within the areas within any new galvanized metal trunking installed. No trunking is to be installed side by side; only one trunking is to be run along a wall. This may have to be compartment trunking and so should be allowed for, when designing the trunking routes. **All routes to be agreed with the Contract Administrator.**

Ensure all connections/joints between trunkings, are provided with manufactures earth links. Which must be visible for inspection by the Contract Administrator.

All trunking shall be provided with manufacturer's cable retaining clips in sufficient quantities to retain all cables in a satisfactory manner, type, depending on the size of the trunking, **no other materials are to be used for retaining the cables within the trunking.**

Where the trunking passes through a structure it is to be continues, fixed directly to the wall. A short piece of lid is to be fixed to the trunking with rivets and the lid is to protrude a maximum of 40mm from the structure on each side. Also a Fire Barrier is to be fitted within and around the trunking once the cables have been installed, such as the Fire Cushion ref: CP651N, Expanding Fire Seal ref: CP660, etc**.** tested to BS 476: Part 20: 1987 or equivalent. **NOTE all fire stopping MUST have 1 hour rating/protection**. For more advise, if required you can contact Lee Frost, his contact details are +44 7802 205846 lee.frost@hilti.com Firestop Specialist. Also fix a label to the lid on each side of the structure, saying FIRE BARRIER as **Clause 3.22**. Red lettering on White background as **Clause 3.23**. This is also to be done with any existing mains trunking as required.

Allow to fix lids to all trunking new or existing as required. Any missing lid is to be replaced, so that at the end of the job, all trunking is lidded.

Galvanised metal Adaptable/conduit boxes are to be used for jointing any lighting cables on site, as required, cables are not to be jointed any other way, cables **MUST NOT** be jointed within trunking for any reason. If boxes are used anywhere on this site, they must have connector blocks fixed within the box mounted on a din rail, complete with stop end, earth terminals and blanks as required. No connector blocks are to be left floating within an adaptable box and of sufficient size to connect all cables required. All circuits are to be labelled within the box as required with plastic numbered/colour sleeves. Also install to the side of any trunking/conduit, the box is not to form part of the structured wiring system and the lid is to be fixed with Torx round head tamperproof zinc-plated steel screws. The box is to be labelled as required to identify the circuits within the box. As **Clause 3.23**. All enclosures performances should be assessed in accordance with **BS EN 1366-5:2003** and be able to withstand the effects of a water jet at the conclusion of the test, no other type of enclosure should be installed. Also all internally fitted adaptable/conduit, box lids, must be fitted with **Intumescent adaptable/conduit box gaskets**, tested to BS476 Part 22, giving a min of 2 hours fire protection and as **Clause 3.3**.

Where new galvanised metal cable tray is installed it is to be MRF type or above.

Ensure all new or existing cable tray is earth via 10mm^2 **6491B** cable, as required, between D.B's and partitions and that any cables are fix with metal straps/cleats as required. Plastic fixings are not to be used.

Where bushes are used to connect any items to the trunking or between accessories, a female bush **MUST** also be fitted to cover the tread, if a coupler is not used.

A make of trunking which meets the specification that can be used in connection with these works is FLYTEC Systems, Unit B1, Chelworth Industrial Estate, Cricklade, Swindon, Wiltshire SN6 6HE. Which can be obtained via local Electrical Wholesaler or contact FLYTEC direct for their local Wholesaler, Contact Charlie Riley Tel: (0179) 3751333. **Or EQUIVALENT TO BE AGREED with the Contract Administrator.**

If any existing trunking is to be replaced which is fixed to the ceiling, then Asbestos Company is to be employed to take down and install new as required.

All exposed screw threads on the new or existing internal and external metal conduits are to be painted with cold galvanised paint, as are all cut trunking edges.

Also allow to fit metal P type cleats to any existing SWA cables reused or used for communication multi-core cables between rooms, as within the large store room, etc.

4.11 LED LIGHTING AND EMERGENCY LED LIGHTING

Thorlux lighting smart Scan is our prefer system at present, Thorlux lighting smart scan is revolutionary WIRELESS systems which will enable us (BCC) to manage/ monitor all the lighting within the block from anywhere using a computer, laptop, tablet or smart-phone or equivalent to be agreed with the Contract Administrator.

LED LIGHTING to be controlled Wireless monitoring system for Emergency and Non-emergency lighting management as per Thorlux Smart Scan or equivalent.

Thorlux Smart Scan lighting all lights including Emergencies are to be connect to management and Emergency monitoring as per the attachments for Each block.

Contactor is to refer to chosen lighting design for final install location and light details.

Allow to wire each light on the ground floor on this own the final circuit, then continue the circuit Vertically up through the block to the top floor, each circuit will feed 11 number lights. Circuits will require a double pole key switch fitted within a multi gang grid switch, located in the main switch room to allow the testing of the emergency lighting.

Also stencil a unique number on each luminaire as required in **Clause 3.18**.

Any existing equipment, accessories, cables, conduit, etc no longer being used are to be removed and offered to the **Contract Administrator for spares**.

Tenant Stores (all levels), chute areas, bin rooms, switch rooms, communal areas, all roof spaces/areas, ducts, lift motor room, plantroom/ calorifier rooms, external, Laundry etc. are all covered within the scope of these works. The onus is upon the contractor to quantify these locations and any other areas served by the communal services.

Self-contained emergency luminaires are to be fitted with a LED indicator. This must be visible to see from the ground on the luminaire and must not be fitted on the diffusers. Also ensure that any fault buzzer is disconnected in all self-contained emergency lights.

Lift Lobbies,

All levels allow to remove the existing luminaires and wire for new **Thorlux** Prismalette LED Bulk head luminaires, vandal resistant, 16 Watt, IP65, Smartscan, with 10% dimming, built-in microwave sensor, die-cast LM2 white aluminium body, 65,000 hours lifetime, fire-retardant polycarbonate Satin cover,

4000^{o}K Temp white LED's, tamper-resistance screw, as the **Thorlux ref: WPS14913SS** all lights to managed/ monitored by Smartscan Gateway system, as the **Thorlux ref: SS17486** or
equivalent, Also ensure an in-line fused plug and socket terminal block is fitted, which is to be fitted by the contractor, secured within each luminaire and not left floating as required. Allow to rewire all the luminaires from the Lighting D.B. within the main switch with LSF low smoke single core stranded cable BS 6419B or equivalent, via existing and new galvanised metal conduit/trunking.
The luminaires are to be connected via THREE different circuits, so a min of two fittings will remain on if the other luminaires trip out.
Detector in each luminaire is to keep the light on for around 90 seconds, before switching to 10% luminance, after last movement detected. The Lux level is to be set so that the luminaire comes on at all times. Refer to preferred lighting design supplied for final locations.

Stair core,

All levels allow to remove the existing luminaires and wire for new **Thorlux** Prismalette LED Bulk head luminaires, vandal resistant, 16 Watt, IP65, Smartscan, with 10% dimming, built-in microwave sensor, die-cast LM2 white aluminium body, 65,000 hours lifetime, fire-retardant polycarbonate Satin cover, 4000^{o}K Temp white LED's, tamper-resistance screw, as the **Thorlux ref: WPS14913SS** all lights to managed/ monitored by Smartscan Gateway system, as the **Thorlux ref: SS17486** or equivalent. Also ensure an in-line fused plug and socket terminal block is fitted, which is to be fitted by the contractor, secured within each luminaire and not left floating as required. Allow to rewire all the luminaires from the Lighting D.B. within the main switch with LSF low smoke single core stranded cable BS 6419B or equivalent, via existing and new galvanised metal conduit/trunking.
Detector in each luminaire is to keep the light on for around 90 seconds, before switching to 10% luminance, after last movement detected. The Lux level is to be set so that the luminaire comes on at all times.
The luminaires are to be connected via TWO different circuits, so a min of ONE fitting will remain on if the other luminaires trip out. Refer to preferred lighting design supplied for final locations.

Plantroom/ Calorifier rooms,

All plantrooms/ calorifier rooms allow to remove the existing luminaires and wire for **Thorlux** Thoroproof LED luminaires, corrosion-resistant grey body, 30 Watt, Narrow body, Fast installation via external stainless steel brackets, IP54, Smartscan, 50,000 hours lifetime, Fire-retardant body and cover, 4000^{o}K Temp white LED's, as the **Thorlux ref: TP16486SS and WPS16486SS** emergency version all lights to managed/ monitored by Smartscan Gateway system, as the **Thorlux ref: SS17486** or equivalent.
Also ensure an in-line fused plug and socket terminal block is fitted, which is to be fitted by the contractor, secured within each luminaire and not left floating as required.
Allow to rewire all the luminaires from the Lighting D.B. within the main switch with LSF low smoke single core stranded cable BS 6419B or equivalent, via existing and new galvanised metal conduit/trunking.
The luminaires are to be connected via two different circuits, so a min of one circuit will remain on if the other luminaires trip out. Refer to preferred lighting design supplied for final locations.

Switch room/ old generator room,

New switch room allow to remove the existing luminaires and wire for new wire **Thorlux** Thoroproof LED luminaires, corrosion-resistant grey body, 30 Watt, Narrow body, Fast installation via external stainless steel brackets, IP54, Smartscan, 50,000 hours lifetime, Fire-retardant body and cover, 4000^{o}K Temp white LED's, as the **Thorlux ref: TP16486SS and WPS16486SS** emergency version all lights to managed/ monitored by Smartscan Gateway system, as the **Thorlux ref: SS17486** or equivalent.
Also ensure an in-line fused plug and socket terminal block is fitted, which is to be fitted by the contractor, secured within each luminaire and not left floating as required.
Allow to rewire all the luminaires from the Lighting D.B. within the main switch with LSF low smoke single core stranded cable BS 6419B or equivalent, via existing and new galvanised metal conduit/trunking. Refer to preferred lighting design supplied for final locations.

Bin Stores,

Allow to remove the existing luminaires and wire for wire for **Thorlux** Thoroproof LED luminaires, corrosion-resistant grey body, 30 Watt, Narrow body, Fast installation via external stainless steel brackets, IP54, Smartscan, 50,000 hours lifetime, Fire-retardant body and cover, 4000^{o}K Temp white LED's, as the **Thorlux ref: TP16486SS and WPS16486SS** emergency version all lights to managed/ monitored by Smartscan Gateway system, as the **Thorlux ref: SS17486** or equivalent.
Also ensure an in-line fused plug and socket terminal block is fitted, which is to be fitted by the contractor, secured within each luminaire and not left floating as required.
Allow to rewire all the luminaires from the Lighting D.B. within the main switch with LSF low smoke single core stranded cable BS 6419B or equivalent,
Refer to preferred lighting design supplied for final locations.

Cleaner's cupboards,

Allow to remove the existing luminaire and wire for new **Thorlux** Prismalette LED Bulk head luminaires, vandal resistant, 16 Watt, IP65, Smartscan, with 10% dimming, built-in microwave sensor, die-cast LM2 white aluminium body, 65,000 hours lifetime, fire-retardant polycarbonate Satin cover, 4000^{o}K Temp white LED's, tamper-resistance screw, as the **Thorlux ref: PS14913SS** all lights to managed/ monitored by Smartscan Gateway system, as the **Thorlux ref: SS17486** or equivalent.
Also ensure an in-line fused plug and socket terminal block is fitted, which is to be fitted by the contractor, secured within each luminaire and not left floating as required. Allow to rewire all the luminaires from the Lighting D.B. within the main switch with LSF low smoke single core stranded cable BS 6419B or equivalent, via existing and new galvanised metal conduit/trunking. Refer to preferred lighting design supplied for final locations.

Old switch room under stairs,

Allow to remove the existing luminaires and wire for new **Thorlux** Thoroproof LED luminaire, corrosion-resistant grey body, 30 Watt, Narrow body, Fast installation via external stainless steel brackets, IP54, Smartscan, 50,000 hours lifetime, Fire-retardant body and cover, 4000^{o}K Temp white LED's, as the **Thorlux ref: WPS16486SS** and **Thorlux** Prismalette LED Bulk head luminaire, vandal resistant, 16 Watt, IP65, Smartscan, with 10% dimming, built-in microwave sensor, die-cast LM2 white aluminium body, 65,000 hours lifetime, fire-retardant polycarbonate Satin cover, 4000^{o}K Temp white LED's, tamper-resistance screw, as the **Thorlux ref: WPS14913SS** all lights to managed/ monitored by Smartscan Gateway system, as the **Thorlux ref: SS17486** or equivalent.
Also ensure an in-line fused plug and socket terminal block is fitted, which is to be fitted by the contractor, secured within each luminaire and not left floating as required.
Allow to rewire all the luminaires from the Lighting D.B. within the main switch with LSF low smoke single core stranded cable BS 6419B or equivalent, via existing and new galvanised metal conduit/trunking. Refer to preferred lighting design supplied for final locations.

Switch rooms 2,

All levels allow to remove the existing luminaires and wire for **Thorlux** Prismalette LED Bulk head luminaire, vandal resistant, 16 Watt, IP65, Smartscan, with 10% dimming, built-in microwave sensor, die-cast LM2 white aluminium body, 65,000 hours lifetime, fire-retardant polycarbonate Satin cover, 4000^{o}K Temp white LED's, tamper-resistance screw, as the **Thorlux ref: WPS14913SS** all lights to managed/ monitored by Smartscan Gateway system, as the **Thorlux ref: SS17486** or equivalent.
Also ensure an in-line fused plug and socket terminal block is fitted, which is to be fitted by the contractor, secured within each luminaire and not left floating as required. Allow to rewire all the luminaires from the Lighting D.B. within the main switch with LSF low smoke single core stranded cable BS 6419B or equivalent, via existing and new galvanised metal conduit/trunking. Refer to preferred lighting design supplied for final locations.

Ground floor entrance and old caretaker flat lobbies,

All levels allow to remove the existing luminaires and wire for new **Thorlux** Prismalette LED Bulk head luminaire, vandal resistant, 16 Watt, IP65, Smartscan, with 10% dimming, built-in microwave sensor, die-cast LM2 white aluminium body, 65,000 hours lifetime, fire-retardant polycarbonate Satin cover, 4000^{o}K Temp white LED's, tamper-resistance screw, as the **Thorlux ref: TP16486SS and WPS16486SS** emergency version, lights to managed/ monitored by Smartscan Gateway system, as the **Thorlux ref: SS17486** or equivalent.
Also ensure an in-line fused plug and socket terminal block is fitted, which is to be fitted by the contractor, secured within each luminaire and not left floating as required. Allow to rewire all the luminaires from the Lighting D.B. within the main switch with LSF low smoke single core stranded cable BS 6419B or equivalent, via existing and new galvanised metal conduit/trunking.
The luminaires are to be connected via THREE different circuits, so a min of two fittings will remain on if the other luminaires trip out. Refer to preferred lighting design supplied for final locations.

Tenant Stores and ground cupboards adjacent to old caretaker flat,

Allow to remove the existing luminaires and wire new **Thorlux** Prismalette LED Bulk head luminaire, vandal resistant, 16 Watt, IP65, Smartscan, with 10% dimming, built-in microwave sensor, die-cast LM2 white aluminium body, 65,000 hours lifetime, fire-retardant polycarbonate Satin cover, 4000^{o}K Temp white LED's, tamper-resistance screw, as the **Thorlux ref: TP16486SS and WPS16486SS** emergency version, lights to managed/ monitored by Smartscan Gateway system, as the **Thorlux ref: SS17486** or equivalent.
Also ensure an in-line fused plug and socket terminal block is fitted, which is to be fitted by the contractor, secured within each luminaire and not left floating as required.
Allow to rewire all the luminaires from the Lighting D.B. within the main switch with LSF low smoke single core stranded cable BS 6419B or equivalent, via existing and new galvanised metal conduit/trunking. The luminaires are to be connected via two different circuits, so a min of one light will remain on if the other circuits trip out. Refer to preferred lighting design supplied for final locations.

Common area,

All Common room allow to remove the existing luminaires and wire for new **Thorlux** Thoroproof LED luminaire, corrosion-resistant grey body, 30 Watt, Narrow body, Fast installation via external stainless steel brackets, IP54, Smartscan, 50,000 hours lifetime, Fire-retardant body and cover, 4000^{o}K Temp white LED's, as the **Thorlux ref: TP16486SS and WPS16486SS** emergency version, lights to managed/ monitored by Smartscan Gateway system, as the **Thorlux ref: SS17486** or equivalent. Also ensure an in-line fused plug and socket terminal block is fitted, which is to be fitted by the contractor, secured within each luminaire and not left floating as required. Allow to rewire all the luminaires from the Lighting D.B. within the main switch with LSF low smoke single core stranded cable BS 6419B or equivalent, via existing and new galvanised metal conduit/trunking. The luminaires are to be connected via two different circuits, so a min of one light will remain on if the other circuits trip out. Refer to preferred lighting design supplied for final locations.

Laundry rooms,

Laundry allow to remove the existing luminaires and wire for **Thorlux** Thoroproof LED luminaire, corrosion-resistant grey body, 30 Watt, Narrow body, Fast installation via external stainless steel brackets, IP54, Smartscan, 50,000 hours lifetime, Fire-retardant body and cover, 4000^{o}K Temp white LED's, as the **Thorlux ref: TP16486SS and WPS16486SS** emergency version, lights to managed/ monitored by Smartscan Gateway system, as the **Thorlux ref: SS17486** or equivalent.
Also ensure an in-line fused plug and socket terminal block is fitted, which is to be fitted by the contractor, secured within each luminaire and not left floating as required. Allow to rewire all the luminaires from the Lighting D.B. within the main switch with LSF low smoke single core stranded cable BS 6419B or equivalent, via existing and new galvanised metal conduit/trunking.
The luminaires are to be connected via two different circuits, so a min of one light will remain on if the other circuits trip out. Refer to preferred lighting design supplied for final locations.

Seating area,

Seating area within the Common room and Laundry allow to remove the existing luminaires and wire for new **Thorlux** Thoroproof LED luminaire, corrosion-resistant grey body, 30 Watt, Narrow body,

Fast installation via external stainless steel brackets, IP54, Smartscan, 50,000 hours lifetime, Fire-retardant body and cover, 4000^{o}K Temp white LED's, as the **Thorlux ref: TP16486SS and WPS16486SS** emergency version, lights to managed/ monitored by Smartscan Gateway system, as the **Thorlux ref: SS17486** or equivalent.
Also ensure an in-line fused plug and socket terminal block is fitted, which is to be fitted by the contractor, secured within each luminaire and not left floating as required. Allow to rewire all the luminaires from the Lighting D.B. within the main switch with LSF low smoke single core stranded cable BS 6419B or equivalent, via existing and new galvanised metal conduit/trunking. The luminaires are to be connected via two different circuits, so a min of one light will remain on if the other circuits trip out. Refer to preferred lighting design supplied for final locations.

Disable Toilets,

Allow to remove the existing luminaires and wire for new **Thorlux** Prismalette LED Bulk head luminaire, vandal resistant, 16 Watt, IP65, Smartscan, with 10% dimming, built-in microwave sensor, die-cast LM2 white aluminium body, 65,000 hours lifetime, fire-retardant polycarbonate Satin cover, 4000^{o}K Temp white LED's, tamper-resistance screws, as the **Thorlux ref: TP16486SS** lights to managed/ monitored by Smartscan Gateway system, as the **Thorlux ref: SS17486** or equivalent.
Also ensure an in-line fused plug and socket terminal block is fitted, which is to be fitted by the contractor, secured within each luminaire and not left floating as required. Allow to rewire all the luminaires from the Lighting D.B. within the main switch with LSF low smoke single core stranded cable BS 6419B or equivalent, via existing and new galvanised metal conduit/trunking. The luminaires are to be connected via two different circuits, so a min of one light will remain on if the other circuits trip out. Refer to preferred lighting design supplied for final locations.

Lift motor rooms,

All lift motor rooms allow to remove the existing luminaires and wire for **Thorlux** Thoroproof LED luminaire, corrosion-resistant grey body, 30 Watt, Narrow body, Fast installation via external stainless steel brackets, IP54, Smartscan, 50,000 hours lifetime, Fire-retardant body and cover, 4000^{o}K Temp white LED's, as the **Thorlux ref: WPS16486SS** lights to managed/ monitored by Smartscan Gateway system, as the **Thorlux ref: SS17486** or equivalent.
Also ensure an in-line fused plug and socket terminal block is fitted, which is to be fitted by the contractor, secured within each luminaire and not left floating as required. Allow to rewire all the luminaires from the Lighting D.B. within the main switch with LSF low smoke single core stranded cable BS 6419B or equivalent, via existing and new galvanised metal conduit/trunking.
The luminaires are to be connected via two different circuits, so a min of one circuit will remain on if the other luminaires trip out. Refer to preferred lighting design supplied for final locations.

Water tank rooms,

Allow to remove the existing luminaires and wire for new Thorlux Thoroproof LED luminaire, corrosion-resistant grey body, 30 Watt, Narrow body, Fast installation via external stainless steel brackets, IP54, Smartscan, 50,000 hours lifetime, Fire-retardant body and cover, 4000^{o}K Temp white

LED's, as the **Thorlux ref: WPS16486SS** lights to managed/ monitored by Smartscan Gateway system, as the **Thorlux ref: SS17486** or equivalent.
Also ensure an in-line fused plug and socket terminal block is fitted, which is to be fitted by the contractor, secured within each luminaire and not left floating as required. Allow to rewire all the luminaires from the Lighting D.B. within the main switch with LSF low smoke single core stranded cable BS 6419B or equivalent, via existing and new galvanised metal conduit/trunking. The luminaires are to be connected via two different circuits, so a min of one circuit will remain on if the other luminaires trip out. Refer to preferred Fernhoward lighting design supplied for final locations.

Chute Room,

All levels allow to remove the existing luminaires and wire for new **Thorlux** Thoroproof LED luminaire, corrosion-resistant grey body, 30 Watt, Narrow body, Fast installation via external stainless steel brackets, IP54, Smartscan, 50,000 hours lifetime, Fire-retardant body and cover, 4000^{o}K Temp white LED's, as the **Thorlux ref: WPS16486SS** lights to managed/ monitored by Smartscan Gateway system, as the **Thorlux ref: SS17486** or equivalent.
Also ensure an in-line fused plug and socket terminal block is fitted, which is to be fitted by the contractor, secured within each luminaire and not left floating as required. Allow to rewire all the luminaires from the Lighting D.B. within the main switch with LSF low smoke single core stranded cable BS 6419B or equivalent, via existing and new galvanised metal conduit/trunking. Refer to preferred lighting design supplied for final locations.

UNDEGROUND DUCTS,

Allow to disconnect and make safe the underground duct lighting within switch room.
NO ACCESS TO DUCT REQUIRED

Contactor is to refer to chosen lighting design for final install location and lighting details.

Connect all luminaires as **Clauses 3.14** and **3.18**.

Also replace the existing lamp post lanterns and fit new IP66 IK09 Abacus AL62004/120watt LED lantern, Colour Temperature 4000K, Thorlux smart scan system or equivalent. **EQUIVALENT TO BE AGREED with the Contract Administrator**. Dimming Profile 50% Lumens from Midnight to 6am switch Regime Code as per BCC Specification (contact BCC Street Lighting Section as required for more information), as required for the car access road. Rewire and paint the columns black as the existing and renumber. Post to painted Sapphire Blue by Ameron Coating Amercoat 2136 BS20.D.45

Contractor will allow to carry out a design of the external carpark and pedestrian walkway for the chosen lighting scheme/manufacture.

Allow too silicon round the base edge of all existing or new internal/external luminaires as required, White silicon round white base Luminaires and white ceilings. Round all other luminaires and surfaces, use clear silicon. When works are 100% complete.

All new and existing Luminaires, gear trays, etc. are to be installed symmetrically, the same each floor, up the block and the lamps, LED's are to face the same way. Also no luminaire is to have drilled entries, all entries into a luminaire are to be via Manufactures entry holes.

Allow too stencil a unique reference number to the side of all the existing and new Luminaires, also the emergency bulkheads. Number must be able to be viewed from both sides in the lift lobbies, lift room, roof area, tank room, calorifier room, down the flat lobbies both sides, within the stairs viewed from the main landing, all store rooms, bin rooms, the chute rooms, viewed from the access door into the rooms, outside luminaires viewed from the ground both sides, etc. All numbering is to be the same each floor, but changing the floor number to each floor and the stairs are to be numbered from the bottom to the top of the stairs in order.

All new luminaires are to be fitted to the structure of the building and not on surface conduit boxes.

Also label all existing and new luminaires, contactors, switches with Dymo tape labelling or similar type system, identifying which circuit is supplying the item, etc, as **Clause 3.23**, Phase, identify D.B. and circuit number fed from.

Also stencil a unique number on each luminaire on site as required. This also includes the emergency bulkheads as required in **Clause 3.18**.

Allow to install new flex within all new & existing luminaires as **Clause 3.14** and **3.18**.

No luminaire is to be wired through as part of a structured cable installation and are to be installed as **Clause 3.18**.

All switches are to be installed as **Clause 3.17**.

The new emergency bulkheads on site are to be fitted as required by, **BS5266 (BS EN 50172)**. Also the normal lighting is not to be affected when testing any emergency bulkheads via the test switch as **BS 5266-1**, **Clause 8.3.3**.

Allow to remove any redundant lighting, cabling, switches, trunking, conduit, etc, which is found on site. Within the lift room, old generator rooms, switch rooms, office, calorifier room, community room, switch rooms, etc.

Ensure that any luminaires, boxes, trunking removed or fixed to an Asbestos ceiling, wall must be carried out by approved Asbestos Company or trained and approved staff members to do as required. Method statement must be supplied and approved before any works take place by the Health and Safety Officer within Bristol City Council.

4.12 GENERAL POWER INSTALLATION

The Electrical Contractor shall identify all circuits of the complete small power installation within the block on the CAD Plans supplied at the end of the job and on each accessory as **Clause 3.23**.

Allow to rewire all the existing and new accessories via the General Power & Lighting D.B within the switch room. The circuits are to be wired in LSHF Cable enclosed within new or existing galvanised metal conduit/trunking, as **Clauses 3.3**, **3.4**, **3.5** and **4.10** or reuse the existing MICC Sheathed Cables.

All Sockets are to be connected to the General Power & Lighting D.B via new MCB/RCD's as required for each circuit, however if the socket outlets are individual RCD protected type, then a MCB can be used, however all sockets on that circuit must be of the RCD type to be able to do this.

The Electrical Contractor shall supply and install a complete small power installation as indicated and rewire any existing found on site. Allow to rewire using **LSHF 6491B** cable, via new galvanised metal trunking. Conduit to be galvanised class 4; however you may be able to utilise the existing conduit.

Fixing screws to structure or conduit systems shall be brass/Zinc coated round head screws and have four fixings per item. **No Counter sunk screws are to be used**.

Allow to rewire the existing mains supplies to the door entry systems, Brunata, fire alarm, smoke vent, etc as required in **LSHF** cables with new MK Metalclad plus un-switched Connection units to match the existing. Wire from the local General Power & Lighting D.B's as is required on individual circuits and not with any other equipment on the same Phase.

Allow to rewire the existing supplies to the Digital TV equipment as required in **LSHF** cables with new MK Metalclad plus un-switched Connection units as the existing. Wire from the new Digital TV equipment D.B. on individual circuit and not with any other equipment as required on the same Phase.

Within the resident store allow to install a new RCD TSSO via new **LSHF** cables and connect as the existing on an individual 16 Amp circuit within the General Power & Lighting D.B. via new or existing galvanised metal conduit/trunking.

Allow to wire for new Caretaker sockets to the Lift lobbies and stair core on each floor in galvanised metal conduit/trunking. In a min 4mm^2 **6491B** cable and fit new MK non-standard switched socket outlets with clean earth facility. Each circuit is to be protected via a 20 Amp 30mA MCB/RCD from the local General Power & Lighting D.B. within the switch room, on individual circuits, per vertical run. Ensure the new sockets are installed at high level, as required. Allow to fit new MK Metal Clad Grid 20 AMP DP (Double Pole) Switch with neon indictor, in series with each socket circuit. Switches are to be positioned within the main switch room and switch rooms as plan supplied. Neon to be lit when sockets are live. Also engrave each new switch indicating what it is controlling, except the

weatherproof switch, where a traffolyte label is to be fitted to the wall above the switch. Identify each circuit as **Clause 3.23**.

HOIST SOCKETS

Allow to install and wire for new CEE-Norm Red Switch, Mechanical Interlocked Unit with RCD Protected Socket 3P+N+E 63A 30mA three Phase Hoist Socket Outlet, all within the same unit, ref: **880464** within the exiting switch room and new switch room (Exiting generator room). Connect to the new Panel Board within the Main Switch room on its own 3 Phase MCCB Label the 63 Amp MCCB and Switch-fuses, Hoist Supply.

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4.13 **LIFT/TANK ROOMS/ROOF SPACE/DIGITAL TV AREA**

Allow to replace old D.Bs within the lift room (Lift motor room lighting and power) and tank room/roof area. Also allow install addition board within the lift motor room (Lift shafts lighting and power ie, car lights, shaft lights, shaft sockets, REM, etc). Then install a new **XLPE/LSHF/SWA/LSHF** cables from the new panel board within the new switch room to each new D.B. via new galvanised metal MRF cable tray in the switch room, enclosed riser and lift room access area.

Between the floors, if installed within a communal area the cable is to be enclosed within a galvanised metal trunking, **route to be agreed with the Contract Administrator.**

Allow to rewire all items like for like within the lift motor room, Items include (twin sockets, extract fan, air con unit and heaters) but not limited too. New sockets 30mA RCD twin switched socket outlet with Active circuit, as the MK Metalclad Plus ref: **K6231ALM**

Within the Tank Room allow to remove the existing heaters, stats, contactor, conduit and install new wall mounted Dimplex PFH30E fan heaters at each end of the room and controlled via new Frost thermostats as required and set to come on when the temperature falls below 5^{o}C the heater will come on. Wire via **LSHF** cables within existing or new galvanised metal conduit/trunking. Heaters to be fed from the new Roof Area Power/Lighting D.B. on individual circuits.

Also in the tank room allow to rewire the existing connection units as required for the rotomag, pump, etc. Each is to have a direct feed from the new Roof Area Power/Lighting D.B. as required via new or existing galvanised metal conduit, alter as required. Wire in **LSHF** cables. Allow to fit new DP switch-fused connection units with flex outlet and neon, as the MK Metalclad Plus ref: **K972ALM** adjacent the equipment. New connection units are not to be wired through as the existing. Ensure the correct size fuse is fitted for the equipment connected. Also allow to wire for and install a new 30mA RCD twin switched socket outlet with Active circuit, as the MK Metalclad Plus ref: **K6231ALM**. Fit adjacent to the above at high level on the wall. Wire as above and connect to the same D.B. but on a separate 16Amp MCB within the board for tank room SSO only.

Also allow wire for and install a new IP66 twin 30mA Active Circuit RCD protected switch socket outlet on the roofs, as the MK Masterseal Plus ref: **K56231GRY**. Fit below the light switch on the roofs. Wire as required via the new galvanised metal conduit/trunking as the external luminaire, however wire the sockets from the new Roof Area Power/Lighting D.B. and Lift Room D.B on their own 20 Amp MCB circuit and in series with a DP Grid switch with Neon, as the MK Grid Plus, fit the switch adjacent to the D.B. Neon to illuminate when sockets are on. Engrave each DP switch, Roof SSO, as **Clause 3.23**.

Connect luminaires as **Clauses 3.14 and 3.18**.

Allow to label all new and existing accessories, sockets, DP switches, etc as **Clause 3.23**, Equipment ID, Phase, identify D.B. and circuit number fed from.

Also stencil a unique number on each luminaire on the roof and lift room as required. This also includes the emergency bulkheads as required in **Clause 3.18**.

Any existing equipment, accessories, cables, conduit, etc no longer being used are to be removed and all surfaces made good.

Self-contained emergency luminaires are to be fitted with a green dot. This must be visible to see from the ground on the luminaire and must not be fitted on the diffusers. Also ensure that any fault buzzer is disconnected in all self-contained emergency lights.

4.14 LAUNDRY ROOMS

Remove the existing D.B's supplying each of the Laundries and install new MEM/Eaton Memshield 3 D.B's. for each laundry room, as existing. One 3 Phase D.B. is to be for all laundry (including Gas solenoid valve) equipment only to be control via Time clock, emergency stop and override switch. Allow to fit new MK Metal Clad Grid DP (Double Pole) Switch with neon indictor, Switch and timeclock are to be positioned within the adjacent to Distribution board and contactor. Final locations of all electrical equipment to be agreed with the Contract Administrator.
Switch Neon to be lit when timeclock is overridden. Also engrave each new switch indicating what it is controlling, where a traffolyte label is to be fitted to the wall above the switch. Identify each circuit as **Clause 3.23**.

Single Phase D.B. (general lighting and power) for all other circuits, is NO connected with the laundry time clock and override switch. Time clock setting to be agreed with **to be agreed with the Contract Administrator.**

Allow to label all accessories, sockets, DP switches, etc as **Clause 3.23**, Equipment ID, Phase, identify D.B. and circuit number fed from.

Allow to rewire all existing circuits, accessories, equipment, etc within the Laundry, Community Room, Kitchen, library, toilet and office from the new Community Room D.B. via new **LSHF** cables enclosed within galvanised white metal trunking at high level around the room and galvanised conduit drops as required to the accessories.

Allow to install MEM switch disconnectors for laundry machines as 207149-GV 20/32amp surface mounted rotary isolator. 32 AMP as MEM Eaton list number 207202, Part number P1-32/I2-SI/N or equivalent to be agreed with contract administrator.

All other accessories to be match existing in type and manufactured by Mk or equivalent.

In the Community Room/Laundry/Kitchen area allow to replace the existing sockets with new MK Plus twin switch socket outlets. Also allow to install an additional twin switch socket outlet, within the kitchen area above the worktop.

Allow to supply and fit new xpalair intake fans or equivalent within Laundry room as required. Also allow to supply and fit new xpalair extract fans or equivalent within Conservatory, WC, Community Room, Kitchen as required to the ring circuit via a new MK Plus switched fused connection units ensure the correct fuse is fitted for the fan. Rewire all in **LSHF** cable. Note any associated ducting should be clean before the extract fan is installed.

Within the Kitchen allow to rewire the Hydro Boiler on its own circuit from the new Community Room D.B. Allow to reuse the existing Hydro Boiler and push switch, however replace the existing connection unit with a new MK Plus Switched Fused connection unit, with the correct fuse fitted for the unit. Wire as all others in **LSHF** cable, via new trunking.

In the toilet allow to rewire the hand dryer via a new MK Plus Switched Fused connection unit, with the correct fuse fitted for the item connected and wired in **LSHF** cables on it is own circuit from the new Laundry lighting and power D.B.

Allow to supply and fit a new Hand Dryer with in the laundry WC.

4.15 CALORIFIER ROOMS/PLANT ROOM/DUCTS

Allow to rewire the ring final circuits to new twin sockets outlets as per present locations.

New sockets 30mA RCD twin switched socket outlet with Active circuit, as the MK Metalclad Plus ref: **K6231ALM.**

When drilling or removing anything on the walls within the room allow for an approved Asbestos Company to do all the drilling of the walls and supply an air test certificate after the works are completed.

4.16 EARTHING **AND BONDING**

A complete system of earthing and bonding shall be installed in accordance with BS7671. Also equipotential bond any metal sinks, lift room lifting beam, cable tray, etc. Bond as required all cold water supplies on site, pipes within the ducts, fire risers, etc. Also the Gas supplies within the laundry, etc. Also the switch room and Lightning protection as required by BS7671.

A separate **6491B** green/yellow insulated stranded copper circuit protective conductor shall be run with every supply, sub-main and final circuit.

Equipotential bonding conductors shall have a minimum cross sectional area of **10mm^2**, no smaller size is to be used, except for within the lamp posts, when **6mm^2** cable may be used.

Label all Earth Cables as is required and as BS7671 514.13.1.

Allow to connect the lightning conductors to the main earth as required by BS7671, 411.3.1.2 and as required by BS EN 62305. Also allow for fitting a removable link point, with each connection, as required, this is to allow for the lightning conductors to be tested. Allow also to do this for the main water, gas, distribution boards, fire risers, etc and connect as required by BS7671 544.1.2. Install an earth bar, to connect all the Main Equipotential Bonds as required. Ensure the earth bar is Insulate as required. Also allow at 25% spare capacity to each earth bar to allow for any future requirements.
Each Earth Cable is to be fitted with a traffolyte label at each end. The labels are to be attached via clear cable ties at each end of the label, indicating what the cable is for, ie GAS, WATER, MAIN EARTH, LIGHTNING PROTECTION, FIRE RISER, etc, or as is required. Dymo tape type labelling is not to be used. If required fit an earth bar within the generator room and switch room.

4.18 **LABELING AND ENGRAVING**

All new and existing connection units, switch-fuses, isolators, Distribution Boards, contactors, TV Amplifier, etc and all items of equipment on the main switchgear shall have new labels fitted in accordance with **Clauses 3.15** to **3.20** and **Clause 3.23** of this Specification. Remove all existing labels.

All labels shall be fixed by brass round head screws to the wall or items and consist of 5mm White characters engraved on white traffolyte back ground or engrave the device with the required information. No labels are to be glued or fixed to the trunking.

Dymo tape type labelling is only to be used, as **Clause 3.23**. Indicating circuit reference on luminaires and accessories.

All Luminaires are to have a unique number to the side of them, not on the diffuser, as **Clause 3.18** and must be viewable from the lifts along the corridor and back from the stairs so has to be on both sides, stores from the entrance, staircase access, laundry entrance, W/C entrance, lift room entrance, Community room entrance, etc.

Also fit Voltage indication labels to all Panel Board, Busbar Chambers, Contactors, D.B's, Switch Fuses and Isolators as **BS7671, 514-10-01**.

Also label all devises as required by **BS7671, 537-02-09**.

Also on each door to the switch room, etc., fit an Only Authorised Person beyond This Point sign.

Also label all cables within D.B's within the switch room, generator room, laundry, caretakers, old boiler room, etc, as **Clause 3.23**.

Label all emergency luminaires, including those fed via the diesel generator, with a green dot. This must be visible to see from the ground on the luminaire.

Ensure all the existing labels, signs in the existing generator room, etc are transferred to the new generator room, as required.

Ensure labels are fitted each side of any Fire Stopping, as **Clause 3.22**.

4.19 **TESTING AND COMMISSIONING**

The Electrical Contractor shall include for testing and commissioning the complete installation in accordance with the Current Issue of the 17th Edition of the IEE Wiring Regulations (BS7671).

Upon final completion of the installation with all systems operating, the Electrical Contractor shall carry out full load tests on each and every Distribution Board, and provide a complete schedule of loadings to the Contract Administrator for each and fit labels to each Board identifying the load on that Board.

The Electrical Contractor shall provide a complete set of testing and commissioning results to the Contract Administrator, within each O&M Manuals. These are to include the Electrical Manor Works Certificate, Standby Electrical Generator Commissioning Certificate, and Emergency Lighting Completion Certificate for the self-contained lighting, Fire Safety Compliance Certificate, Street Lighting Test Certificate, etc.

The Electrical Contractor is to supply all delivery notes and orders for the LED luminaires. This is to obtain the Guarantee Period from the Manufacture for the luminaires. These sheets are to be held within the O&M Manual in Section 10 of the file.

All Distribution Boards/Consumer Units are to be fitted with Periodic Inspection Notice, with the companies name, date tested and re-test date of Five Years.

4.20 RATES

The quotation is to be broken down as Part 5; Forms 1 Tender Analysis and Form 3 a quantity of materials is also to be supplied**.**

Part 5; Form 4 shows a List of Schedules that must be completed.

Part 5; Form 2 is to be used if an alternative item is suggested, other than that in the specification. However the Tender Price must be as the Specification.

4.21 "AS-FITTED" DRAWINGS AND MAINTENANCE MANUALS

The Electrical Contractor shall allow within his Tender for the provision of "As-Fitted" Drawings and Maintenance Manuals.

Draft copies of these drawings and manuals shall be handed to the Contract Administrator two weeks prior to hand over of the Contract Works and before final invoice for work completed todate. If this is not supplied no payments for received invoice will be passed for payment until this has been agreed.

When the Drawings and Manuals have been approved, the Electrical Contractor shall supply two complete sets of "As-Fitted" A1 size Drawings and two complete sets of "Maintenance Manuals" for the block, which are to be held within hard backed lever arch files. A copy of the O & M is to be left

within the switch room, within a new metal holder on the wall. The other copy is to be handed to the Contract Administrator upon completion of the contract works, within a separate hard backed lever arch files. **There is also to be a computerized copy of the O & M given to the Contract Administrator**.

The As-Fitted drawings shall include a layout of the property, circuits, lighting positions, emergency lighting, generator, mains, lightning earthing points in the ground, main earth bonds, street lighting circuits, garage lighting circuits, name sign circuits, etc.

Also supply a full asset list of the type and number of accessories, luminaires, generator, self-contained emergency lights, sockets, communal fans, wiring, etc. installed on site. This is to be supplied to the Contract Administrator at the end of the works in a Microsoft 2010 Excel Format.

All the layout paper plans are also to be supplied on computer disc and are to be compatible with Microsoft Auto CAD LT 2014.

The Electrical Contractor is to supply complete O & M Manuals to the Contract Administrator at the handover of the site, back to the Council. These are to be as follows, two Paper copies, held within lever arch hard backed files and one computer disc, with all the O & M file information and AutoCAD plans held on it in dwg format. The information which is to be supplied is to be in the format as follows and is to include 1. introduction, O & M Manual Issue/Revision Chart, 2. System Description. 3. Specialist System Technical Data. 4. Operating Procedures. 5. Maintenance Procedures. 6. Emergency Procedures. 7. Plant Malfunction, 8. Recommended Spares. 9. Design Data Test and Commissioning Certificates, etc, 10. Manufactures & Suppliers Detail and Equipment Details. 11. Health & Safety Information, Disposal Notices and 12. Schedule of Drawings & Copies of Drawings.

All LED lighting Delivery notes & order numbers are to be supplied with the O&M Manuals and Warranties for the luminaires confirmed with the Manufacturers. These are to be included within the O&M Manuals, Section 10. If this is not supplied, the last payment before the retention payment will be withheld to cover any costs which could be incurred by Bristol City Council.

It is emphasised that Final Payment will not be agreed without proper compliance with **Clauses 4.20, 4.22 and 4.24**.

Ensure Diagrams/Charts comply with BS7671 514.9 and **Clause 3.15**.

4.22 SCHEDULE OF EQUIPMENT MANUFACTURERS

The Specification has been prepared on the basis of specific equipment manufacturers, as stated in the specification, Appendix A and Luminaire Schedule. The Tender shall be based on using these equipment manufacturers. However alterative can be listed on Tender Analysis Form 2, with cost saving.

No guarantee is given that any alternative manufacturers/supplies of comparable make/type/quality of equipment proposed by the tenderer will be considered and hence all tenders shall be based on the equipment specified.

4.23 **MAKING GOOD**

Allow to make good all paintwork and holes round Luminaires, trunking, etc when works are completed.

All paints must have a 0 rating for fire safety.

Allow to repaint the ceiling, walls, floor, etc within each switch room and make good within the generator room, after all works are completed.

Fit an Electrical Safety Mat when works are completed in front of all D.B's, isolators, switch-fuses, to all sides of the generator, etc. As **Clause 3.27**. **All mats are to have metal/plastic edging strips, as required, so as to prevent a tripping hazard**. If existing rubber mat fitted, allow to fit new edging strips as required.

Allow to make good any other items which may need making good after the rewire and paint as required.

Note **Clause 4.6** Builders Works.

4.24 **DRAWINGS**

The following drawings are issued as part of the Specification for Tender purposes, they are only a guide and not as fitted drawings: -
Redwood ground floor layout
Redwood 1st to 10th floor layout
Redwood House Roof lift and water tank room's layout.
Willow House ground floor layout
Willow House 1st to 10th floor layout
Willow House Roof lift and water tank room's layout.

General Notes

Historically the Council has tended not to install fire alarm systems into its multiple occupancy buildings due to the ongoing risk of vandalism, although many individual flats will have stand-alone smoke alarms fitted. Instead, the blocks are designed to meet the requirements of the Building Regulations by following the principle of Compartmentation, with protected staircases and escape routes that lead to a place of final exit.
Compartmentation means that the structural layout follows a cellular arrangement with individual flats and communal areas enclosed in a fire resisting structure to stop fire and smoke spreading from one compartment to another. Often this will by means of concrete floors and continuous block walls that provide at least ½ hr resistance. It is very important to ensure that there are no holes or gaps left where services extend from one compartment into another. Large communal areas will also be sub-divided into specific compartments (i.e. lift lobbies, long runs of corridor or stairwells) separated by fire doors to slow down the advance of a fire to give the occupants time to escape.

Under the **Regulatory Reform (Fire Safety) Order 2005** the Council must ensure that these safety features are maintained and not compromised, for example by building work that changes or reduces the separation between compartments. It is therefore crucial where work is carried out that the work is properly specified and post inspected by the persons responsible to ensure that fire stopping is maintained, for example;

a) Where internal alterations are carried out to ensure that any new partitions are of suitable fire resisting construction and are continuous i.e. they go right up to the underside of the concrete soffit and do not terminate hidden inside a suspended ceiling providing a passage for fire and smoke

b) That replacement services e.g. electric cables, data systems, wet / dry risers, waste pipes, gas carcass, heating pipes are properly fire stopped between compartments.

c) Where extract fans vent into internal ducts that the design is understood so that changes to these flues do not provide a passage for smoke or fire into other flats similarly connected to the duct.

d) That where panels or side walls are replaced to ducts which are designed as fire resisting enclosures that the replacement material is suitably fire resisting.

It is important that responsible individuals engaged in these works are aware of the technical and statutory issues and that adequate resources are provided for full investigations into existing design characteristics and to how new work will affect the compartmentation.

The Fire Safety compliance Certificate

The certificate must be completed for all refurbishment, alteration, repairs, relets or maintenance to high rise, low rise, HMOs where the integrity of fire stopping will be affected. In signing the certificate, individuals are making a statement that the fire stopping has not been adversely affected and that they understand their responsibilities. Bristol City Council staff that commission and administer these works must ensure the certificate is properly and accurately prepared, signed by relevant persons and added to the property file held by the Fire Safety Team. It will be assumed from the certificate that fire stopping is complete and that the information contained is accurate. The document will be kept as evidence that the Council has complied with its duties and may form part of a subsequent investigation by Avon Fire & Rescue in the event of a fire.