FIT-OUT AND DESIGN GUIDELINE

While every reasonable care has been taken to provide the information in this guideline, MRT Corp makes no representation whatsoever on the accuracy of the information contained which is subject to change without prior notice. MRT Corp reserves the right to make amendments to this guideline from time to time as necessary. MRT Corp accepts no responsibility and/or liability whatsoever for any reliance on the information herein and/or damage howsoever occasioned

TABLE OF CONTENTS

1 FIT-OUT GUIDELINE

Fit-out requirements

This document is created as a general guide for Retailers and their appointed contractors/interior designers/consultants in carrying out fit-out work at \ Retail Spaces. This document serves as a guide only. Proposals for the purpose of the fit-out work is subject to final approval by MRT Corp, Operator and Relevant Authorities. Please read this document prior to planning for fit-out work. While reasonable care has been taken to prepare this guideline, MRT Corp reserves the right to amend its contents from time to time without prior notice.

Should there be further any queries on the requirements, please feel free to send them to **retail.operations@mymrt.com.my**

1.1 House Rules

1.1.1 Fit-Out Deposit

Upon signing of the Licence Agreement, the Retailer is required to submit a fit-out deposit as mentioned in the Licence Agreement clause 1.3 (c) – Fit-Out Deposit, in addition to all other fees and deposits as stated. Upon completion of fit-out period, the fit-out deposit will be converted to Reinstatement Deposit, as stated in clause 1.3 (d) – Reinstatement Deposit of the Licence Agreement.

1.1.2 Handover Checklist

Retailer will be given a checklist at the point of handover on site. The checklist will provide information on provisions of mechanical and electrical items, as well as the state of Retail Space. Retailer will need to acknowledge handover by signing the checklist. Once handover is complete, the Retail Space is the sole responsibility of Retailers. Therefore all fit-out activities, repair work, and clean up are under the responsibility of Retailers. MRT Corp and Operator reserves the right to monitor and instruct Retailers and the appointed contractors throughout the fit-out period in the effort to ensure compliance of the rules and regulations spelled out in this Handbook.

Upon expiry of Tenancy Period, Retailers must reinstate the Retail Space in accordance to the checklist. Please refer to Licence Agreement clause 2.12 - On Determination of Licence, for further regulations on reinstatement of the Retail Space. Should there be any fixtures or finishing that Retailers choose to remain, a letter or undertaking must be sent to MRT Corp stating the needed information. Please refer to Section 3 Appendix E for this document.

1.1.3 Insurance

Retailers must ensure all relevant insurances are in place prior to commencing fit-out work. Please refer to clause 2.17 – Insurance in the Licence Agreement. These documents are to be submitted to the Design Approval Committee at the Design Approval Stage, prior to fitting-out period.

1.1.4 Safety on site

MRT Corp emphasizes highly on safety when conducting work on site. Retailers and its interior designers and contractors must observe and adhere to the rules and regulations set out by MRT Corp during induction, and must at all times practice safe working methods during the fit-out period. MRT Corp and Operator reserves the right to issue a Stop Work Order to Retailers and the appointed contractors should there be non-compliance on safety as spelled out in this Handbook.

1.1.5 Cleanliness on site

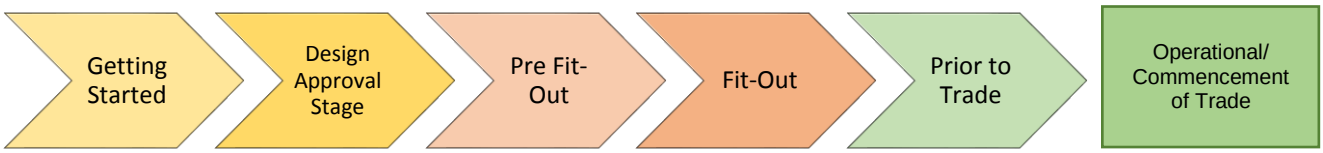
Cleanliness throughout the fit-out period is of high priority when conducting work in Stations. Retailers must ensure the appointed contractors adhere to the rules and regulations on cleanliness and the maintenance of cleanliness on site at all times. MRT Corp and Operator reserves the right to issue a Stop Work Order to Retailers and the appointed contractors should there be non-compliance on cleanliness as spelled out in this Handbook.

1.1.6 Lifts and Escalator Usage

Retailers and the appointed contractors are not permitted to use passenger lifts and escalators to deliver or carry materials or merchandise into the Retail Space throughout the fit-out period. All materials must be delivered using the Station staircase, with the appropriate precautions taken prior to delivery i.e. work method statement submission, usage of rubber tire as carry tools, early communication on material delivery schedule etc.

1.2 Fit-Out Process

1.2.1 Process Overview



Once the **Licence Agreement** and **Letter of Award** is signed signifying the lease offer is accepted, the MRT Retail Operations team will provide a **Fit-Out Package** to Retailers.	Retailers will provide a **Preliminary Design Submission** to the Design Approval Committee. Upon review, a **Final Design Submission** is to be submitted. Final approved plans/ proposal will be stamped – with conditions if necessary.	Retailers engages & appoints contractor. Retailers must arrange for contractor to attend the pre fit-out induction and submit application for work permit to the Operator.	Retailers meets MRT Retail Operations on site for site handover on the handover date. Retailers must provide rent in advance and certificates of insurance prior to handover. Fit-out commence.	Fit-out period includes defects work, to be completed a minimum of 5 days prior to trade, to allow for stocking and merchandising of the tenancy. Retailer must **provide all authority and trade certification** prior to removal of hoarding from site.

1.2.2 Getting Started: Fit-Out Package

Once the Letter of Award and Licence Agreement is signed, the design process commence. MRT Retail Operations will release the Fit-Out Package. The package will provide the following documents:

a. Fit-Out Guideline
b. Design Guideline
c. Fit-Out Timeline – Key milestone dates for Retailer
d. IFC/As-Built Drawings of Retail Space – Electrical & Mechanical drawings, Architecture Drawings, Structural Drawings
e. List of Design Documentation Package – lists out the required documents to be submitted by Retailer during Design Approval Stage
f. Provisions checklist – provisions available prior to handover to Retailer

1.2.3 Design Approval Stage

Preliminary Design Submission

The preliminary design submission must be presented in A3 PDF format (for drawings only) and should include the following documents:

a. Cover Page – Please refer to Section 3 Appendix A
b. Work Schedule (WS) – Please refer to Section 3 Appendix G
c. Contractor's org chart - Manpower name list with valid IC no/passport no
d. Design Documentation Package, as listed in item 1.2.2 (e)
e. Work Method Statement (WMS) – Please refer to Section 3 Appendix F
f. Relevant insurances as mentioned in item 1.1.3

The design submission will be assessed by the Design Approval Committee. The Design Approval Committee will provide a review of the submitted proposals and advise if further action/changes is required in order to progress the submission to the final stage.

Final Design Submission
The final design submission must address all comments and suggestions made during the preliminary design review, and again, must be presented in A3 PDF format (for drawings only).

Upon review of the final drawings, and in accordance with the Retail Design Guideline, the Design Approval Committee will advise if the submission is approved or not approved.

If approved, the drawings will receive a stamp of approval to signify drawings are approved for construction (as-built drawings). A consent letter for submission to local authorities for relevant licences can be issued, if necessary.

If not approved, the Retailer will need to make the required changes and resubmit the documentation in order to achieve approval on final design. Fit-out can commence only when the as-built drawings are approved.

1.2.4 Pre-Fit-Out Induction

Upon approval of all drawings, Retailers must attend an induction organised by the Operator. Retailers shall then submit to the Operator an application of Work Permit (WP) prior to fit-out work. Upon receiving approval of the WP, Retailers can proceed to commencing work on site, according to the submitted documents (WMS and WS).

MRT Corp will not be held liable for any actions taken by the Operator in the event of a non-compliance and/or misconduct on the part of Retailers when conducting work on site.

It is the responsibility of Retailers to appoint a qualified and experienced interior designer and contractor to execute fit-out work. The appointed person in charge (PIC) is responsible in monitoring and overseeing day-to-day execution of fit-out work from pre fit-out phase until commencement of trade. This will include arranging for interior designer and contractor to attend the pre fit-out induction prior to handover of site.

During the induction, a briefing will be held on hazard and safety on site. The attendance is compulsory for all PICs, interior designers and contractors who will be conducting work/on duty on site.

Should the Retailer require assistance in procuring the relevant insurances, please contact MRT Retail Operations for further information.

1.2.5 Fit-Out Stage

Upon completion of induction, a notice for possession of premise will be issued out to Retailers. A date will be arranged between Retailers and MRT Retail Operations Team to conduct the handover of site for fit-out work to commence. The Retailers fit-out team must commence work on the agreed handover date, or within 3 days upon handover date. Before fit-out work commence, a hoarding must be erected on site with the necessary notices of information. Please refer to Section 3 Appendix J for sample of notice. Please use this template at fit-out stage.

Retailers PIC is responsible for monitoring works done to ensure it is on track according to the work schedule. The Retail Operations Team and the Design Approval Committee, from time to time, will conduct inspection on site to monitor the progress of fit-out work throughout the fit-out period.

Retailers and the appointed interior designers and contractors must at all times practice safe working conditions during the fit-out period and adhere to rules and regulations when working on site. Please ensure all emergency contact persons and details are well noted for easy access in case of emergency situations.

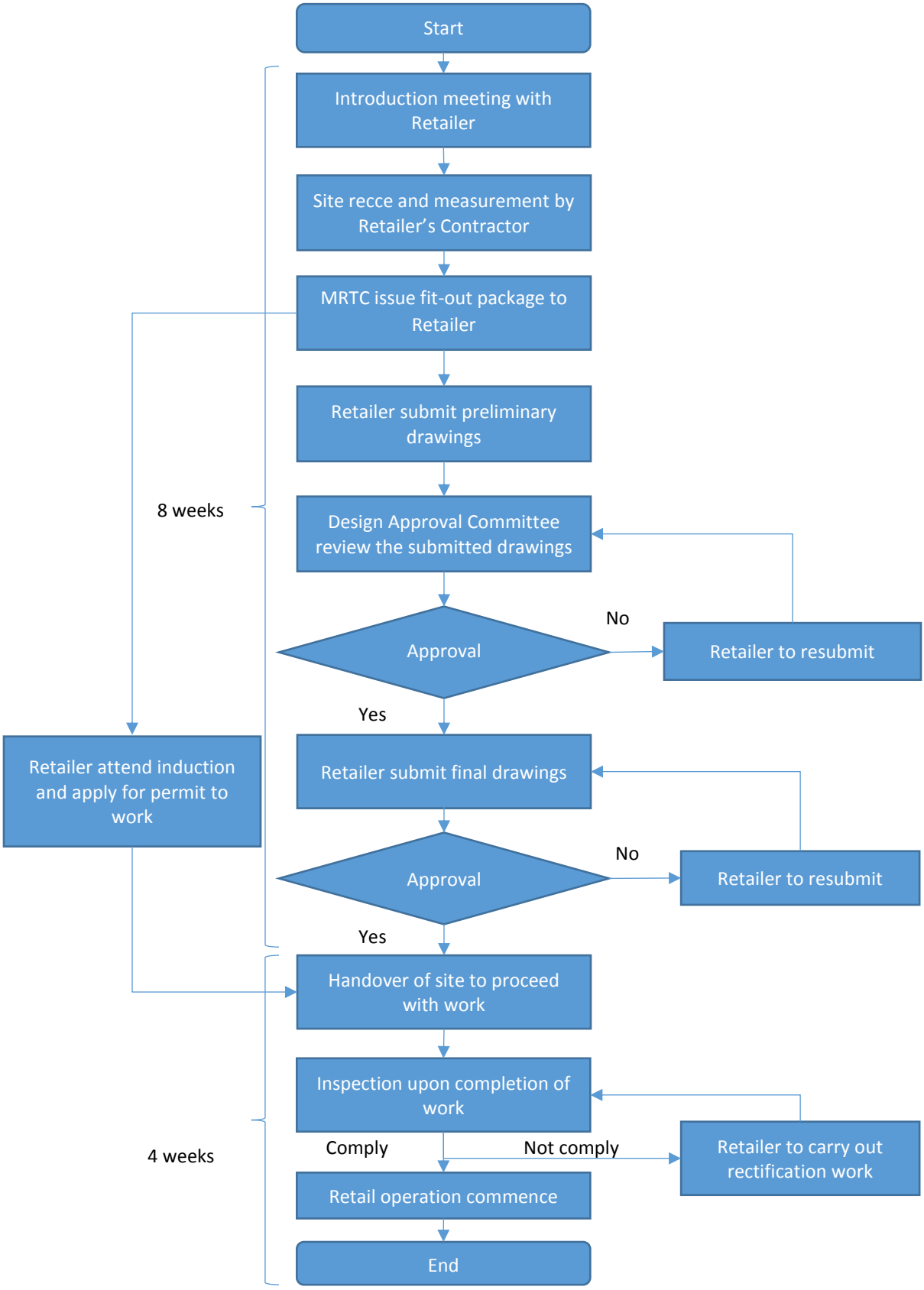
1.2.6 Prior to commencement of Trade

Once fit-out work is complete, Retailers and the appointed contractor must notify the Retail Operations Team for inspection to commence. Inspection will include testing and commissioning of all services within the Retail Space. Retailers must ensure all work satisfies the Retail Operations Team, with the inclusion of rectification of defects and thorough cleaning up, prior to removal of hoarding. Once all the requirements are met during inspection, Retailers will be given a written consent to commence trade.

Retailer must ensure to have received the following certification prior to trade:

a. Premise Licence
b. Business Licence
c. Health Department Certification in relation to F&B Retailer
d. Other related licences and permits

1.2.7 Flow of events for fitting out works



1.3 Worksite Policies

Prior to fit-out, Retailers must ensure worksite policies are communicated to its contractors and adhered to when work is being carried out. It is the responsibility of Retailers to submit the names of appointed contractors prior to commencing work. The contractor must be CIDB certified and hold copies of insurance documents required during fit-out work at all times. Contractors without CIDB certification is strictly not permitted to enter and conduct work onsite.

1.3.1 Workmen

a. Retailers must submit a manpower's list as part of the documents submission during Design Approval Stage. The list includes mandatory information to ensure all workers are legally employed, certified and is with relevant experience in executing fit-out works.
b. Workers must have at all times, valid identification and work permit.
c. Any changes to names in the list must be notified and resubmitted to the Retail Operations Team at least 48 hours in advance.
d. Please ensure workers are supervised at all times when on site, with the appointed PIC at site at all times when fit-out work is in progress.

1.3.2 Conduct

a. Smoking is NOT PERMITTED at all times within the Retail Space and within the Station.
b. Contractors are required to wear personal protective equipment (PPE) in accordance with the safety guidelines communicated during induction, and must exercise safe work conditions at all times, utilising necessary tools during construction of work.
c. A basic PPE consist of a safety helmet, safety shoes/boots and a safety vest.

1.3.3 Notice of Renovation

a. Retailer must ensure a notice of renovation is mounted clearly on hoardings, with clear information such as name and contact number of PIC and contractor, and approved work hours.
b. Areas where fit-out work is in progress, hazard warning signs and barriers are a must in accordance to the safety guideline.
c. Please refer to Section 3 Appendix J for notice for fit-out work.

1.3.4 Access & Work Hours

a. Daily work hours for fit-out work is 8 am – 10 pm.
b. Any hours outside of the defined time will require prior written consent from MRT Corp and Operator at least 48 hours in advance. Any additional cost incurred for this purpose must be borne by Retailers.
c. Fit-out work is not permitted during normal Station operational hours.
d. Usage of passenger lifts and escalators for delivery/loading/unloading of materials is prohibited at all times.

1.3.5 Temporary services

a. Temporary power and water supply must be taken from the distribution board and water pipe within the Retail Space.
b. Mandatory work permits and approval from Operator are required for power and water connection for this purpose.
c. Power and water supply consumed during fit-out period will be chargeable based on the agreed tariff rates indicated in the Licence Agreement.

1.3.6 Contractors parking

a. Parking in and around the Station is strictly not permitted, with the exception of Stations not located in residential and commercial areas.
b. Parking is only permitted at areas allocated by the Station security and/or relevant MRT Corp personnel.
c. In no circumstance will parking be permitted at road shoulders, operational taxi and bus laybys and main entrances of the Station.

1.3.7 Security & Fire Alarm

a. CCTV and fire alarms are installed throughout the Station and are monitored 24 hours.
b. In the event that any work on site sets off a false alarm, it will trigger the Emergency Response Team on site, and any cost incurred in this event will be borne by the Retailer.
c. All security or fire alarm isolation will require a 48 hour prior notification to the Retail Operations Team. This may be necessary where work is likely to generate dust, smoke or fumes which may set off alarms.

1.3.8 Hoardings

a. All Retail Space must have hoardings erected throughout the fit-out period.
b. Hoardings must have a minimum height and width of the shopfront, and must be in the approved material and build, as submitted during the Design Approval Stage.
c. Hoardings must be of non-combustible material such as Prometech, cement board or zinc board/panels.
d. Where required, hoardings must be attached with plastic sheets/screens to contain dust and other debris within the Retail Space.
e. A notice of work must be mounted clearly on hoardings with the necessary information as mentioned in item 1.3.3

1.3.9 Floor protection

a. Protection of the Station floor must be provided by the contractor with suitable temporary heavy duty PVC sheeting, Masonite or other suitable stout protection to prevent damage or staining of floor finishes.
b. Floor protection sheets must be maintained and/or repaired while in use while work is in progress and removed upon completion of work.

c. Floor protection also includes Station floor outside of the Retail Space i.e. public area, where loading/unloading of materials is concerned.
d. Where the use of trolley for mobilizing materials is concerned, please ensure the use of rubber tire trolley when transporting goods within the Station.

1.3.10 Noisy work

a. Please avoid any noisy work that can cause disturbances to the public (residential areas) and/or other Retailers during station operational hours.
b. Any unreasonable noisy work found on site will be asked to cease immediately and will require to be conducted during Station non-operational hours.
c. For Retail Space located within Station in/nearby residential areas, noisy work will need to be conducted within the allowed time, subject to advice by MRT Corp.
d. Noisy work consist of but not limited to jack hammering, percussion drilling and machine saw cutting of materials such as timber, metal and concrete.

1.3.11 Hot works

a. Hot works shall require mandatory permits for approval from Operator, and is subject to Design Approval Committee.
b. Please ensure the needed documents and information is provided in the proposal for Design Approval.

1.3.12 Plumbing works

a. Any modification to in-built plumbing is to be executed by the contractor in accordance to the approved fit-out plans as submitted during the Design Approval Stage.

1.3.13 Paint work

a. Paint work or other work that causes chemical fumes that may affect the public and other Retailers must only be carried out during Station non-operational hours, subject to approval of the Retail Operations Team and Operator.

1.3.14 Loss and/or Damage to property

a. Retailers will be fully liable for any loss and/or damage to property caused by them during the fit out works. Retailers shall at all times indemnify MRT Corp from and against all claims, damages and/or losses in respect of, relating to or in connection with the fit out works.

1.3.15 Waste storage and Disposal

a. It is compulsory for Retailers and its appointed contractor to clean the site during each work day, at the end of each work day and after the fit-out work is completed. Failing to do so will give the MRT Corp the right to dispose the left-over and to deduct the cost incurred from the fit-out deposit.
b. Retailers and its appointed contractors must be responsible for the removal of waste from the site in the manner that is agreed by MRT Corp and Operator.

c. Waste may be disposed in skips or containers located at the approved locations, specified by the MRT Corp and Operator.
d. Waste materials from fit-out work is not permitted to be left within the Station compound, or within the Retail Space.

1.3.16 Cleanliness

a. It is the responsibility of Retailers to ensure cleanliness of the site **at all times.**
b. It is the responsibility of Retailers to deliver a clean Retail Space after the fit-out period is complete.
c. Cleaning of the Retail Space (not limited to floor and walls), corridor floors at the shopfront, shopfront frames and glazing must be completed prior to trade.

1.3.17 Other General Guidelines

a. MRT Station are a **NO SMOKING** zone at all times.
b. F&B is strictly prohibited on site **at all times**.
c. Each Station displays its respective emergency contact information at prominent locations. Please take note of the locations and contact information in the event of an emergency.
d. Please take note of the Emergency Assembly Point of every Station.
e. Please ensure that a complete first aid kit is available at all times during the fit-out period
f. Station public toilets are located at the paid area. Please ensure responsible and appropriate use of the public toilets.
g. No amplified music likely to cause disturbance to the public and other Retailers is permitted on site during fit-out period.
h. Loading/unloading of materials is permitted at designated areas of the Station staircase and is subject to permitted time.
i. Please ensure the use of proper scaffolding when conducting work at height i.e. ceiling work.

1.3.18 General Clauses

a. MRT Corp shall not be liable for any loss of tools, equipment, materials, fittings or other relevant items that is subject to fit-out work.
b. Retailers must acknowledge and accept that the site, including premises in which the works are to be carried out, shall at all times be subject to the reasonable discipline of the MRT Corp, Operator, and the Retail Operations Team.
c. Advertising of the Retailer's businesses are generally not permitted within the internal or external of the MRT Station unless with written permission of MRT Corp.
d. For advertisements, the Retailer are advised to contact the MRT Crop advertising concessionaire details of which can be obtained from the Retail Operations Team.

2 DESIGN GUIDELINE

Design requirements

This document is created as a design guide for Retailers, in planning the store concept of the Retail Space whilst meeting the specifications set out by MRT Corp. Retailers are required to abide by the guidelines spelled out in this document. Proposals for design of the Retail Space is to be submitted to the Design Approval Committee before carrying out fit-out work. MRT Corp reserves the right to reject any submission of plans and design that does not meet the requirements in this document.

2.1 Key Responsibilities

2.1.1 As owner, MRT Corp has three key responsibilities in ensuring delivery of the Retail Space meets the desired quality and standards of the Station:

a. Design review and approval
   Ensure required drawings are submitted and approved.
b. Coordination of overall fit-out process
   Ensure smooth coordination of schedules for a smooth delivery.
c. Day-to-day management of the fit-out process
   Organize site access, review and collect relevant certifications such as insurances, documentation and work method statements that will be carried out by the appointed contractor.

2.1.2 Retailers must ensure the hire of qualified and experienced:

a. Interior Designer in designing the store concept
b. Graphic Designer in designing graphic elements such as logo, business signage etc.
c. Contractor to undertake the construction of the Retail Space
d. Architect to submit and obtain necessary approvals from Local Authorities/Bomba

2.2 Tenancy Design Criteria

When applying interior and graphic design elements to the Retail Space, the following design criteria must be adhered to.

2.2.1 Shop Fit-Out In General

The Retailers fit-out/ceiling design proposal shall be subject to the review and clearance of the Design Approval Committee. Arising from this, if the proposed design is deemed to affect the approved fire separation, protection services and emergency escape, Retailers shall make all the necessary submissions to the relevant authorities to obtain the necessary approvals prior to commencement of work on site. The submission shall be made at the cost of Retailers.

Where food preparation is considered integral to the store design, the design proposal will be considered by the Design Approval Committee based on overall design merit.

2.2.2 Shopfront

Installation of shopfront must be within the Lease Line. Shopfront designs/ displays which extend beyond the Lease Line is not permitted so as not to disrupt station operation and pedestrian circulation.

The shopfront is the face of Retailers business. In order to maximise visual presentation within the station, full height and width must be utilised in the design of the shopfront. Full height and width refers to the opening of the shopfront. The shopfront should maintain a visible area of about 70% either as full height glass or opening. The remaining 30%, should adopt a dynamic approach to finishes and design detailing which may be of either full height graphic glass, feature wall, signage panel or other architectural feature deemed feasible/appropriate.

In this case, the shopfront should be designed to fit the overall shop fit-out design suitable for the image of Retailers business and must also comply with all authority requirements. Emergency exit must be considered and all material shall be non-combustible according to authority requirements.

Every shopfront has its own unique dimensions. Please ensure accurate measurements are taken per Retail Space if there is more than one unit in your Licence Agreement.

Lighting is provided in the public areas within the Station. Retailers are responsible for all lighting within the Retail Space. Decorative lighting can be considered to highlight and improve visibility of the shopfront, and is subject to approval.

Where fire extinguisher or other safety equipment are concerned, please ensure the design of the shopfront incorporates the placement of these items. Please ensure the statutory signage and hardware complies with all relevant safety regulations.

Where glazing is installed to the shopfront, it must comply with the standards set by MRT Corp. The sheet size, the installation method and the material used must be included in the proposal for submission during Design Stage Approval.

2.2.3 Shopfront Closure

Every Retail Space will be provided with a motorised roller shutter with fire security feature, as well as an emergency exit. Please ensure the design of the shopfront, and layout within the Retail Space gives space allowance for the shutters and its motor enclosure.

Please note, in the event of fire, the roller shutter will automatically shut. Please ensure when designing the layout of the Retail Space, there is no obstruction at the roller shutter and the emergency exit.

The roller shutter must open during business operating hours as stated in the Licence Agreement, and closed during non-business operating hours. The emergency exit serves as access for employee/contractor during non-business hours.

Concertina, stacked, sliding or bi-fold doors must be concealed in housing that is integrated within the shopfront design. All track guides, locks and hinges must be recessed and concealed into the shopfront design.

2.2.4 Exterior Signage/ Graphics

The exterior signage and graphics are integral to the design of the shopfront and must be designed by a professional graphic designer. Please note that signage manufacturers are not considered as graphic designers.

One exterior signage is permitted to each shopfront. Joined or combined retail units are considered as one shopfront.

It is the responsibility of Retailers to ensure application of necessary licences for exterior signage are submitted and approved by Local Authorities to avoid disruption of trade.

Retailers are encouraged to be creative with the signage design strategy but should be restricted to the trading name and logo. The use of banners, placards or signs fixed to shopfront glazing/windows are not permitted. Menu boards/ product information boards shall be installed within the Retail Space and are to be edge-lit and slim-line.

Creativity in signage design to improve visibility of shopfronts are welcomed. Protruding signs are generally not permitted but may be considered as exceptions in cases which satisfy the following conditions:

a. Shop lots are situated away from the main pedestrian flow and such signage are assessed to be required to improve visibility of the shops.
b. It is confined to the shopfront and forms part of the shopfront design.
c. Must not obstruct CCTV coverage or pose security concerns.
d. Do not obstruct view of transit fixtures within the Station such as station clock, Pedestrian Information Display (PID) as well as station directional system and operational signage.

The exterior signage is a standard format with the measurements below:

Dimensions	Signage Frame (square edged only)
Length	Equal to the length of the shopfront opening
Width/Depth	To be confirmed on site.
Height	600 mm or 2 feet

When designing the signage, please ensure it is three dimensional and lit from behind with internal illumination using LED lighting. Illuminated signs shall be lighted during the station operational hours and power requirements for the illuminated signs shall be from the Retail Space electrical power supply.

Non-illuminated signage that demonstrates exceptional design quality may be considered, subject to approval by the Design Approval Committee.

All electrical wiring and fitments are to be concealed and all mounting attachments/fasteners are not be exposed, therefore please ensure planning is done prior to installation of the signage.

Signage styles not permitted include but not limited to:

a. Animated/flashing/moving signage that may interfere with station safety and operations
b. Noise making signage that may interfere with Station safety and operations
c. Light box style
d. Foam lettering
e. Plain painted signage
f. Hand written pricing, signage or graphics
g. Neon lights
h. Cloth/paper/cardboard design
i. Mobile signage
j. Other combustible materials

Snapper frames will be assessed on individual design merit. Please note, where permitted, frames must be square edged and recessed into the surrounding joinery.

No installation of graphics is allowed onto the roller shutter. Installation of graphics onto other areas of the shopfront will be subject to approval of the Design Approval Committee, with consideration to material type, installation method, graphic content and other requirements outlined by the Design Approval Committee.

The use of banners, placards or signs fixed to shopfront glazing/windows are not permitted.

2.2.5 Ceilings

The design of the ceiling, if any, must relate to the overall design concept. Open plan ceiling will be subject to review by the Design Approval Committee.

Please ensure proper care and attention during installation of fixtures (lights, AC unit etc.) to the ceiling. Installations must produce clean, neat and well flushed workmanship.

Fire protection system (smoke detector, air grille smoke spill system and emergency speaker) is provided in all Retail Space. Relocation of the fire protection system is not permitted. Any design to the ceiling must not conceal the fire protection system.

From time to time, Station maintenance of services above ceiling is required for Station operation work. For this purpose, Retailers must install/provide access openings for inspection and maintenance of ceiling equipment and services. Therefore design of the ceiling must give flexibility for such access requirements. Please provide adequate ceiling access, with no obstruction of fixtures and/or enclosure. Advance notice will be given of such access requirements in mark-ups of either the provided drawings/plans or the Retailers design submission.

Ceilings are to be suspended from the structural slab. Ceilings may not be suspended from mechanical ductwork, cable trays, hydraulic or fire service pipe work.

Ceiling materials must be of non-combustible material.

Valid certification of material non-combustibility and lab test results must be submitted when required.

2.2.6 Floor

The flooring must be in line with the overall design concept and must meet minimum slip coefficients.

Any form of coring, hacking, drilling, cutting, and chasing of any part of the floor base structure is not permitted.

All floor finishes must sit flush and include a recessed metal angle between the finishes. Please note, for safety reasons, screw fixed edge plates or raised cover strips between floor finishes are not permitted.

If the floor design requires a ramp, please ensure that it complies with the regulatory requirements. Design with ramps is subject to approval by the Design Approval Committee.

Other important requirements include non-slip finishes specified into all wet areas, steps, ramps and landings. Please ensure the floor finishes comply with slip resistance test certification. Relevant certification must be provided at Design Approval Stage.

For F&B Retailers, floor and skirting must meet all regulatory requirements. A portable grease trap must be installed where necessary.

A waterproof membrane between the concrete floor slab and the finished flooring must be installed if water is used for any purpose. The installation of the waterproofing membrane must be extended at 300mm upturn into the wall.

Types and designs of waterproofing are torch on membrane which must be submitted to the Design Approval Committee for approval. A 48 hour water ponding test must be carried out and witnessed by relevant member of the Design Approval Committee. The Retailer must submit a certificate of warranty for the water proofing works upon completion.

2.2.7 Electrical Fittings

Lighting

The lighting must complement the overall design. It is important that the lighting design provides high quality illumination and enhance both the merchandise and visual appeal of the store. A combination of architectural fittings and alternate light sources is highly encouraged. The light fittings shall be of LED type.

Ensure lighting is designed to minimise energy usage and complies with the Electrical Material and Workmanship Specifications provided by MRT Corp.

Lighting shall be glare free and without visible lamp sources. In cases where decorative light fittings are used to establish tenant identity and lamp source/fittings are exposed for design effect, only those of very low intensity are permitted.

All lightings complete with switches and accessories are to be shown in the electrical/lighting plans and single line diagram. Similarly, for exterior signage lighting is to be included and indicated in the signage drawing. Details on method of installation must be included in the drawing.

Emergency Lighting/Exit Sign

Retailers are required to install emergency lighting/exit sign within the Retail Space, if not already provided. The recommended specification for emergency lighting/exit sign is battery pack. The emergency lighting/exit sign must be installed above the exit door/bypass door.

Light fittings not permitted include:

a. Exposed neon
b. Spinner type lights
c. Flashing lights/ laser beam type lights

d. Surface mounted fluorescent lighting troffers

Power Points

Location of the power points is to be indicated in the electrical drawings and in the single line diagram. Details like quantity, specifications/make and fact sheet must be provided. Please submit a product catalogue indicating which product will be used.

The points to be used and installed shall be surface mounted type. Rating, socket outlets/isolators type to be indicated in the drawings and single line diagram. The design must comply with Electrical Material and Workmanship Specifications provided by MRT Corp.

The electrical load must not exceed the rating of the circuit breaker provided in the DB. Please submit a load calculation sheet as part of the electrical drawings submission.

Please refer to Appendix D of this Handbook for plumbing technical and installation requirements.

2.2.8 Walls

The wall finishes must be innovatively designed. Elements such as graphics and three-dimensional elements are allowed, subject to final approval by the Design Approval Committee with consideration to material type, installation method, graphic content and other requirements outlined by the Design Approval Committee.

Coring, hacking and chasing of the wall is subject to the approval of Design Approval Committee. Any relocation of cables/DB box attached or within the walls of the Retail Space is subject to the approval of the Design Approval Committee. Replacement of the DB box is not permitted.

All additional internal walls/partitions within the Retail Space, if any, must be in full height from floor to underside of ceiling. Construction of internal walls/partitions should be undertaken using metal or timber studs, and must be lined.

Retailers with potential noise for example music, hairdressing salons, key cutting services, cobbler and similar services, are required to use acoustic sound proofing materials such as insulation.

Wall designs with painted or exposed blockwork walls is subject to approval by the Design Approval Committee. Exposed prefabricated paneling is not permitted. Exposed conduits or power poles are also not permitted.

Where there are additional internal walls/partitions, doors to back of house must be oversized, made flush with front of house walls, frameless and self-closing. Curtains separating front of house from back of house is not permitted.

2.2.9 Fixtures

Fixtures used must complement the overall store design concept. As such walls, wall mounted display systems and loose joinery items need to support and be consistent with the overall store design.

Point of Sale counters or freestanding fixtures must be carefully located within the Retail Space.

The Retail Space does not come with AC units. Retailer must propose own units, appropriate to the Retail Space. Location for outdoor units is at Station's back of house, to be determined by the Design Approval Committee. Installation of outdoor units must be according to the method approved by the Committee.

Please ensure fixtures do not obstruct the fire protection system located on walls and ceilings.

2.2.10 Display/ Visual Merchandising

When creating a product display, consider how to install, hang and remove products and props – particularly in relation to displays at the shopfront.

Ensure display is to the theme, and show products in use/ for sale. Lighting and props should be professional, with power walls, and displays best sellers/hot items.

Displays must be well stocked, and must not be empty at all times throughout business operating hours. Ensure pricing information is complete with products on display.

2.2.11 Audio Visual and Music

Screens must be fully integrated or recessed into the joinery or walls of the Retail Space, using concealed cabling and fixings.

Stereo systems require a sound leveler in order to maintain a constant music sound level. All music system shall be present at a low level volume and must not interfere/overwhelm the Station public announcement system which may affect Station safety and operations. In this case, Retailers must adjust the music sound level as required.

The Station public announcement speakers provided within the Retail Space is not allowed to be removed, relocated or disconnected.

Speakers must be ceiling recessed or recessed into horizontal track lighting systems. Speaker locations must be detailed within the design drawings. Portable speakers are not allowed.

Speaker system is not allowed to be installed outside of Lease Line.

Retailers are required to obtain MACP/PPM licence prior to retail outlet opening or trading.

2.2.12 Additional information for F&B Retail

For F&B Retail, the counter front design shall be subject to the same visual requirements described in item 2.2.2 on “Shopfront” design guide.

The store design must reflect a high standard with a clear focus on presenting and highlighting the goods and services offered.

Design of the counter fronts must incorporate high quality and durable finishes without protruding past the Lease Line. Counter must also incorporate point of sale or cash register equipment, as well as condiments, cutlery and serviettes dispensers where applicable.

Counter displays should be free of visible supporting frame which inhibits or interrupt the presentation of the product; and shall be constructed using square-edged frameless glass and concealed lighting. Counter heights generally between 800-1200mm are encouraged.

Refrigeration motors are to be installed in a remote location. Extraction and ventilation grilles cannot be located on the counter front.

2.2.13 Materials

The materials specified throughout the Tenancy Period must be:

a. Of a commercial quality and relate to the design concept with particular attention to the shopfront.
b. Shall be class ‘O’ non-combustible according to authority requirements, or as advised by the Design Review Committee.

Material use that is not permitted for the shopfront:

a. Laminates
b. Brush paint finishes
c. Exposed fittings
d. Plasterboard
e. Cork
f. Sheet vinyl
g. Wallpaper
h. Acrylic sheeting
i. Powder coated framing

Material use for floors:

Permitted (but not limited to)	Not Permitted
Vitrified Tiles	Sheet Vinyl
Natural Stone	Applied painted floor finishes
Homogeneous Tiles	Timber or timber based composite materials
	Carpet Tiles

2.2.14 Plumbing and Sanitary

Any modifications and/or additional plumbing works/connections is subject to approval by the Design Approval Committee.

Drawings showing the connections to the Station's main water supply or drainage system including positions of all drainage, piping, control valves and materials to be used must be submitted and approved by the Design Approval Committee. Only self-closing taps may be installed at any sink and an isolating valve must be provided at all tee off points.

Where required, the Design Approval Committee may determine the Retailer's drainage system, including drainage points and is subject to approval and site adjustment.

For F&B Retail, Retailer is required to install a grease trap/interceptor before final discharge point. Maintenance of the grease trap/interceptor is the sole responsibility of Retailers. Failing to do so may cause blockage/disruption to the Station drainage system. Should this happen, the Operator shall engage its contractors to carry out the repair works and the cost for repairing the Station drainage system shall be borne by Retailers.

Please refer to Appendix B of this Handbook for plumbing technical and installation requirements.

2.2.15 AC and Ventilation System

In planning AC installation within the Retail Space, please refer to the AC drawings provided for location of AC piping. Please refer to Appendix C of this Handbook for AC technical and installation requirements.

2.2.16 Telephone/Fax Line

Telephone trunking/conduit complete with telephone point is provided. However, currently there will be no telecommunication services provided. Retailers are advised to install own wireless connection via local network providers.

2.2.17 Fire Protection System

The Station public announcement speakers provided in the Retail Space is part of the Station's fire protection system for broadcasting emergency messages/announcements.

Should Retailers fit-out design require modification and/or additional work to the existing fire protection system, all necessary submissions to obtain the approval from Relevant Authorities prior to commencement of works will be the sole responsibility of Retailers.

Where relevant, after the sprinkler system within the Retail Space is charged and activated, the system must not be drained at any time without prior approval form the Operator and Relevant Authorities. Should the necessary approvals be obtained and the sprinkler system need to be drained, it shall be done after Operation hours and must be recharged and pressurized before Station opens for operations the next day. The cost for draining and recharging the sprinkler system shall be borne by the Retailer.

Where relevant, the Retail Space must be within the effective range of the fire hose reel. The hose reel and its operation must not be obstructed at any time. If the internal layout of the Retail Space causes any part to be inaccessible from the fire hose reel, the Retailer must then provide additional fire hose reel at own cost to achieve the required range and accessibility.

Where relevant, the fire protection system within the Retail Space shall have links to BOMBA via the Station's Fire Control Centre (FCC) or Fire Control Room (FCR).

2.2.18 Retail Space Security

Retail Space security is the sole responsibility of Retailers. All security devices and alarms proposed will be under the responsibility and cost of Retailers. Consider careful placement of the systems, as it must be concealed within the shopfront, subject to approval by the Design Approval Committee.

All security devices and its appliances must be incorporated into the relevant drawings. Please note, the fittings cannot be attached to the base building material.

MRT Corp and the Operator shall not be liable for any lost, theft, personal injury and/or damages occurred to the assets or persons within the Retail Space and/or Retailers.

3 APPENDICES

3.1 Appendix A – Retailer's details.

Sample as below.

NO	ITEM	PARTICULARS
1.	Station name	
2.	Unit no.	
3.	Name of person-in-charge	
4.	Name of company	
5.	Address of company	
6.	Contact no.	
7.	Email address	
8.	Contractor detail: Name, Contact no., address	

3.2 Appendix B - Plumbing Technical & Installation Requirements

The specification listed out here covers manufacture, installation and material requirements of pipework.

Installation in General

1. The pipe installation shall be neat and tidy, with accurate spacing between pipes, valves and joints, whether running in straight routes or turning through bends.
2. No bends or curves in any pipe shall be made so as to diminish the waterway or alter the internal diameter of the pipe.
3. Pipe runs, where exposed, shall be positioned at least 25mm from the finished wall surfaces to enable subsequent cleaning and painting of all surfaces. Where pipe runs are installed at an angle, they shall be positioned 40mm from the finished surfaces.
4. All pipes shall be fitted clear of the floor to permit cleaning beneath the pipes. Where possible, a 125mm clearance shall be provided between the underside of the pipe and the finished level of the floor and in no case shall the pipe be less than 100mm clear of the floor.
5. During installation, all open ends of pipes shall be blanked off with blank flanges or pipe caps. These shall be removed only immediately prior to connecting to adjacent sections. As soon as pipes have been installed, all open ends shall be covered to prevent ingress of materials that would obstruct the pipes. Covers shall be left in place until removal is necessary for completion of the installation.
6. MRT Corp reserves the right to reject any material deemed to be unsuitable for installation and such material shall be removed from the site and be replaced with approved material at no extra cost.
7. Cold water plumbing works shall be carried out by licenced plumber registered with SPAN.

Pipe Material for Plumbing System

1. The pipe selection for cold water service shall be in accordance with SPAN.
2. Material of cold water pipe shall be <100mmØ: Stainless Steel
3. Stainless steel pipe which diameter less than 100mm shall be jointed using screwed joint.

Testing & Commissioning

Any member of the Design Approval Committee or appointed MRT Corp representative shall be invited to witness Testing & Commissioning prior to completion of work.

3.3 Appendix C - AC Technical & Installation Requirements

The specification listed out here covers manufacture and installation of air-cooled split type air conditioning units.

Split-type air conditioning unit consists of an indoor evaporator unit, filter section and outdoor air-cooled condensing unit, power supply, control and the interconnection wiring, piping and accessories.

Quality Control
Nameplates shall be attached on each unit showing manufacturer's name, serial and model numbers.

General
1. Refrigerant type: R-410a or equivalent
2. All bolts, nuts, stud anchors, hangers, chemical bolts and washers shall be hot dipped galvanized to minimum 50 microns and facilitate ease of fastening and removal during service and maintenance.

Evaporator Unit
1. The indoor fan coil unit shall be of the type indicated in the submission drawing.

Condensing Unit
1. Unit shall be suitable for outdoor installation.
2. Air-cooled condensing units shall house the refrigeration compressor, condenser coil, and condenser fan and associated electrical equipment and shall be fully weatherproofed suitable for outdoor installation.

Refrigerant Piping (if required)
1. Refrigeration pipe shall comply with AS 1571, "Copper - Seamless Tubes for Air Conditioning and Refrigeration", and suitable to be used considering the working pressure of the refrigerant.
2. Refrigerant piping bore of 50mm and below shall be copper to BS 2871.
3. Fittings such as elbows, tees, reducers, couplings, etc., shall be manufactured from wrought copper and have capillary type connections. Elbows shall be long radius.
4. Join lengths of pipe using capillary fittings, or swage the end of one pipe to form a capillary joint with the adjoining pipe. Braze or solder joints using suitable fluxes and silver alloy hard solders complying with AS 1167 and having not less than 5% silver. Pass dry nitrogen through the piping system when brazing or soldering.

Condensate Water Drain Piping (if required)
1. Condensate drain piping shall be UPVC pipe to BS 5225:1989.
2. All joints shall be solvent welded using the manufacturer's approved cement, rubber ring push fit or push-on spigot and socket.

Insulation (if required)

1. External pipe Insulation is required for refrigeration piping and condensate drain piping.
2. Insulate condensate drain pipes with a minimum wall thickness of 7mm. Glue the longitudinal and circumferential joints along their full length and glue the ends of the insulation to the pipe using adhesive respectively. Taping which compresses the insulation cells will not be accepted.
3. Insulate refrigeration pipework, including valves and fittings with a minimum wall thickness of 13mm. Glue the insulation longitudinal and circumferential joints along their full length and glue the ends of the insulation to the pipe using adhesive respectively to effect a vapor seal. Finish circumferential joints by wrapping with 50mm wide pressure sensitive pre-glued PVC tape.

Controls

Following control shall be provided:

1. Electronic thermostat for desired temperature setting from 16°C to 28°C or other temperature range as per Manufacturer's standard;
2. Fan speed selector with high, medium, low and off selections.

Installation

1. Equipment and associated accessories shall be fitted to the space provided and be readily serviceable.
2. Air cooled split unit air conditioners shall be installed in accordance to the manufacturer's installation instructions.
3. All galvanized support beams, galvanized legs, galvanized hangers, anchor bolts, vibration isolators, ductworks and silencers for the installation of the units shall be provided.
4. After completion of testing on piping and accessories, the system shall be charged with refrigerant in accordance with the manufacturer's published data.
5. All necessary adjustments shall be carried out to ensure unit operation without noticeable vibration after installation.
6. Retailer shall submit detail information to MRT Corp for approval comprising technical catalogues and data of equipment offered.

Testing and Commissioning

Any member of the Design Approval Committee or appointed MRT Corp representative shall be invited to witness Testing & Commissioning prior to completion of work.

3.4 Appendix D – Electrical Technical & Installation Requirements

1.0 LOCAL ELECTRICAL PANELS

1.1 Standards

IEC 60269/ BS 88	:	Cartridge fuses for voltages up to and including 1000V AC and1500V DC.
IEC 60269/ BS EN 60269-2	:	Cartridge fuses for voltages up to and including 1000V AC and 1500V DC. Specification for fuses for use by authorized persons.
IEC 61439-1/ BS EN 60439-1	:	Specification for low-voltage switchgear and control ear assemblies. Specification for type-tested and partially type-tested assemblies.
IEC 60439-3/ BS EN 60439-3	:	Specification for low-voltage switchgear and control gear assemblies. Particular requirements for low-voltage switchgear and control gear assemblies intended to be installed in place.
IEC 60529/ BS EN 60529	:	Specification for degrees of protection provided by enclosures (IP code).
IEC 60947-4-1/ BS EN 60947-4-1	:	Specification for low-voltage switchgear and control gear. Contactors and motor-starters. Electromechanical contactors and motor-starters.

1.2 Technical and Installation Requirements

1.2.1 Quality Control

Test certificates issued by reputable independent testing laboratories and authorities are required to substantiate the quality of the product.

1.3 Distribution Boards

a. Distribution boards for miniature circuit breakers shall be of sheet steel construction with a minimum thickness of 1.6mm, suitably braced to form a rigid structure. Exterior corners and edges shall be rounded to give a smooth overall appearance. Hinged swing doors shall be fitted with gaskets and shall be easily removable to simplify installation.

b. IP ratings for distribution boards shall be as follows:

   i. Within stations, Ancillary Buildings and Depot: minimum IP 42

   ii. Outdoor areas: Minimum IP 55.

c. Each distribution board shall be arranged for top and bottom cable entry and shall be provided with ample cable termination plates and chambers to enable cables to be neatly glanded with tails grouped and terminated on to appropriate internal terminations.

d. Distribution boards shall be wall mounted and shall, where specified, incorporate double pole or triple pole all insulated switches as appropriate, which shall be front of panel operated with an "ON/OFF" indicator and capable of being padlocked in the "OFF" position. Distribution boards shall incorporate HBC cartridge fuses, or combinations of single pole, double pole and triple pole miniature circuit-breakers (MCB's) as specified.

e. Each bank of MCB's shall be clearly identified with its appropriate phase colours/ code, and the mounting framework for the banks of MCB's shall be easily removable to simplify installation. Adequate phase barriers and shields shall be fitted to ensure that after installation and wiring, all bare terminals and wires are covered to prevent accidental contact with live conductors during the normal procedure of fuse changing and resetting MCB's.

f. Each distribution board shall be supplied complete with a permanent circuit identification chart, preferably mounted within the front door. This chart shall be permanently and legibly filled in as circuits are completed, including the circuit description, the MCB rating and the identification of upstream source of the distribution board.

g. Each distribution board shall be clearly labelled indicating its service and all 3-phase distribution boards shall be fitted with white labels red engraved "DANGER - 415 VOLTS".

h. In the top and bottom, of each distribution board a 32mm clear hole in addition to other requirements shall be provided. These spare holes shall be fitted with 32mm stopping plugs and locknuts.

i. Spare MCB's shall be provided on the basis of one per four ways or part thereof for every distribution board ensuring that spares are provided in numbers and ratings proportional to the numbers and ratings in the installation.

j. Distribution boards shall comply with IEC 60439-3 or BS EN 60439-3.

k. All busbars shall be of hard drawn copper having ratings as specified, and shall be electro-tinned. Neutral busbars shall be of the same cross-sectional area as the phase busbars and shall have adequate number of terminals for all outgoing circuits including spare ways.

l. The configuration of the busbars, busbar supports and busbar mounting arrangement shall be rated at 415V. It shall be type tested and certified to a short-time withstanding current which is not less than 4.5kA for 0.2 second at voltage of 415V.

m. Multi-terminal connectors shall be provided within the distribution board for connection of protective conductors of all outgoing circuits including spare ways.

2.0 SUB-MAINS ELECTRICAL DISTRIBUTION EQUIPMENT

2.1 General

This Section specifies the manufacture and installation of sub-mains electrical distribution equipment.

Sub-mains electrical distribution equipment shall be provided as specified hereafter.

2.2 Standards

IEC 60269/ BS 88	:	Cartridge fuses for voltages up to and including1000V AC and 1500V DC.
IEC 61439-1/ BS EN 60439-1	:	Specification for low-voltage switchgear and control gear assemblies. Specification for type-tested and partially type-tested assemblies.
IEC 60529/ BS EN 60529	:	Specification for degrees of protection provided by enclosures (IP code).
IEC 60898-1/ BS EN 60898-1	:	Specification for circuit-breakers for overcurrent protection for household and similar installations.
IEC 60947-2/ BS EN 60947-2	:	Specification for low-voltage switchgear and control gear. Circuit-breakers.

IEC 60947-3/ BS EN 60947-3	:	Specification for low-voltage switchgear and control gear. Switch, disconnectors, switch-disconnectors and fuse- combination units.
IEC 60947-4-1/ BS EN 60947-4-1	:	Specification for low-voltage switchgear and control gear. Contactors and motor-starter.
IEC 60947-6-1/ BS EN 60947-6-1	:	Specification for low-voltage switchgear and control gear. Multiple function equipment.
IEC 61008/ BS EN 61008	:	Residual current operated circuit-breakers without integral overcurrent protection for household and similar
IEC 61009/ BS EN 61009	:	Specification for residual current operated circuit-breakers with integral overcurrent protection for household and similar uses (RCBOs).

2.3 Technical and Installation Requirements

2.3.1 Quality Control

Test certificates issued by reputable independent testing laboratories and authorities are required to substantiate the quality of the product.

2.3.2 Moulded Case Circuit Breaker (MCCB)

a. MCCBs shall comply with and be type-tested to IEC 60947-2 or BS EN 609472. Each MCCB shall be of fixed type and shall have all the mechanical and live parts completely enclosed in an insulated moulded case.

b. MCCBs shall meet the following requirements:

i. Number of poles: double-pole, triple-pole or four poles as specified on the Drawings,

ii. Rated operational voltage: 240/ 415V AC or as shown on the Drawings,

iii. Rated insulation voltage: 660V AC,

iv. Rated uninterrupted current (In): as shown on the Drawings after taking into account of the installation conditions,

v. Rated frequency: 50 Hz,

vi. Rated short-circuit making capacity (Icm): 105 kA at 0.25 power factor,

vii. Rated ultimate short-circuit breaking capacity (Icu): 40 kA,

viii. Rated service short-circuit breaking capacity (Ics): 40 kA,

ix. Utilization category: A or B as appropriate,

x. Degree of protection: IP 3X to IEC 60529 or EN 60529, and

xi. Rated ambient temperature: 40°C

c. The operation of MCCB shall be independent of the operating speed of the overcentre toggle action, and shall provide a quick-make and quick-break switching. Contacts shall be non-welding. The operating mechanism shall be trip-free and provided with mechanical "ON", "OFF" and "TRIPPED" indicator. The MCCB shall be designed for both vertical and horizontal mounting, without any adverse effect on electrical performance.

d. MCCBs shall have overcurrent tripping mechanism of the thermal-magnetic type, or electronic type with temperature compensation, to give time delay overload protection and instantaneous short-circuit interruption. The time delay on overload tripping shall be inversely proportional to the overcurrent up to a threshold value of approximately seven times the rated current at the rated working temperature.

e. Wherever specified on the Drawings, the MCCB shall incorporate shunt trip release which shall operate correctly at all values of supply voltage between 70% and 120% of the nominal supply voltage under all operating conditions of the MCCB.

f. MCCBs rated at 63A or above shall have adjustable-threshold short-circuit protection. Electronic trip units shall comply with the requirements as specified in Appendix F of IEC 60947-2 or BS EN 60947-2.

g. Electronic trip units shall comply with the requirements as specified in Appendix F of IEC 60947-2 or BS EN 60947-2.

h. Circuit breakers shall have breaking capacity to clear the short circuit fault at the point of installation.

2.3.3 Miniature Circuit Breakers (MCB)

a. MCBs shall comply with and be type-tested to IEC 60898-1 or EN 60898-1. The enclosure of the MCB shall be made from moulded insulation materials.

b. MCBs shall meet the following requirements:

i. Number of poles: single-pole, double-pole or triple-pole as specified on the Drawings,

ii. Protection against external influences: enclosed-type,

iii. Method of connection: Bolted type or clip-on type,

iv. Rated operational voltage: 240/415V AC or as shown on the Drawings,

v. Rated current: 6A, 10A, 13A, 16A, 20A, 25A, 32A, 40A, 50A, 63A 80A, 100A as shown on the Drawings,

vi. Rated frequency: 50 Hz,

vii. Range of instantaneous tripping current: C or D type as appropriate,

viii. Rated short-circuit breaking capacity: not less than 6kA unless otherwise specified,

ix. I2t characteristic: as specified in the Specification,

x. Degree of protection: IP 3X to IEC 60529 or BS EN 60529, and

xi. Reference ambient temperature: 40°C

c. The load handling contacts and operating mechanism shall be designed so as to give a wiping action both at make and break. The breaker operating dolly shall be clearly indicated for the "ON" and "OFF" positions.

d. Circuit protection against overload and short-circuit conditions shall be provided by means of thermal-magnetic device.

e. Circuit breakers shall have breaking capacity to clear the short circuit fault at the point of installation.

2.3.4 Residual Current Circuit Breaker with Integral Overcurrent Protection (RCBO)

a. RCBOs shall comply with and be type-tested to IEC 61009 or BS EN 61009. The enclosure of the RCBO shall be made from moulded insulation materials.

b. RCBOs shall meet the following requirements:

i. Number of poles: double-pole or four-pole as specified on the Drawings,

ii. Rated current (In): 6A, 10A, 13A, 16A, 20A, 25A, 32A, 40A, 50A, 63A and 80A as shown on the Drawings,

iii. Rated residual operating current: 10mA, 30mA or 100mA to the Approval of the Employer's Representative,

iv. Rated voltage: 240/ 415V AC or as shown on the Drawings,

v. Rated frequency: 50 Hz,

vi. Rated short-circuit capacity: not less than 6kA unless otherwise specified,

vii. Rated residual making and breaking capacity: 10In or 500A, whichever is the greater,

viii. Operating characteristics in case of residual currents with DC components: as specified in the Specification,

ix. Method of mounting: distribution board type,

x. Method of connection: as specified in the Specification,

xi. Range of instantaneous tripping current: C-type,

xii. I2t characteristic: as specified in the Specification,

xiii. Degree of protection: IP 3X to IEC 60529 or BS EN 60529, and

xiv. Reference ambient temperature: 40°C, and

xv. Equipped with appropriate filters to eliminate tripping due to transient voltage and transient currents.

c. A quick make and quick break switching mechanism irrespective of toggle switching speed shall be provided by the RCBOs. The automatic residual current tripping operation of RCBOs shall be of passive type.

d. Manually-operated ON/OFF facility with clear indications of the “ON” and “OFF” positions shall be provided.

2.3.5 Residual Current Circuit Breakers (RCCBs) or Residual Current Devices (RCDs)

a. RCCBs shall be double pole or four-pole current-operated, housed in a totally enclosed moulded case, manufactured and tested in compliance with IEC 61008 or BS EN 61008.

b. The tripping mechanism shall be of trip-free so that the unit cannot be held closed against an earth fault.

c. The rated earth-leakage tripping current shall be as indicated on the MCB Board Details.

d. Provision shall be made for testing the automatic earth-leakage tripping by an integral test device. A device shall be fitted for prevention against reclosing after the device has tripped on earth leakage.

e. The technical requirements of RCCBs except overcurrent protection shall refer to the Clause 0 of this Section.

3.0 CABLE CONTAINMENT

3.1 General

This Section specifies the manufacture and installation of cable trunking, and conduits.

3.2 Standards

BS 476-6:	Fire tests on building materials and structures. Method of test for fire propagation for products.
BS 476-7:	Fire tests on building materials and structures. Method of test to determine the classification of the surface spread of flame of products.
BS EN ISO 1461:	Specification for hot dip galvanized coatings on iron and steel articles.
BS EN 50085:	Cable trunking - Steel surface trunking.
BS EN 61386-1:2008:	Conduit systems for cable management. General requirements.
BS EN 61386-21:2004:	Conduit systems for cable management. Particular requirements. Rigid conduit systems.
BS 7671:	Requirements for electrical installations. IEEWiring Regulations, 17th edition.

3.3 Technical and Installation Requirements

3.3.1 Installation of Cable Containment System

a. Support channels shall be the basic structural members of the system and shall be easily fixed to the floors, walls or ceilings as necessary and may be interconnected in a multitude of ways by using different brackets. All components shall be fitted together using bolts, spring washers and channel nuts.

b. Brackets and fittings shall be attached to the channel using bolts, spring washers and channel nuts. Standard fittings shall be used for the attachment of cable tray to a framework.

3.3.2. Cable Trunking

a. Trunking and fittings shall comply with BS EN 50085.

b. Factory fabricated bends and tees shall be used. Trunking shall be manufactured in mild-steel sheet and shall be hot-dip galvanized. Where trunking is suspended, the suspension shall be rigid. Trunking shall be normally top accessed. Inverted trunking is not acceptable. The trunking shall normally be supplied in 2400mm lengths

c. Each length being supplied with a sleeve-type coupling and a copper earth bonding link. Bonding link shall be fixed on external surfaces.

d. Joint of metal trunking carrying conducting wires shall be bonded to ensure overall continuity and to achieve an acceptable earth loop impedance level in compliance with BS 7671.

e. Trunking shall be adequately supported throughout its length. Trunking support and channel shall be quick-fixing type and shall be such as to space the trunking a minimum of 13mm from any part of the wall or bulkhead. The maximum spacing between fixings shall be as follows:

	Trunking Size Maximum	Distance
i.	up to 50 mm by 50 mm	900mm
ii.	up to 75 mm by 75 mm	1200mm
iii.	up to 150 mm by 150 mm	1500mm
iv.	above 150 mm by 150 mm	1800mm

f. A minimum of two fixings shall be provided between joints in the trunking except where the distance between is less than the maximum spacing.

g. Where trunking is cut or drilled, the cut edges of the trunking shall be smoothed to prevent abrasion of the cables and shall be painted with anti-corrosion paint, to the same colour as the adjacent surfaces, such painting to be carried out as the work proceeds. In no circumstances will rough screw edges and nuts be allowed in the interior of the trunking. Round headed screws of a non-corrosive material shall be used when installing trunking. The round screw heads shall be on the interior of the trunking.

h. The space factor for cables installed in trunking shall be according to IEE Wiring Regulations (17th edition) and shall be indicated in working drawings as well.

i. All lengths of vertical run trunking in excess of 3000mm, shall contain cable supports made of insulating, non-hygroscopic, non-combustible material. The spacing between such supports shall not exceed 1800mm. An additional support shall be provided at the top of all vertical runs exceeding 3000mm, to support the

weight of the cable and distribute the cables within the trunking to prevent undue compression of the installation.

j. Where trunking crosses expansion joints, a trunking fitting shall be used which shall allow for expansion and maintain earth continuity.

3.3.3 Conduit and Accessories

a. General

i. There shall be two types of conduit system used for underground and aboveground installations:

- Steel conduit system according to BS 4568-1
- Rigid / UPVC conduit system according to BS EN 61386-21

ii. The use of types of conduit system shall be as indicated in Drawings.

iii. Exposed rigid UPVC and flexible UPVC conduit and fittings for underground installations if used shall be of low smoke halogen free material.

iv. Separate conduits system shall be provided for low voltage circuit, extra low voltage circuits, fire alarm circuits and emergency lighting circuit as stipulated in BS 7671.

v. All boxes and conduit accessories shall be fully weatherproof when used in outdoor locations. Weatherproof boxes and conduit accessories shall also be used in locations other than outdoors where specified.

vi. All conduits shall be kept clear of water, gas and other services. All necessary equipotential bonding shall be installed including that for piped services, in accordance with BS 7671.

vii. The ends of conduits laid or set in formwork prior to concreting shall be temporarily sealed off.

viii. All bends shall be made on Site to suit Site conditions.

ix. All conduit systems shall be electrically and mechanically continuous and substantially water-tight after installation.

b. Cast-In Conduits

i. Conduit installations that are in conspicuous locations within public areas and at locations as shown on the Drawings shall be cast-in/concealed within the structural members. All conduit boxes and accessories for concealed/cast-in conduit systems shall be of the type specifically manufactured for that purpose.

c. Concealed Conduits

i. Concealed conduits shall be mounted and secured in formed chases and consequently plastered-up after installation.

d. Surface Conduit

i. All conduit boxes and accessories for surface conduits shall be of a type manufactured specifically for that purpose.

ii. Conduit systems in electrical and mechanical plant rooms and within false ceiling void areas, behind detachable wall panels, below raised floor and at locations where cast-in conduits and concealed conduits are not used, shall be surface mounted, on the walls or ceiling soffit, they shall be fixed by means of distance saddles and shall terminate in deep pattern conduit boxes. In other areas, concealed/ cast-in conduit system shall be adopted. Surface conduits shall not be bent or set to enter accessories, and where they turn through walls, back-outlet boxes shall be provided.

iii. All surface mounted conduits shall run neatly on the surface of the building and truly vertical and horizontal, substantially supported on vertical runs and at appropriate distance on horizontal runs. Conduits in ceiling voids shall be supported independently of the suspended ceilings.

e. Flexible Steel Conduits

i. Flexible steel conduits and solid type brass adaptors for outdoor applications shall be of metallic watertight pattern to IP 54 in accordance with BS EN 60529. The flexible conduits shall be of galvanised steel with oversheathed jacket complying with BS 476: Parts 6 and 7 for installation inside ventilated ceilings.

f. Cable Bracket

i. Brackets and fittings shall be formed from mild steel and hot dip galvanized. Fittings shall be in a standard width of 40mm or 60mm or as shown on the Drawings.

ii. Colour Coding for Cable Ladders, Cable Trays, Cable Trunkings, and Conduits.

iii. The colour coding for all cable containment shall generally follow BS 381C and in the event of absence of specifically mentioned services shall be as follow:-

- Normal Power : Orange
- Essential Power : Orange (with labeling)
- Telephone/Telecommunication : Green System

- Fire alarm System : Red
- Data Cabling System : Grey

4.0 POWER, SIGNAL AND CONTROL CABLE

4.1 General

This Section specifies the manufacture and installation of LV power cables.

4.2 Standards

The power cables shall comply with the latest version of the relevant requirements of the British Standards, International Electromechanical Commission (IEC) standards, European Standards, or equivalent National standards.

The following standards shall apply where appropriate:

Method for Determination of Temperature Index	EN ISO 4589-3	-
Measurement of Smoke Density of Electric Cables Burning	IEC 61034	-
Methods of Test for Insulation and Sheaths of Electric Cables	-	BS EN 60811
Calculation of Continuous Current Rating of Cables	IEC 60287	-
Specification for performance of mechanical and compression joints in electric cable and wire connectors	-	BS EN 61238
Mechanical cable glands	-	BS 6121
Optical fibres and cables	-	BS EN 60793
Requirements for electrical installations. IEE Wiring Regulations. 17th edition	-	BS 7671

4.3 Technical and Installation Requirements

4.3.1 LV Power Cables

a. Quality Control

All the cable requirements listed herein shall be met without compromising the mechanical and electrical properties of the cables both during and after installation.

Unless otherwise specified, all insulated LV power cables shall be rated at 600/ 1000 V for armoured cables and non-armoured cables interconnecting services transformers and LV switchboards or MCCs, and 450/ 750 V for other non-armoured cables.

The Employer's Representative shall have such access to the premises of the Contractor as is reasonable to enable him to determine the quality of the material and the workmanship and may reject any part of the cable which may appear defective either in material or workmanship.

In lieu of relevant test certificates from a recognised testing laboratory being available, necessary tests and tests as laid down in this Specification shall be carried out by the Contractor. This shall not preclude any further tests which may be required to determine the quality of the cable.

b. Construction Requirement

i. Conductors

- The conductors shall be of stranded, high conductivity annealed copper wire complying with all the requirements of IEC 60228 and BS EN 60228.

- Cables for fixed installations shall have conductors with stranding to Table II Class 2 of IEC 60228, and flexible cables shall have stranded conductors to Table II Class 5 of IEC 60228.

- Conductors shall be smooth, uniform in quality, free from scale, spills, splits and any other defects. There shall be no joints in individual strands except those made in the base rod or wire before final Drawing.

ii. Insulation

- The cable insulation shall be extruded cross-linked polyethylene (XLPE) complying with the requirements of BS 7655 (type GP8).

- The nominal thickness of the insulation shall be as specified in BS 6724/ BS 7211.

iii. Core Identification

- Core identification shall be as follows:

Number of Cores	Core Colours
Single	Red
Two	Red, Black
Three	Red, Yellow, Blue
Four	Red, Yellow, Blue, Black

- Black denotes the neutral conductor and other colours denote the phase conductors. The earth conductor shall be coloured green/yellow.

iv. Fillers and Binders

Fillers and synthetic binders shall be applied to ensure that the cable is compact and reasonably circular.

v. Armour

Armouring shall be of galvanized steel wire. Where single core cables are armoured and are in use on ac circuits, the armouring shall consist of non-magnetic material.

vi. Oversheath

The oversheath of the cable shall be an extruded layer of anti-corrosion and reduced flame propagation. The colour of the oversheath shall be black.

vii. Properties of Cable Sheathing

Physical properties of the cable sheathing materials shall comply with BS 6724 and have the following requirements when tested in accordance with BS EN 60811.

c. Flame Propagation

i. Fire Resistant Cable

Apart from those specified on the Drawings, fire resistant power cables shall be provided for the emergency lighting circuits, UPS supply circuits, battery and charger circuits, fire services installations, smoke extraction system, staircase pressurization system, fireman lifts, standby generator set and those circuits required to maintain circuit integrity under fire conditions. Fire resistant power cables shall comply with the requirements of IEC 60331.

ii. Flame Retardant Cable

Power cables for essential and non-essential circuits shall be flame retardant and shall comply with the requirements of IEC 60332-1 for tests on a single cable under fire conditions when tested in accordance with that standard.

The cables shall comply with the requirements of IEC 60332-3-21 to 25 Category 'C' for tests on bunched cables under fire conditions when tested in accordance with that standard.

d. Corrosive and Acid Gas Emission

The level of hydrochloric acid (HCL) of the insulation, fillers, binder tapes, bedding, and oversheath of the cable shall not be greater than 0.5% when tested in accordance with IEC 60754: Part 1.

e. Smoke Emission

The value of smoke generated (Ao) shall meet the requirements of IEC 61034 when a sample of the complete cable is tested in accordance with IEC 61034.

f. Cable Current Carrying Capacity and Design Parameters

The maximum continuous current carrying capacity and the factors for determining such ratings and temperatures, for XLPE insulated cables shall be based on IEC 60287 and on the conditions obtained on Site.

i. The maximum continuous rating of the cable shall be based on the following conditions: Rated duration for maximum short circuit current: 3 sec

g. Cable Construction Identification

The individual cores of the cable shall be clearly identifiable in terms of phase sequence, voltage level, and insulation type.

4.3.2. Power Cable Installation

a. This clause covers the requirements for the use and installation of all cables on or in conduits, trunking and accessories.

b. Cables shall be installed in accordance with this Specifications and BS 7671 and shall be run between their source and termination points on or in cable ladder/trays, ducts, cable brackets, trunking and conduits.

c. All cables shall be provided with identification labels at each end and at each position where cables change direction. In the instances where cables are multiple runs, labels shall be provided at 10m intervals.

d. Cables running horizontally at high level shall in general be supported by cable ladder and/or perforated cable trays or trunking. Where cables are installed in

vertical ducts or on vertical cable ladder/tray, they shall be cleated at intervals not exceeding 1,200mm.

e. Where cables pass through fire-rated walls and floors, all openings shall be sealed with fire-resistant material of a fire rating equivalent to that of the fire rating of the wall or floor.

f. Cables running through tunnels or along viaducts shall either be supported by cable brackets or laid in designated ducts or troughs.

g. Power cables shall be separated from the signalling and communication cables as specified

4.3.3 Installation of Insulated Power Cables

a. The installation and handling of cables shall be undertaken at all times by adequate and suitably trained staff, equipped with all the necessary plant, equipment, tools and lighting.

b. Every precaution shall be taken to ensure that the cables and accessories are not installed in a manner or under conditions likely to cause electrolytic or other corrosive action or damage to the cables, or be detrimental to the performance of the cable during operation.

c. The cable system shall be fully protected from mechanical damage and be accessible at all points for inspection.

d. All cables installed shall conform to the appropriate International standard for acceptable bending radius.

e. Should it prove necessary to cut any cables during installation, all cut ends shall be properly sealed.

f. All transitions where cables pass from one graded area to another shall have an Approved means of sealing the aperture against fire transference.

g. The maximum pulling force on any cable shall not exceed the design force of the cable.

h. All bolts, studs and nuts supplied shall comply with the relevant requirements.

i. All exposed metalwork surfaces shall be properly painted, finished and galvanised in accordance to the General M&E Specifications.

4.3.4 Installation of Cable Supports and Insulated Power Cables

a. The design of all support and fixing items shall ensure freedom from rough edges, burrs and sharp corners. All cable supports shall be hot dipped galvanised.

b. Hot dipped galvanised cable supports that are subject to excessive humidity or in a marine environment shall be protected with an Approved coating.

c. The cable supports required for the installation of single-core cables forming three phase circuits shall permit the cables to be laid in close trefoil formation in case of three phase circuit without neutral conductor or quadrature formation in case of three phase circuit with neutral conductor. Non-magnetic metal cleats shall be used for this purpose. Low smoke halogen free packing material shall be applied between the cables and the cleats to avoid damaging the cable sheath by the installation of the cleats.

d. Unless otherwise indicated on the Drawings, all non-armoured cables, where required to be run on walls, ceilings or other building structures, shall be secured or enclosed in conduit on surface or encased in wall as specified in Drawings or trunking. Armoured cables shall generally be supported by cable ladders, cable trays or cable brackets.

e. Every cable, whether in or out of sight, shall be neatly run vertically, horizontally or parallel to adjacent walls, beams or other structural members.

f. Spacing of clips, saddles and cleats shall be such as to prevent sagging of the cables at all times during their installed life.

g. All steel trays, supporting steel work, brackets, clamps, hangers, cleats, saddles and other fixings necessary for the support of the cables shall be of adequate strength for the cables they are supporting.

h. Where a number of cables are terminated to any particular item of plant or machinery, special care shall be taken to ensure that the cables finally approach the plant or machinery from a common direction and are individually terminated in an orderly and symmetrical fashion.

i. At joints and terminations, all cables shall be adequately supported and secured by cable cleats.

j. LV power cables terminated onto services transformer LV cable box shall not impose load on the LV cable box to cause sagging and distortion.

4.3.5 Termination

a. Cable conductor termination shall be by means of a solderless cable lug.

b. The lug shall be of high conductivity copper, electro-tinned and applied to the conductor by means of an hydraulic crimping tool. All wires shall be terminated with a connector.

4.3.6. Cable Glands and Accessories

a. Non-Armoured Cables

i. Cable glands shall have a watertight seal when fitted to a cable. Each cable gland shall be supplied with a brass gland locknut and a flame retardant outer gland shroud.

ii. All cable glands and accessories shall be supplied by a single manufacturer.

b. Armoured Cables

i. Cable glands shall have a watertight seal when fitted to a cable. Cables shall be terminated in a gland fitted with an armour clamp and an earth tag. A flame retardant shroud shall be fitted to cover the gland body.

ii. All cable glands and accessories shall be supplied by a single manufacturer.

c. Cable Ties

At locations where cables are installed above tracks or in areas subjected to significant and constant vibration, cable ties shall be with a corrosive resistant and flame retardant insulation material.

4.3.7 Cable Joints

a. The appropriate tools specified by the joint manufacturer shall be used when jointing cables.

b. Every connection at a cable joint shall be mechanically and electrically sound, be protected against mechanical damage and any vibration, shall not impose mechanical stress on the fixings of the connection and shall not cause any mechanical

c. No cable joints shall be allowed without the prior Approval of the Employer's Representative. All joints, accessories and cable joint locations shall be submitted to the Employer's Representative for Approval prior to any jointing of cables.

4.3.8 Cable Identification

a. All cables shall be provided with identification markers, at each end of the cable, at entry and exit point of cable trays, ducts and trenches and in other such positions as are necessary to identify and trace the route of the cable.

b. Cable identification shall be assembled from elliptical profiled markers, carrier strip and cable ties.

5.0 WIRING ACCESSORIES AND MISCELLANEOUS ELECTRICAL EQUIPMENT

General

This Section specifies the manufacture and installation of electrical wiring accessories including lighting switches, sockets outlets, fused units, switches, remote indicator units, terminal blocks and telephone outlets.

The miscellaneous electrical equipment specified in this Section include outdoor bell push buttons, remote indicator units, terminal blocks, water heater connection and telephone outlets.

In the case of surface conduit installations, accessories shall be mounted in surface type cast iron boxes, unless the accessory is a waterproof or flameproof pattern, in which case it shall be so mounted as to suit the particular circumstances.

Metal boxes for the enclosure of electrical wiring accessories in conduit system shall be of 35mm deep for lighting switches and 47mm deep for power sockets and all other outlets, complying with BS 4662. Earth bonding between the metal boxes and the associated accessories shall be achieved by a sheathed copper wire of minimum size 2.5mm2.

Coloured labels shall be provided on the front plates of the wiring accessories to indicate the phase of circuitries.

5.1 Standards

BS 546	:	Two-pole and earthing-pin plugs, socket-outlets and socket-outlet adaptors.
BS 1362	:	Specification for general purpose fuse links for domestic and similar purposes (primarily for use in plugs).
MS 589	:	1997 – 1&2: 13 A plugs, socket-outlets and adaptors.
MS IEC 60669	:	Switches for household and similar fixed electrical installations.
BS EN 60309	:	Specification for industrial plugs, socket-outlets and couplers for AC and DC Supplies.
BS 4662	:	Specification for boxes for the enclosure of electrical accessories.
BS 5733	:	Specification for general requirements for electrical accessories.

BS EN 60670	:	Specification for junction boxes for use in electrical installations with rated voltages not exceeding 250 V.
BS 7671	:	Requirements for electrical installations (IEE Wiring Regulations, the latest edition)
IEC 60529/ BS EN 60529	:	Specification for degrees of protection provided by enclosures (IP code).

5.2 Technical and Installation Requirements

Quality Control

All similar items of equipment shall be interchangeable and shall preferably be of the same manufacture.

5.3 Lighting and Appliance Switches

a. Lighting and appliance switches shall generally be 10A, 15A, 20A, or 32A depending on duty and according to BS 7671.

b. The front plates of lighting and appliance switches shall be made of high impact polycarbonate or stainless steel with mat satin finish depending on the location of where it is installed.

c. Switches shall be one way, two way or intermediate as required and where mounted together, they shall be fitted in a common multi-gang box and share a common front plate. For surface installation, they shall be adjustable with front plates having a 6mm minimum overlap.

d. Switches mounted externally shall be weatherproof to IP 54 in accordance with IEC 60529 Alternatively they may be mounted inside watertight enclosures.

e. Ceiling switches shall be white semi-recessed pattern and operated by a non-conducting cord.

f. Flameproof switches shall be of flanged construction, and thoroughly greased before installation.

5.4 Socket Outlets

a. 13A socket outlets shall be connected in a ring or radial system in accordance with BS 7671 or shall be spur feeds. All 13A socket outlets shall be shuttered type, comply with MS 589 -1&2, accept two pole and earth flat pin plugs and have switches

with a rocker type lever. The front plate of the socket outlets shall be made of stainless steel with mat satin finish. Socket outlets shall be flush mounted unless fitted to non decoratively finished walls or pillars where surface mounting will be accepted. Mounting boxes shall be galvanised steel incorporating an earthing terminal and shall accommodate conduit entry for flush mounting or surface mounting. Labels shall be provided on all the front plates to indicate their circuits.

b. Socket outlets mounted externally or in damp areas shall be weatherproof and shall have a degree of protection of IP 54 to IEC 60529 or BS EN 60529.

c. Floor-mounting socket outlets shall comprise a recessed galvanized steel floor box, neoprene sealing gasket, metal alloy plug cover cap, and shall be correctly set in the floor slab to ensure that the screwed level adjustments set the unit with the finished floor level.

d. 15A socket outlets shall be of the shuttered type, complying with BS 546, and shall accept two pole and earth round pin plugs and have switches with a rocker type lever. Details of finish and mounting boxes shall be the same as for 13A sockets.

e. Metal clad switched socket outlet shall be manufactured from rugged heavy gauge steel with lacquer finish. Knock outs for conduits entry shall also be provided on the steel boxes. The cover plate shall also be of steel materials.

f. Heavy-duty three phase socket outlets shall be 32A or 63A 5-pin, complying with BS EN 60309.

g. Emergency power sockets for Fire Services Department shall be provided in headwall units, tailwall units and other locations shown on the Drawings. The socket outlet shall be 32A, three phase, 5 pin socket outlets, in red colour, to IP 54 in accordance with IEC 60529 or BS EN 60529.

h. All weatherproof and heavy duty socket outlets shall be supplied complete with appropriate plugs.

i. Power points for signalling apparatus boxes shall be weatherproof, single phase, 13A, 3 pin, metal clad socket outlets.

5.5 Fused Connection Units

a. Fused connection units shall be employed for final connection to the fixed equipment or appliances which have a full load current not exceeding 13 A. The front plates shall be made of stainless steel with mat satin finish. They shall comply with the requirements of BS 5733 and BS EN 60670 and provide with an outlet for flexible cable. Each fused connection unit shall be complete with a fuse link to BS 1362 rated to suit the appliance to be fed. An earth terminal shall be provided for the connection of the circuit protective conductor to the appliance.

b. Wherever specified on the Drawings, integral double pole switch and neon light indicator shall be provided as part of the fused connection unit.

5.6 Isolators

a. Isolators shall be weatherproof high impact resistant PVC switches mounted rigidly on the equipment frame, the adjacent wall or on an approved galvanised mild steel bracket at the right hand side of the motor, viewed from the non-drive end. Isolators shall be of adequate rating for the use to which they will be put under working conditions.

b. Where motors are assisted start, the switch shall be equipped with auxiliary contacts so connected that when switched off they de-energise the run contactor and force a complete start sequence on reclosure.

c. Extended terminals shall be used to allow front terminating of cables.

d. The termination of MICC cables on the 63 Amp switch shall have the MICC core wrapped around the terminal screw ensuring maximum clamping area. On the 100 Amp and 200 Amp isolators, MICC cable lugs of correct size shall be used.

e. Crimped lugs shall be used on other cables being terminated at the isolator.

f. In all cases, the isolators shall be of a kind which permits removal of the switch plate and/or actuating mechanism, and subsequent full access to all terminal screws without removing the switch mechanism itself from the enclosure and disturbing any cabling.

g. Fireman isolation switch shall comply with Jabatan Bomba's Requirement and IEE Regulations 17th Edition. All Fireman isolation switches location is indicative and shall be approved by the Employer’s Representative prior installation.

5.7 Connection Boxes

a. Connection boxes shall be flushed mounted similar to back boxes for switched socket outlets and isolators. The flushed steel boxes shall be zinc electro-plated for good earth continuity and protection against rust and corrosion. The plating shall include a chromate passivation process to provide a better degree of protection.

b. Brass earth terminals complete with brass fixing screws shall be provided. A blank steel plate with suitable fixing centres shall be provided. Suitable connections for incoming as well as outgoing cables with appropriate ratings shall be provided.

3.5 Appendix E - Fit-Out Checklist

For Retailers reference in ensuring proposal submission to Design Approval Committee is complete.

No.	Description	Y	N
1.0	**Insurance Policy**		
1.1	Contractor's All Risk Insurance with Principal's Existing Property Extension (PEP)		
1.2	Comprehensive Public liability Insurance with minimum limit of RM 5 million		
2.0	**Deposit**		
2.1	Fit Out/Reinstatement Deposit		
3.0	**Letter / Form / Other Related Documents**		
3.1	Cover Page – Schedule 1 with PIC contact details		
3.2	List of Appointed Contractors & Workers name list (with ID no)		
3.3	Work Method Statement		
3.4	Work Schedule		
4.0	**Fit Out Plans / Drawings**		
4.1	Architectural / Interior Design Layout plan, Reflected ceiling plan, Internal elevation plan, Furniture plan, Signage, Graphic Design etc) Section plans Shopfront Elevations plans 3D Perspective / Visual in color Fixtures & finishes material sample board with certifications		
4.2	Electrical Services Electrical lighting and power layout plan Single-line diagram plan Load Calculation Sheet Table of loading / Equipment list Ceiling plan with details Product catalogue		
4.3	Mechanical Services AC layout plan with details Plumbing layout plan with details Reflected ceiling plan with details Product catalogue		

3.6 Appendix F – Sample Template of Work Method Statement

Your Business Name
Your business address here
Your contractors name here
Your contractors contact no here

Written by: _____
Date: _____

Project: Retail Space Fit-Out

Site address: < station name/ location >

Date of works: < # May – # June 2017>

• Description of Task

< Describe the work by listing out type of work eg below: >

- M&E - <describe in detail>
- Hacking - <describe in detail>
- Plumbing - <describe in detail>
- A/C works - <describe in detail>
- Electrical works - <describe in detail>

Involves: <sample content >

- Removal of existing bathroom at lower ground at liverpool station.
- Installation of new pipework, lagging and bathroom fixtures.

Access on-site to be after hours between __am/pm -__am/pm

• Supervision of Task

- Name - 12345678
- Name - 12345678

• Methodology

< Provide a step by step or sequenced description of how the work will be conducted, detailing out no of workers required, certification of qualification if any, type of tools, precautions taken etc >

• Working at height

< SAMPLE CONTENT >

When working at height, site operatives must ensure that the working area is cleared on a period basis to ensure that there is continually a clear and safe working area to prevent slips trips and falls. Manual handling

• PPE requirements

< SAMPLE CONTENT >

- Hard hats
- Safety boots
- Hi-vis vest
- Safety gloves

• First aid

< SAMPLE CONTENT >

Refer to the onsite safety notice board for all first aid information.

A first aid box with enough equipment to cope with the number of workers on site should be provided for by the client or principal contractor.

The client or principal contractor should nominate an appointed person to take care of first-aid arrangements.

The number of appointed first aiders shall be dependent on the number of employees.

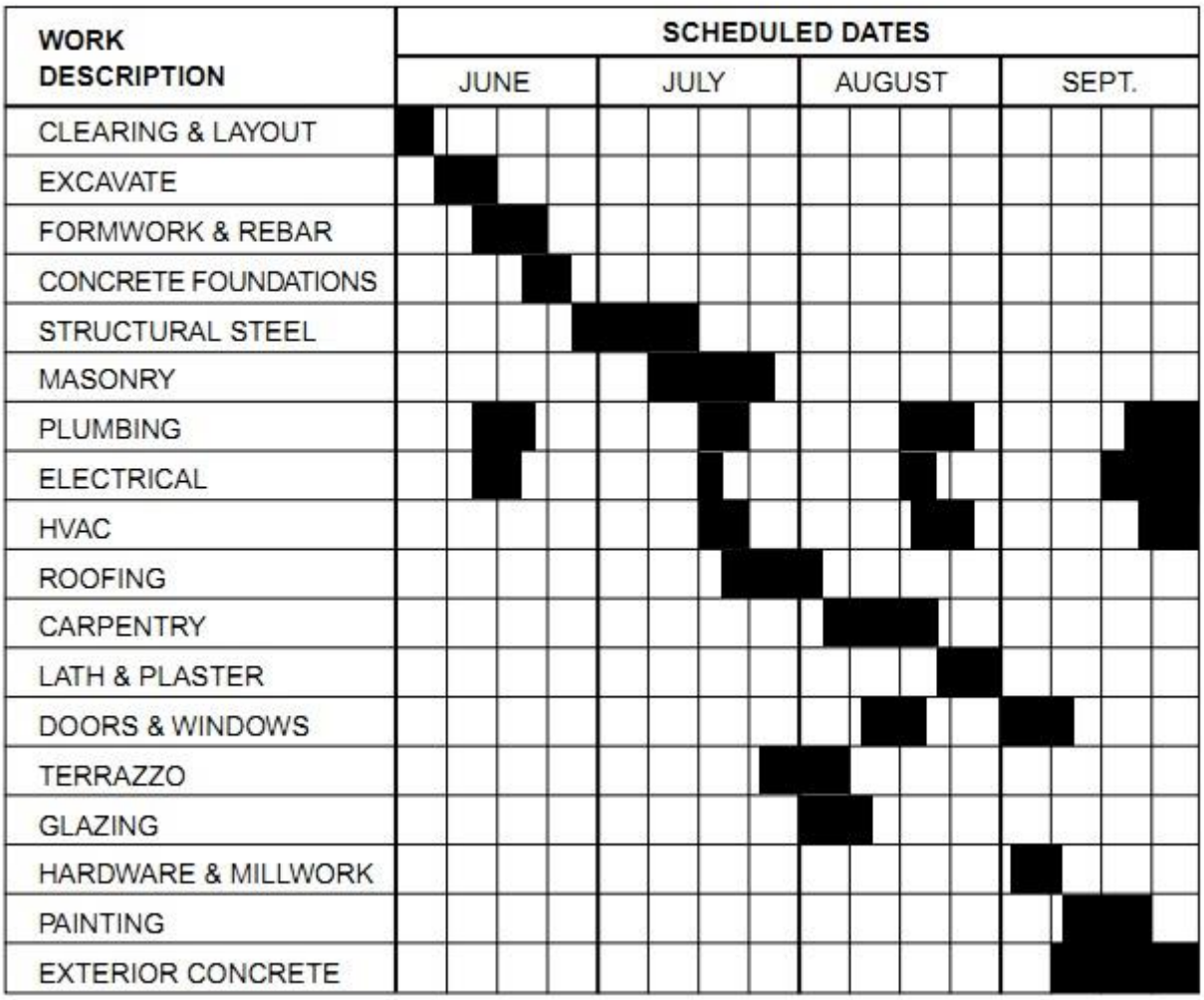
• Emergency procedures

< SAMPLE CONTENT >

The client or principal contractor will ensure that the existing site emergency procedures are followed and that relevant information is given to operatives at time of induction or when changes are made to procedures.

The closest hospital is: St. Thomas' Hospital, Westminster Bridge Rd, London SE1 7EH, United Kingdom

3.7 Appendix G – Sample Template of Work Schedule



Please note that this is a sample to give an idea of what a work schedule should contain. For the purpose of retail fit-out at MRT Stations, please ensure the appropriate and relevant type of work is listed out against the number of weeks given for fit-out work.

3.8 Appendix H - Checklist for EP & SP Submission

Checklist for EP & SP Submission

1. Engineering Possesion & Safety Permit Form	☐
2. Company Profile (Only for Third Party Contractor)	☐
3. Method of Statement	☐
4. Engineering Drawing Prior to Work	☐
5. Schedule of Work	☐
6. Work Planning of Work	☐
7. Manpower identification	☐
8. Safety Briefing Attendance (RM 212.00 Inclusive GST - Cheque)	☐

Notes :
1) All workers must provide their photocopy of their Identity Card/Passport upon submission
2) Safety Briefing price are RM 212.00 Inclusive GST per **Session**

3.9 Appendix I - Engineering Possession / Work Permit Form

ENGINEERING POSSESSION / WORK PERMIT FORM | **EP / WP No:**

A : Application Details

APPLICANT			Possession Date	**From**		**To**	
COMPANY & DEPARTMENT			Possession Time	**From**		**To**	
CONTACT NO			Locations	**From**		**To**	
DIVISION							
DATE							

SYSTEM		**RSD**		**FMAD**		**STATION**	
		WEES		**QA**		**TRACK ACCESS**	
		TNM		**SECURITY**		**OTHERS**	

Description Of Work

CONDITIONS OF POSSESSION (Required)

Method Statement		Yes		No	Power Isolation		Yes		No
Detail Drawings		Yes		No	Work Train		Yes		No
Schedule		Yes		No	Safety Plan		Yes		No
Work Planning		Yes		No	Safety Review		Yes		No

Declarations

I understand that the above mentioned works must be carried out in accordance with the conditions of the approval set out by MRT SBK Line Management as well as to the Malaysian legals requirement Health & Safety. Furthermore, I will undertake to complete the "WORKS" and declare the system normal upon completion. I will be available through my contact number throughout the duration of the works and until this possession permit is surrendered (closed).

Signature	Contact Person (PIC)	Contact No (PIC)

Comments:

1. Ensure activities will not jeopardize to MRT SBK Line operation.
2. Ensure safety caution in work place.
3. Every works are subject to OCC approval

B : MRT SBK Line Person In Charge

Possession Status :		Rejected		Accepted As Requested			Accepted With Condition		
Owner Verification :		**RSD**		**WEES**		**TNM**		**STATION**	**TRAIN**

Review and Approved by EP / WP Committee

Person In Charge

Name		Contact Person	
Comment			

C : MRT SBK Line Weekly Workplanning Meeting Committee Approval

Verified / Acknowledge By	Approve / Reject By
SAFETY HEALTH & ENVIRONMENT / WAYSIDE ELECTRICAL AND ELECTRONIC SYSTEM	**QA DEPARTMENT**

Scheduling by EP / WP Coordinator

Possession Application No :			Comments:	
				Not approved on Sat's, Sun's and Mon's
Planned Schedule for Work :	Yes	No		**PIC to liaise with related sections accordingly**
Scheduled By:	Name			**Caution of Train / Workcar movement**
				Do not obstruct passengers Entry / Exit area
	Sign / Date			**To liaise with RSD on Train availability**
				Standby Train and Crew Required
				Do not use Escalator to move goods

RR/MRT-SBK/QA/FM/EPWP-01

3.10 Appendix J - Notice for fit-out work

To be displayed on hoardings on site during fit-out period.

NOTICE OF FIT OUT WORKS

1. The Tenant of unit no. _____ of _____ Station has been given approval by MRT Corp to carry out fit out works in the premise between:
   Date: _____ to _____
   Time: _____ to _____

2. The particulars of the fit out contractor who is authorised to carry out the fit out works on the premise are:

   Name of Company:
   Address of Company:

   Telephone:
   Person in Charge:
   Mobile No:

3. This notice is issued by:

   Retail Operations Team
   Mass Rapid Transit Corporation Sdn Bhd
   Tingkat 5, Menara I&P 1
   No 46, Jalan Dungun, Bukit Damansara
   50490 Kuala Lumpur

4. Date of issue: _____ Authorised Signature: _____

IMPORTANT:
THIS NOTICE MUST BE DISPLAYED AT ALL TIMES DURING FIT OUT PERIOD ON RETAIL HOARDING

3.11 Appendix K - Handover Checklist

Station : _____ **Retailer** : _____
Unit No : _____

No	Item	Base Shop Specification	Qty	Specs/Code	Remarks
1.	Floor	Homogeneous tiles	N/A	300 x 600 Niro tiles	
2.	Wall	Paint/wall screed finish	N/A	NIL	
3.	Ceiling	Perforated metal ceiling	N/A	Hunter Douglas C clip Luxzalon RAL 7035	
4.	Shop front	Fire roller shutter	1 unit	NIL	
5.	Fire Protection System	Fire extinguisher	1 unit	NIL	
		Smoke detector	2 unit	Double layer	
		PA system speaker	1 unit	NIL	
		Smoke extraction fans and ducting	1 set	NIL	
6.	AC	Refrigerant pipe	N/A	To be provided by MRT Corp during fit-out	
		Condensate drain pipe			
7.	Electrical	Distribution board/Isolator (Electrical load: 63 Amp 3-phase incoming). Metered.	1 unit	Final circuit and fittings to be provided by Tenant.	
8.	Water	Metered cold water piping	N/A	Further connection and fitting by Tenant	
9.	Keys	Bypass door	1 unit	NIL	
10.	Sanitary services	Floor trap	1 unit	NIL	
11.	Comms	Telephone socket outlet	1 unit	Telephone cabling until fibre wall socket to be provided by MRT Corp. Further connection and equipment by Tenant, if needed.	

Comments: _____

I, on behalf of _____ (Licensee) agree to take over the above-captioned licenced area and base shop specifications. On termination/expiration of licence period, the licenced area shall be reverted to MRT Corp (Licensor) in a good and tenantable condition in its bare condition in the above specifications. The above key(s) (if any) shall also be returned to MRT Corp (Licensor). All existing furniture, fittings and fixtures shall be removed including the replacement or lost damaged key(s) shall be at my own cost and expenses. I further undertake to make good all damages and reinstate the said licenced area to its original condition/otherwise acceptable by the Licensor.

By Licensee:

_____
Name of authorised person:
_ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _

By Licensor (MRT Corp):

_____
Name of authorised person:
_ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _

3.12 Appendix L - Notice of Access of Premise

To be issued to Retailer prior to fit-out period.

Our Ref:

[Mr/Mrs]
[Business Name]
[Address]

[Date]

Dear Sir/Madam,

NOTICE OF ACCESS OF UNIT NO. [#] AT [STATION NAME] STATION

We are pleased to inform you that the signed Licence Agreement for the above unit is received. You are effectively the successful tenant of the retail space for the station mentioned above. Please take access of premise no later than [Date]

The actual date of possession shall be the date we handover the premise to you. The rent-free period will commence from this date until the [Date]

In the event there is a delay in taking possession, the date is assumed to be within three (3) days following the date mentioned above.

The Retail Operations Team will contact you to make the necessary arrangements.

Thank you.

Sincerely,

[Signature]
Name of Signatory

3.13 Appendix M - Letter of Undertaking

Takeover of existing fixtures and fittings, to be signed by Retailer and submitted to MRT Corp.

Ref:

Retail Operations Team
Mass Rapid Transit Corporation Sdn Bhd
Tingkat 5, Menara I&P 1
No 46, Jalan Dungun, Bukit Damansara
50490 Kuala Lumpur [Date]

Dear Sir/Madam,

LETTER OF UNDERTAKING FOR TAKING OVER EXISTING FIXTURES AND FITTINGS

Station: _____ Unit No.: _____
I/We, _____ (Incoming Tenant) hereby agree to takeover
(Business Name)

the above premise on a "as is, where is" basis from _____
(Business Name)

(Outgoing Tenant) as follows:

No	Item	Description

On expiration/termination of lease, the premise shall be reverted to MRT Corp in good condition. All existing fixtures & fittings, including those taken over from the Outgoing Tenant shall be removed at my/our own expenses.

I/We further undertake to make good all damages occasioned thereby and reinstate the said premises to its original condition/otherwise acceptable by MRT Corp.

Yours faithfully,

[Signature]
Name of Signatory

3.14 Appendix N - Notice of Commencement Date

Our Ref:
Date:

[Business Name]
[Address]

Attention to: [Name]

NOTICE OF COMMENCEMENT DATE FOR RETAIL OPERATIONS

- [UNIT NO.], [STATION NAME] STATION

In accordance with the Letter of Offer (LOO) and Licence Agreement, please be informed that the Commencement Date of the above mentioned retail unit is [Date] for a term of two (2) years ("Licence Period") ending on [Date].

Please be informed that the rent for the following month will contain a pro rata adjustment. Each month thereafter, with the exception of the final month, rental shall be at the full amount as provided for in the Licence Agreement.

Thank you.

Yours faithfully,

MASS RAPID TRANSIT CORPORATION SDN. BHD.

[Signature]
Name of Signatory

3.15 Appendix O - Retail Key Handover Form

RETAIL KEY HANDOVER FORM

I hereby acknowledge receipt and undertake the responsibility for the safe-keeping of the following key(s) as stated in schedule below in the acceptance conditions:

No.	Station	Unit	Door Number	Remarks

Acceptance conditions of temporary key usage

1. Licensee is fully responsible for safe-keeping of the key throughout the tenancy period.
2. Licensee is required to exercise due care when using the key.
3. In the event of damaged or stolen/loss key, the Licensor reserves the right to impose the penalty cost of replacement for:
    a. Key cylinder
    b. Key (3 copies)
4. All keys must be return in good condition upon the expiry of the tenancy period, either by the termination or by completion of term.

By Licensee: _____
(Company name)

_____
Name of authorised person:

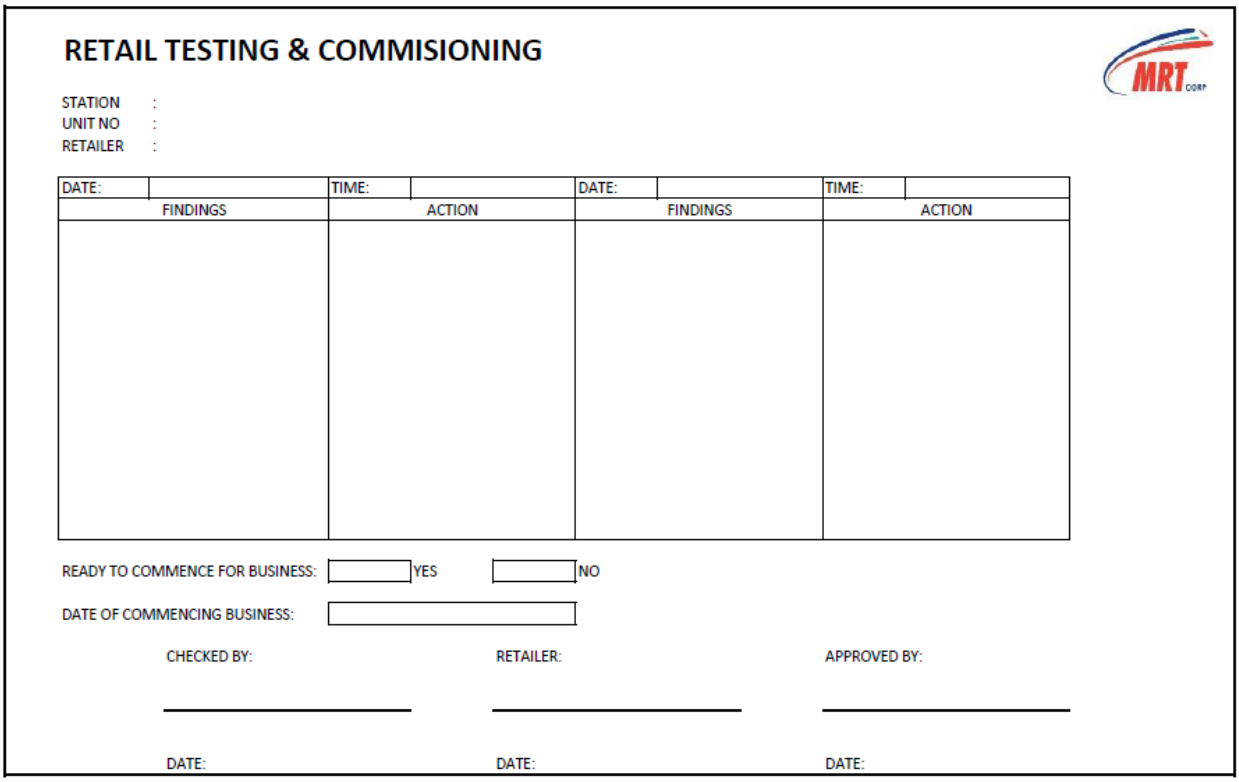
_ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _
Date Received:

By Licensor: MRT Corp.

_____
Name of authorised person:

_ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _
Date Issued:

3.16 Appendix P: T&C Report



RETAIL TESTING & COMMISIONING

STATION :
UNIT NO :
RETAILER :

DATE:		TIME:		DATE:		TIME:	
FINDINGS		ACTION		FINDINGS		ACTION	

READY TO COMMENCE FOR BUSINESS: ☐ YES ☐ NO

DATE OF COMMENCING BUSINESS: ☐

CHECKED BY:	RETAILER:	APPROVED BY:
DATE:	DATE:	DATE: