

METHOD STATEMENT FOR INSTALLATION OF SUB MAIN DISTRIBUTION BOARDS

RED LINE NORTH ELEVATED AND AT GRADE

Revision and Issue Records

Review History

Document No.	Revision	Title
M002-RLR-ELE-MES-00016	1	MS for Installation of Sub Main Distribution Board (SMDB)

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Rev. No	Date	Description	Prepared	Reviewed	Approved

Document Review and Approval

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Contents

1 Definitions and Abbreviations: 3

2 Purpose: 4

3 Scope of Method Statement: 4

4 Work Execution: 4

4.1 General Supplied Items: 4

Document No.	Revision	Title
M002-RLR-ELE-MES-00016	1	MS for Installation of Sub Main Distribution Board (SMDB)

4.1.1	Personnel:	4
4.1.2	Equipment and tools :	6
4.1.3	Material	7
4.1.4	Handling and Storing of Materials	7
4.2	Site Execution.....	8
4.2.1	Program.....	8
4.2.2	Pre-Requisites.....	8
4.2.3	Transportation and Storage on Site	8
4.2.4	Pre-Installation Procedures	9
4.2.5	Installation Procedure	9
4.2.6	Glanding & Termination	13
4.2.7	Special Checks	14
4.2.8	Inspection.....	14
4.2.9	IDENTIFICATION OF ELECTRICAL SERVICES	15
5	Quality	15
5.1	Quality Records:.....	15
6	Health and Safety Plan:	16
6.1	Specific Measures:	17
7	Environmental:.....	18
8	Interfaces and Permits.....	18
8.1	Interfaces	18
8.2	Permits	18
9	Appendices / References:	18
9.1	Appendices:.....	18
9.2	References:.....	18

1 Definitions and Abbreviations:

Table 1: Definitions and Abbreviations

Abbreviation	Definition
BS	British Standard
HS	Health, and Safety
ITP	Inspection and Test Plan
MSDS	Material Safety Data Sheet
PMC	Project Management Consultant
QA/QC	Quality Assurance / Quality Control
QCS	Qatar Construction Specification
SONO	Statement of No Objection
PPE	Personal Protective Equipment

Document No.	Revision	Title
M002-RLR-ELE-MES-00016	1	MS for Installation of Sub Main Distribution Board (SMDB)

Abbreviation	Definition
RLN-EAG	Red Line North Elevated and At Grade
RLR JV	Rizzani de Eccher, Lotte and Redco - Joint Venture
DB	Distribution Board
MCB	Motorized Circuit Breaker
SMDB	Sub Main Distribution board
MDB	Main Distribution Board
ITP	Inspection Test Plan
FAT	Factory Acceptance Test
MS	Method Statement
QR	Qatar Rail
QCS-2014	Qatar Construction Specification

2 Purpose:

The purpose of the method statement is to describe the procedure for material delivery inspection, installation and inspection of the Sub Main Distribution Boards at Stations. The Intent of this report is to explain, the methods to be adopted to ensure works conducted on site are in compliance with approved design & material approvals as per Project specifications.

3 Scope of Method Statement:

The scope of application of this method statement is the Installation and inspection of Sub Main Distribution Board for RedLine North Elevated & At Grade. (Chainage: 25+285 to Chainage: 31+950, Section of the RLN-EAG Project.

4 Work Execution:

4.1 General Supplied Items:

4.1.1 Personnel:

Ref.	Trade & Despines	Responsibility

Document No.	Revision	Title
M002-RLR-ELE-MES-00016	1	MS for Installation of Sub Main Distribution Board (SMDB)

1	MEP Construction Manager	<ul style="list-style-type: none"> Delivering the overall works in a safe and timely manner, ensuring conformance with the approved design. Leading the team of engineers and surveyors, guiding them in the delivery of the works. Verifying that work done is in accordance with requirements of contract. Ensuring the quality standards set for the work are achieved and the work team adhere to the QA/QC and HS requirements of the contract.
2	Systems Assurance Engineer	<ul style="list-style-type: none"> Establish the system assurance process. Manage the RAMS team and EMC team in delivering the system assurance submissions. <p>Liaise with the System Assurance Manager for all safety and RAM related activities respectively.</p>
3	Project/Site Engineer	<ul style="list-style-type: none"> Ensuring that the works are being carried out in accordance with contract requirements and this Method Statement. Management onsite to ensure that the team carries out the works in time with the delivery schedule. Implementation of and adherence of the team to the QA/QC and H&S policies and procedure.
3	QA/QC Manager	<ul style="list-style-type: none"> The preparation of the company's QA manual control and supervision of all amendments and revisions Monitor all quality related activities on the project Perform all internal and external audits on behalf of the company's management Preparation, monitoring, training of project staff on method statements, and control of material on site.
4	QA/QC Engineer	<ul style="list-style-type: none"> The QA/QC Engineer is the overall responsible for the implementations of this procedure and will carry out the material inspection to ensure that materials received on site are approved materials. He will be conducting surveillance and inspection duties at various stages of the project delivery to ensure compliance to contract requirements and to QA / QC requirements. He will monitor the installation works according to the approved drawing & method statement. He will coordinate with the Supervisory Consultant to carry out inspection/testing of the completed works. The QA/QC Engineer is responsible for the detail application of this procedure for the inspection and testing, to coordinate with the Construction Manager and Site Engineer for the inspection of on-going work.
5	Surveyor	<ul style="list-style-type: none"> Setting out all planned works.

Document No.	Revision	Title
M002-RLR-ELE-MES-00016	1	MS for Installation of Sub Main Distribution Board (SMDB)

		<ul style="list-style-type: none"> Monitoring the works being carried out to ensure they are at the correct levels and measurements. Maintaining documents relevant to alignment and height control.
6	Document Controller	<ul style="list-style-type: none"> Documenting, distributing and maintaining data in the prescribed format. Making the necessary data available as requested by the team or the client.
7	HS Inspector	<ul style="list-style-type: none"> Identify HS requirements, non-compliance or otherwise by conducting both formal and informal audits and communicate said to relevant site management Advise site management on HS substandard acts and HS substandard conditions on a continuous basis and record said. Coordinate and record action by site management as identified and advised. Verify actions taken by site management , record and report accordingly Conduct relevant HS administrative functions and additional tasks as directed by HS Management.
8	Supervision Engineer	<ul style="list-style-type: none"> Checking the compliance of works to the design. Carrying out comprehensive supervision of all construction works. Confirming that the work executed complies with the approved design and be responsible for checking the construction works.

All of the above will individually be responsible for a safe and healthy operational environment consideration of all the workers in their team related to the execution of their duties and any other personnel. Furthermore one group of workers is planned for execution of installation of Distribution Board & Accessories. This group will perform all activities. The group will have following labour profile.

Labours/Workers

No.	Description	No.	Description
1	Electrical Supervisor	3	Electrician
2	Electrical Forman	4	Labours

4.1.2 Equipment and tools :

The typical construction equipment requirements is as listed below, and will be used for Installation activities at site.

General Tools used for this activity

- PPE for all staff and labour
- Measuring tapes and setting out markers
- Electrician Tool Box with all tools
- Spirit Level
- Screwdriver set
- Maker/Whitener
- Mechanical Winches
- Lugs Punch

Document No.	Revision	Title
M002-RLR-ELE-MES-00016	1	MS for Installation of Sub Main Distribution Board (SMDB)

- Cable Lugs and Heat Shrink Sleeve
- Identification Tags
- Insulation Tape
- Hammer
- Flat File
- Spanners Set
- Heat Gun
- Multimeter
- Mobile Scaffolding (if Required)
- Man Lift (if Required)
- Ladders (if Required)
- Drilling Machine

Note: All the powered tools shall be suitable for use of 220V - 240V power Supply.

The above tools and equipment shall be checked for operational suitability before each shift of commencement of works including, but not limited, to safety and operational compliance. The same shall be executed for all small tools and miscellaneous items.

Equipment may be substituted subject to availability and actual requirements on the day.

The type and quantities of equipment are subject to change to suit the site requirements and to meet the construction program.

4.1.3 Material

The material shall be used according to project specifications and shall be approved by the Engineer. Must have following minimum requirements.

SMDB to be installed as per Approved Shop Drawing and load Schedule 15% Spare Breaker capacity and 20% spare space shall be provided for future use.

MCCB shall be as per approved brand and rating shall be according to approved schedule.

All wiring materials and installations shall confirm to the requirements of NFPA 70 and NFPA 130

4.1.4 Handling and Storing of Materials

On receipt of SMDB & fittings, it shall be handled & stored in line with the following procedure

➤ Material Delivery

1. When material arrives at site shall be inspected as per inspection check list and it shall be ensured that the materials are as per approved material submittals.
2. It shall be ensured that while unloading, shifting and storage, it shall be ensured that there are no damages.
3. Ensure that the material do not have denting and scratches on the enclosure.
4. Ensure that the enclosure door, hinges, lock are in working condition.
5. It shall be ensured that the FAT and other test reports are available upon delivery.
6. It shall be ensured that proper SMDB tag & name plate is fixed on the front cover.
7. If any discrepancies, damage, and etc. found to the materials shall be notified and reported to QA/QC Engineer and Site Engineer for further action.
8. Manufacturer's packing shall be retained during Transporting, Handling inside its Storage area

Document No.	Revision	Title
M002-RLR-ELE-MES-00016	1	MS for Installation of Sub Main Distribution Board (SMDB)



Sample Figure -1 (Storing of DB)

9. QA/QC Engineer will be responsible on checking and receiving all the materials delivered at site prior to stock on storage area.
10. Storage shall be performed in compliance with manufacturer recommendation, and all precautions to prevent from any damage to Equipment and respective accessories shall be taken.
11. Delivered materials shall be covered with polyethylene sheets while storage to ensure free from dirt, dust and water free area.
12. Materials shall be stored in an elevated ground with manufacturer's packing.
13. Rejected and damaged materials shall be stored at a suitable quarantine area with proper identification label to prevent unintended use and to be returned for replacement.

4.2 Site Execution

4.2.1 Program

Installation of Sub Main Distribution Board is expected to be performed starting **MAY**-2017. Detail schedule of Installation activity will be provided in the weekly update of the 3-weeks look ahead construction schedule.

4.2.2 Pre-Requisites

1. To make sure that the entire installation is in conformance and in accordance with the design intent of the project for the Distribution Board in addition to the specification and as per approved shop drawings and comply with Local and International Standards.
2. Adhere to the drawings as closely as possible. The right is reserved to vary the DB position according to the Site Conditions and later the repositioning shall be mentioned in as built with Red Marker.
3. Before beginning installation in any area, examine all parts of the adjoining work onto which applicable work is to be placed. Should any condition be found which will prevent the proper execution of the work, installation shall not proceed in that area until such conditions are corrected by the contractor.

4.2.3 Transportation and Storage on Site

1. Manufacturer's packing should be retained during Transporting, Handling and hauling of SMDB.
2. Personnel involved in this task should wear site mandatory PPE always on site.

Document No.	Revision	Title
M002-RLR-ELE-MES-00016	1	MS for Installation of Sub Main Distribution Board (SMDB)

3. Specific job training shall be given to all prior to start the work.

4.2.4 Pre-Installation Procedures

1. It shall be ensured that all civil work is completed before installation of MEP utilities.
2. It shall be ensured that the cable containment system for both Normal and Emergency power is installed and inspected
3. It shall be ensured that all cables are installed and tested and site is cleared.
4. Prior to start installation, it shall be ensured that latest approved shop drawings/ MEP services coordination drawings related to the installation area are referred and that required materials are available at site as per approved material.
5. Ensure the approval of benchmark installation and related mock Ups. Approved Mock up details for the SMDB shall be followed for the installation
6. Before the installation of SMDB, it shall be ensure that the SMDB are new free from dirt, damage and corrosion.
7. Before the Installation of SMDB, Work Permit need to be obtained and it shall be ensured that other MEP services all already installed in the particular section.
8. No one shall be allowed to interfere installation work on going, or work in the immediate vicinity of installation without a valid permit to work signed by the QA/QC Engineer. This applies to both temporary and permanent electrical installations and equipment. It is to be done to avoid any damage to installed light fittings.
9. Where it would be required to work in the vicinity of Electrical installation all necessary precautions shall be taken to avoid accidental damage to the Electrical fixtures.
10. Make sure the Main Incomer and branch breakers are selected from the store as per the approved schedule.

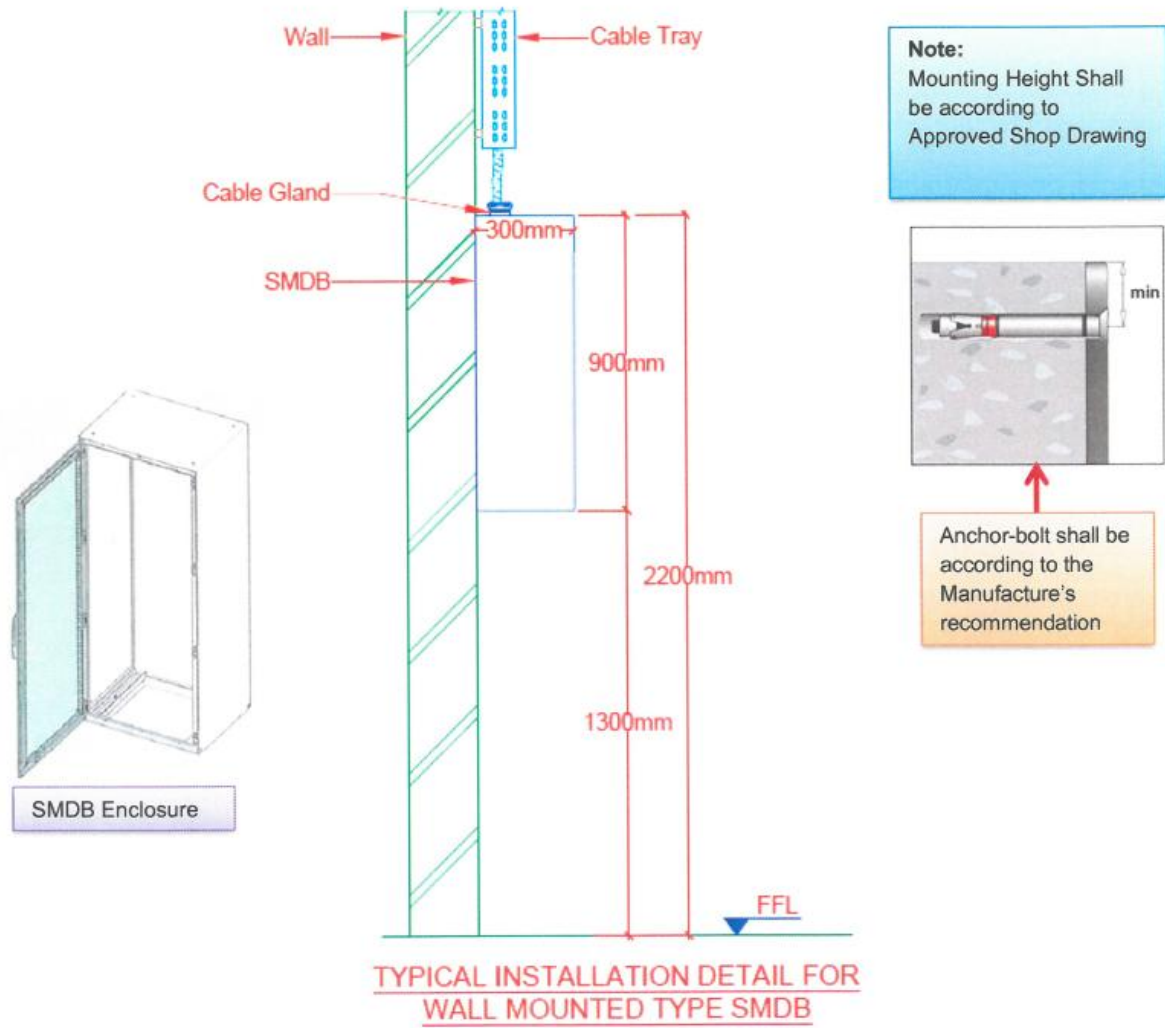
4.2.5 Installation Procedure

The following stages are applicable for the installation of SMDB

1. SMB's to be mounted will be selected at warehouse and conveyed to installation area.
2. Exact location of the SMDB shall be marked by the surveyor as per the construction drawings.
3. Ensure opening and closing of doors shall be proper, must be enough clearance area.
4. SMDB will be held on the wall such that top side of SMDB is according to the specified height from finished floor, and mounting holes will be marked on the wall.
5. Marked points will be drilled and anchor-bolted. Remove the SMDB doors before installation.
6. SMDB will again be held on its exact place and mounted using screws.

Document No.	Revision	Title
M002-RLR-ELE-MES-00016	1	MS for Installation of Sub Main Distribution Board (SMDB)

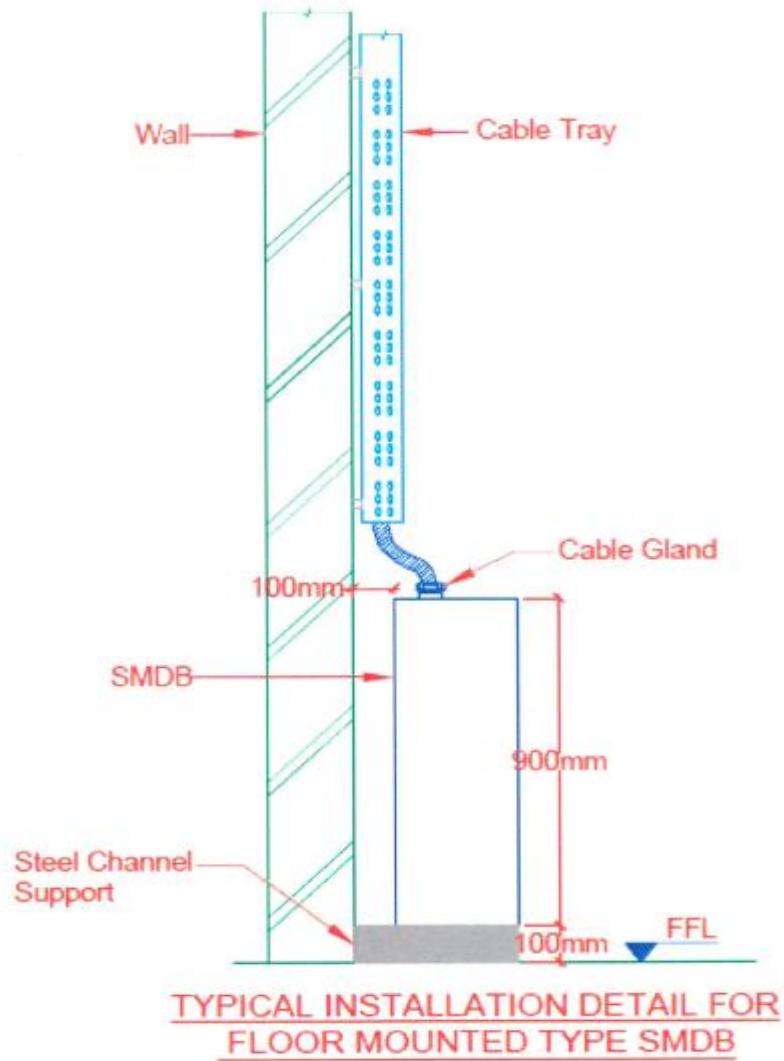
7. This drawing shows how to install a wall mounted SMDBs.



Sample Figure -2 (Installation Details for Wall Mounted Type SMDB)

Document No.	Revision	Title
M002-RLR-ELE-MES-00016	1	MS for Installation of Sub Main Distribution Board (SMDB)

P. O. Box 23452, Doha, State of Qatar; Ahmad Bin Ali Business Centre, 1st Floor, Room 2, Building 289, St.230, C Ring Road, Doha



Sample Figure -3 (Floor Mounted Type SMDB)

8. After the mounting the SMDBs, it is ready for the installation of the MCCB's breakers as per the approved schedule.

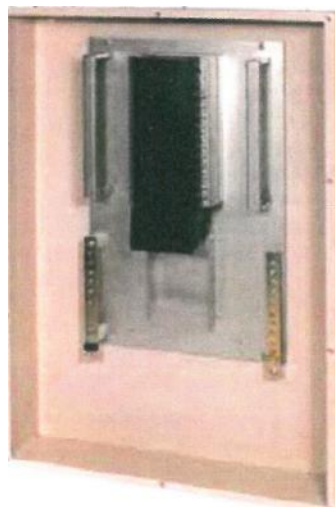







Figure - 3 (Sample Picture) Shrouded Busbar Assembly inside the Enclosures

9. Installation of Moulded case circuit breakers (MCCB's) in SMDB enclosures shall follow with following procedures steps as described below.

Document No.	Revision	Title
M002-RLR-ELE-MES-00016	1	MS for Installation of Sub Main Distribution Board (SMDB)

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	<ul style="list-style-type: none"> • The 3 pole busbar system ready to accept the circuit breaker.
	<ul style="list-style-type: none"> • The circuit breaker is placed in the panel board and pushed up to the busbars. 1P and 3 pole breakers may be mixed in any order on the busbars.
	<ul style="list-style-type: none"> • The circuit breaker fixing screw is fitted and tightened to retain the breaker in the board. Retaining screw M5 8.5mm long.

	<ul style="list-style-type: none"> • The connections to the busbars are tightened until the tops of the connection bolts shear off. This ensures that the correct torque has been applied to the connections.
	<ul style="list-style-type: none"> • The circuit breaker is now mechanically & electrically connected in the panel board. It is now ready for the outgoing cables.

4.2.6 Glanding & Termination

1. All Incoming / Outgoing Cables shall be terminated properly. Ensure that Cables shall be tested for continuity and insulation resistance test.
2. Cable bending radius should be as large as possible and shall not to bend to a radius less than as specified in relevant IFC specifications, manufacturer instruction and Kahramaa standards.
3. Cable shall be supported in accordance of the IFC Specifications and Kahramaa regulations.
4. It shall be ensured that all incoming and outgoing cables from above are fit with watertight gland.
5. It shall be ensured that all minor control cables are installed in glanded and water tight conduit.
6. Labelling / tagging of all circuit breakers / cables in which area and loads are served.
7. Ensure all conductors terminate correctly to their corresponding circuit number and tighten properly by torque wrench to avoid short circuit or faulty wiring. Terminate earth cable to the designated earth point inside the panels by the torque wrench.
8. Approved cable lugs shall be used for termination.
9. Lugs shall be insulated with an approved type of insulation tape or heat shrinkable sleeve after crimping the lugs before termination.
10. The insulation tape or heat shrinkable sleeve shall be adhered to the core securely and permanently.
11. Number of Spare of Breakers shall be 15% for future use.
12. Clean and ensure SMDB panels are free from dust and burrs to receive good performance of the circuit break. Check and remove all unused bolts, nuts, washers and clean the panel by vacuum cleaner.
13. Approved Cable identification tags shall be provided at both ends of the cable.

Document No.	Revision	Title
M002-RLR-ELE-MES-00016	1	MS for Installation of Sub Main Distribution Board (SMDB)



Figure - 4 (Sample Picture): Installed SMDB (Cables Terminated)



Figure - 5 (Sample Picture): Installed SMDB

4.2.7 Special Checks

1. All protection and control devices shall be correctly set/connected for operation.
2. All unused cable entries and openings shall be sealed properly with dummy plugs of suitable IP rating.
3. Incoming and Outgoing cables to SMDB shall be done for continuity and insulation resistance test.
4. The height of installation shall be as per shop drawing or advised by Engineer.
5. Ensure earthing of SMDB panel and doors.
6. Ensure to fix warning labels wherever required.
7. Every work place must ensure proper housekeeping before leaving the activity area, all tools are on proper place and secure the materials from deterioration or damaged.

4.2.8 Inspection

1. Inspection shall be as set out in the Inspection & Test Plan (ITP)
2. On satisfactory inspection by construction that installed system is in compliance with the procedures and the specifications as set out above and in the contract documents, a request shall be made for an inspection of the works by QA/QC department.

Document No.	Revision	Title
M002-RLR-ELE-MES-00016	1	MS for Installation of Sub Main Distribution Board (SMDB)

3. Verify the type/rating of SMDB which includes MCB, MCCB are correct and as per verified drawings and load Schedule.
4. Check the horizontal and vertical alignment by sprit level.
5. All circuits shall be correctly identified, labelled and core identification ferrules are used for individual core.
6. After installation remove burrs, dirt and construction debris.
7. Ensure final touch of paint of same colour of the panel if required.
8. The QA/QC department shall inspect the works and where necessary generate a punch list. The construction department shall then action the items on the punch list.

4.2.9 IDENTIFICATION OF ELECTRICAL SERVICES

1. All identification labels and notices in accordance with BS 7671 and Kahramaa shall be provided.
2. Warning, caution and instruction notices where indicated in the engineering system sections of this Specification or on the drawings shall be provided.
3. It shall be ensured that all identification labels and notices shall be installed in a visible position, without interference to the operation and maintenance of equipment.
4. It shall be ensure that labels and notices are sized in proportion to the equipment on which they are mounted and that they are securely fixed.
5. When conductor fixing and termination is completed then Permanent label and notices shall be provided according to the Approved method statement of "TAG and Marking(M008-RLR-ELE-MES-00018)"

5 Quality

The Inspection and Test Plan (ITP) for this Method Statement summarizes various characteristics to be checked. The concerned Site Engineer or Site Supervisor will be responsible to ensure compliance for these operations and the site QA/QC Engineer will carry out quality control checks and report the inspection results.

5.1 Quality Records:

ITP reference No: M002-RLR-ELE-ITP-00016.

Quality records shall be provided as identified in the ITP and maintained as per ISO 9001/QCS 2014 section 2 part 5 QR Quality Guidelines.

Document No.	Revision	Title
M002-RLR-ELE-MES-00016	1	MS for Installation of Sub Main Distribution Board (SMDB)

6.1 Specific Measures:

Specific measures related to span erection are as follow:

1. Working at height: all measures described in M002-RLR-HMS-PRO-00005 shall be in place during erection activities.
2. Load shifting Machinery
 - i. Do not operate any load shifting machinery without training and approval.
 - ii. Operators of forklift trucks, bulldozers, loaders, excavators, trucks should possess appropriate certificates/ Passes.
3. Manual Handling

Avoid manual handling operations as far as possible to minimize the risk of injury. Estimate the weight of the load. Lift an object with a correct posture. Wear suitable protective equipment. Put on gloves as far as possible to protect your hands from any cut, scratch or puncture, and wear safety boots or shoes to prevent injury to toes by heavy falling objects .Seek assistance from someone in lifting a load if necessary.
4. Portable Power Tool
 - i. Do not use a portable power tool (such as saw, grinder and drill) unless its dangerous parts have been effectively guarded.
 - ii. Place the electric cable and hose of a tool at an appropriate position to avoid tripping hazards.
 - iii. Do not operate a cartridge operated fixing tool unless you have possessed a valid
 - iv. certificate.
 - v. Wear suitable eye and ear protectors while operating a cartridge-operated fixing tool.
 - vi. Use a cartridge-operated fixing tool with great care.
5. Scaffold (Mobile)
 - i. Do not use scaffolds unless they have been erected by trained workmen and under the supervision of a Supervisor.
 - ii. Do not use a scaffold unless it has been inspected and certified safe (A Green Tag to visibly hoist on the scaffolds) by a Certified Supervisor before use.
 - iii. Strictly follow the instructions of a Supervisor. Do not alter the scaffold unless authorized to do so.
 - iv. Do not work on an unfinished scaffold.
 - v. When it is necessary to work on a mobile scaffold, lock the wheels of the scaffold before you start working.
 - vi. Do not work on a scaffold unless it has been provided with a suitable working platform.
 - vii. Ladders shall be used where no other means of access is possible.
6. Safety Requirements.
 - i. First Aid Kit to be provided at Station working areas in consultation with HSE officer.
 - ii. Clean up work area immediately after each task; never leave an area that is cluttered
 - iii. with tools or supplies that could present tripping hazard.
 - iv. Barriers as required shall be in place wherever necessary.

Document No.	Revision	Title
M002-RLR-ELE-MES-00016	1	MS for Installation of Sub Main Distribution Board (SMDB)

- v. Visible “Safety sign” shall be provided where necessary as per HSE requirements.
- vi. Good quality gloves are to be worn to protect your hands when using the equipment or handling materials.
- vii. The basic Personal Protective Equipment for this particular job are:
 - a. Hard Hats (Hat Colours as specified by HSE Department)
 - b. Gloves (Must Be Task Specific)
 - c. Goggles (Clear Glass for underground areas and Black Glass for work in Sun Light)
 - d. Reflective Vest
 - e. Safety Boots (High Ankle as Qatar Rail)

Note: Always wear safety spectacles when using the equipment.

Other specific risks & measures are addressed in the Risk assessment attached in Appendix B.

7 Environmental:

The site team including subcontractors shall implement the following environmental controls measures:

- a) The waste material from the installation of Sub Main Distribution Board are to be placed in waste skips provided at site.
- b) Unused materials shall be returned to the stores for appropriate storage according to manufactures’ instructions for potential reuse;
- c) Colour coded skips with signage shall be provided for waste segregation (general waste, metals, and plastics). Separate colour coded storage skips to be used for hazardous material.
- d) Good housekeeping shall be maintained regularly at job site.

8 Interfaces and Permits

8.1 Interfaces

- Interface with other utilities etc will be resolved using BIM.

8.2 Permits

- Qatar Rail Permit 2

9 Appendices / References:

9.1 Appendices:

- Appendix A –Inspection and Test plan;
- Appendix B– Risk Assessment;
- Appendix C- Test Report

9.2 References:

This Method Statement shall be read in conjunction with the following documents:

Material Submittal:

Material submittal for Cable Glands.

Material Submittal for Fir Resistant Multicore Armoured Cables.

Material Submittal for Low Voltage LSOH Cables & Wires.

Document No.	Revision	Title
M002-RLR-ELE-MES-00016	1	MS for Installation of Sub Main Distribution Board (SMDB)

Material Submittal for Distribution Boards.
 Material Submittal for Cable Accessories.
 Material Submittal for Wiring Devices and Accessories.

Method Statement For:

Document No.	Document Title
M002-RLR-ELE-MES-00001	Installation of Cable Containment System
M002-RLR-ELE-MES-00002	Installation of GI Conduits, Flexible Metallic Conduits & Accessories
M002-RLR-FRS-MES-00009	Installation of Fire Alarm Control Panel & Repeater Panels
M002-RLR-ELE-MES-00010	Installation of Wiring Accessories & General Power
M002-RLR-ELE-MES-00011	Installation of LV Cables & Wires

Specifications:

Document No.	Document Title
M002-RLR-MEP-TEN-00007	Volume 6 – Employer’s Requirements – Design Specifications
M002-RLR-MEP-TEN-00008	Material and Workshop Specifications Volume 7
M002-RLR-MEP-SPE-27005	DD2 –Qatar University Station-WP11.2 MEP Specifications
M002-RLR-MEP-SPE-36303	DD2 –Lusail Station-WP18.2 MEP Specifications
QCS 2014	QCS 2014 Section 21 Part 2
M002-RLR-ELE-SPE-36013	Lusail Station - WP18.2 - DD2 - Earthing and Bonding Specifications
KAHRAMAA	Section 04
Volume 6 –Contract’s Requirements Design Speciation’s	13.3 Electrical Works Description,(13.3.2 General Design Criteria) 13.3.3 Station
BS EN 61439	Low- Voltage Switchgear and control gear assemblies
BS EN 60529	Specifications of degrees of protection provided by enclosures (IP Code)
BS EN 7671	Standards for Electrical Installation
BS EN 60947	Low Voltage Circuit Breaker
NFPA 70	National Electrical Code ®
NFPA 130	Standard for Fixed Guide way Transit and Passenger Rail System

Reports & Calculation:

Document No.	Document Title
M002-RLR-MEP-RPT-27003	DD2- Qatar University Station Earthing & Bonding Report
M002-RLR-ELE-RPT-26000	DD2- Qatar University Station WP11.2 – MEP Design Report
M002-RLR-ELE-CLN-26004	DD2- Qatar University Station Electrical Calculation Notes
M002-RLR-MEP-RPT-27701	DD2- Qatar University Station BACS Sequence of Operations
M002-RLR-MEP-RPT-27702	DD2- Qatar University Station BACS Input/output Schedule
M002-RLR-MEP-RPT-27703	DD2- Qatar University Station BACS Design Report