METHOD STATEMENT FOR INSTALLATION OF CONTROL CABLES

RED LINE NORTH ELEVATED AND AT GRADE

Revision and Issue Records

Review History

1		For SONO	SHA	MAG	PSE
Rev. No	**Date**	**Description**	**Prepared**	**Reviewed**	**Approved**

Document Review and Approval

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Contents

1 Definitions and Abbreviations

Table 1: Definitions and Abbreviations

Abbreviation	Definition
BS	British Standard
PPE	Personal Protective Equipment
HS	Health, and Safety
ITP	Inspection and Test Plan
PMC	Project Management Consultant
QA/QC	Quality Assurance / Quality Control
QCS	Qatar Construction Specification
SONO	Statement of No Objection
PPE	Personal Protective Equipment
RLN-EAG	Red Line North Elevated and At Grade

Abbreviation	Definition
RLR JV	Rizzani de Eccher, Lotte and Redco - Joint Venture
MS	Method Statement
SWA	Steel Wire Armoured
FOH	Front of House
LV	Low Voltage
LSOH	Low smoke zero Halogen
BOH	Back of House
OSHA	Occupational Safety and Health Administration
SLD	Single Line Diagram
QCS-2014	Qatar Construction Specification
MCP	Manual Call point

2 Purpose:

The purpose of the method statement is to describe the procedure for material delivery inspection, installation and inspection of Control Cables 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 and as per project requirement.

3 Scope of Method Statement:

The scope of application of this method statement is the Installation and inspection of Control Cables for Red Line 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

1	MEP Construction Manager	• 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	• Establish the system assurance process. • Manage the RAMS team and EMC team in delivering the system assurance submissions. Liaise with the System Assurance Manager for all safety and RAM related activities respectively.
3	Project/Site Engineer	• 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	• 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	• 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	• Setting out all planned works.

		• 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	• 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	• **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	• 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.

Workers

One group of workers is planned for execution of Installation of Control Cables. This group will provide all activities. The group will have following labour profile:

Sr. No.	Description
1	Electrical Supervisor
2	Electrical Foreman
3	Electrician
4	Labour (skilled and unskilled)

4.1.2 Equipment and tools :

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

Plants

No.	Type	Use
1	Man Lift	For Installation of Tags and Markers
1	Scaffolding	For the Installation
2	Lights	For use during night operations
3	Generator	For Power Generation for Lights

Small Tools and Equipment

- PPE for all staff and labour
- Measuring tapes and setting out markers
- Electrician Tool Box with all tools
- Wire Cutter
- Steel Wire (Pulling Wire)
- Electrical drill and drill bits (only for surface installation works)
- Screw Drivers
- Wire Stripper
- Side-Cutting Pliers
- Ladders
- Multimeter

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.

4.1.3 Material

Control Cables

As approved by Engineer and project specification

4.1.4 HANDLING AND STORAGE MATERIAL

a. Receiving Report

It shall be ensured that the shipments are of correct material, quantity and quality. A receiving report shall be immediately completed which indicates:

i. The date the material received.

ii. Whether the delivery on time.

iii. The quantity of material received and whether any discrepancies exist when compared with the packing slip.

iv. Whether the quality of the material meets specifications.

b. Off Loading

i. Rolls shall be checked for any trace of damage. Damaged rolls shall be reported before offloading.

ii. Rolls shall not be dropped. Lower gently onto a firm and relatively level surface.

iii. Rolls shall be off load in such a way that they are easily accessible.

c. Cable Storage

Indoors

i. Stack shall be flange to flange and preferably not one on top of the other. Cable rolls shall not be laying flat.

ii. Rolls shall be stack so that are easily accessible.

iii. Fire precaution rules shall be observed.

iv. Cable ends shall be sealed at all times

Outdoors

i. Rolls shall be stored on a hard surface

ii. Rolls shall be released on a “first in – first out” basis.

iii. Cable ends shall be sealed at all times.

iv. Stack shall be flange to flange and preferably not one on top of the other. Cable rolls shall not be laying flat.

v. Rolls shall be stack so that are easily accessible.

vi. Fire precaution rules shall be observed.

vii. Cables shall be identifiable at all times.

4.2 Site Execution

4.2.1 Program

Installation of Control Cables is expected to be performed starting April-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 - Installation Procedure

1. It shall be ensure that all drawings are approved and available to the installation team.
2. It shall be ensured that prior to the installation of control cables in any area, cable tray or any containment system must be inspected and approved.
3. It shall be ensured that the factory test report of the cables is reviewed by the QC Engineer.
4. It shall be ensured that sleeves are installed for cables passing through block or concrete or similar structures in case there is need in future withdrawal.
5. Transport and place the cables rolls as per rolls schedule and at the locations where space is available for working.
6. It shall be ensured that marking of control cable routing are clearly visible.
7. It shall be ensured that the maximum pulling tensions of all the cables is not exceeded at any time.
8. It shall be ensured that before termination complete length and route of the control cable shall be inspected by QA/QC engineer.
9. It shall be ensured that cables are caped on both ends after installation until termination is done.
10. Control Cable are used for following purpose.
    - i) For lighting control system
    - ii) For HVAC control system
    - iii) For Controlling the motors for elevators and escalators
    - iv) For Controlling VFD drives

4.2.3 Precaution

1. Care shall be taken to avoid sharp bending and kinking of conductor damaging insulation and stressing the control cable beyond the pulling force recommended by the manufacturer. Control Cable shall be protected at all times from mechanical damage.
2. All the Field Instrument cables which are not coming in conduit / trunking shall be terminated using flexible conduit pipes or otherwise advised by the Supervisor Engineer.

The connection to the instrument shall be either from bottom or from side. This is in order to prevent water penetration inside the instrument.

4.2.4 Cabling and Containment

1. Upon successfully completion of test a certified test certificate shall be issued.
2. It shall be ensured that control cable tails are make-off into the motor control centre panels.
3. It shall be ensured that cable identifications are recorded on the installation diagrams.
4. It shall be ensured that final connections are carried out within the panel using the motor control centre manufacturer's terminal wiring diagrams.
5. It shall be ensured that communication and control wiring not to exceed 1000m in length.
6. It shall be ensured that wire communication cables, analogue inputs, digital inputs and analogue outputs are Belden type cables.
7. It shall be ensured that there is no joint in control cable.

4.2.5 Installation Procedure of Control Cables

1. Pulling of Control Cables
    a. Make sure that all conduits and boxes in both ends are free from damages blockages and installation is approved.
    b. Blockage shall be checked by inserting the steel draw wire and checking that it reaches to other end without any disturbance.
    c. Once the conduit is not blocked the wires shall be pulled using the draw wires while ensuring no damage occurs while pulling.
    d. Cables insulation shall be checked before and after the pulling to ensure that the cable is in good condition.
    e. No sudden jerks shall be exerted over the cable to ensure its quality and best deliverance.
    f. While pulling the wires care shall be taken to not insert the pull tension greater than manufacturer allowed limits.
2. Termination
    a. All control cables shall be installed at a minimum distance of 200mm from power cables unless otherwise agreed with consultant as per site conditions.
    b. Control Cables shall be Meggered once they are laid completely before termination and connection.
    c. Control Cable ends shall be thoroughly checked for any insulation damages.
    d. All the Control cables shall be properly laid in conduit / trunking and dressed properly.
    e. All termination shall be provided with tight fitting covering sleeves.
3. CABLES IDENTIFICATIONS
    a. Tags/ Labels shall be installed as per project specifications and approved materials.
    b. Cable shall be identified at about 50mm below the gland.
    c. Identification shall be provided at all position where cable changes direction and each side of the wall or floor slab where cables are in multiple runs.
    d. Cable connecting control gear, thermostats, valves etc shall be identified and shall be fitted with identification sleeves bearing the same marking as the terminal of the apparatus to which these are connected.

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-00017.
Quality records shall be provided as identified in the ITP and maintained as per ISO 9001/QCS 2014 part section 2 QR Quality Guidelines.
Required form of records and reports are defined in the Inspection and Test Plans. Refer to Doc. No: M002-RLR-ELE-ITP-00017.

6 Health and Safety Plan:

a) The Health and Safety Plan: M002-RLR-HMS-PLN-00001 will be strictly adhered to at all times.

b) Compulsory RLR HSE induction is required before access to workplace is permitted. PPE relevant to the scope of work risks as identified must be utilized.

c) Compliance with the HS Summer working plan is compulsory Ref: M002-RLR-HMS-00003.

d) Expose to direct sunlight; including Installation of Control Cables shall be avoided 11.30 AM to 3.00PM hours during Hot seasons. Prcaustion shall be taken on heat strokes, dusty winds and other unsuitable weather conditions.

e) Workplace HS communication ie Toolbox talks, task briefings and HS non compliant notices / closeouts are compulsory.

f) The health and safety Department shall create and approve tool box talks which the safety office shall conduct such meetings shall cover, at various times and before use of equipment, the respective matters consisting of, but not limited, to:

i. Use of tools including specialised equipment;
ii. Personal protective equipment;
iii. Smoking;
iv. Handling of waste material;
v. Use of ablution facilities;
vi. Barricades, signs and warning tape;

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RLR **EMERGENCY CONTACT NUMBERS** In case of emergency, accident, sickness	
Water Team	**74798184**

Environmental Assistant:	
Management Office: _____	

Contacts for Traffic issues:

Security Manager		
Traffic Manager		

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.
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 HS 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)

7. Electricity

Before using an electric tool, check the tool and its plug and connecting cable.

1. Do not use a damaged tool.
2. Do not use an electric tool unless its connecting cable is well protected.
3. Do not use an electric tool unless its metal casing is earthed and its power supply is provided with an earth leakage circuit breaker.
4. Regular monthly inspection and regular inspection (prior to commence work) of equipment and tools shall be conducted as required. Tag must be put to tools and equipment that have damaged to prevent using.
5. Ensure that it has the correct inspection report for the month and report immediately any defects or damage to your supervisor. If faulty DO NOT USE!
6. Do not repair or alter any electrical installation unless competent to do so.
7. If you meet any fault or problem, report it to your supervisor immediately.
8. Make sure that the power cables have good insulation and properly connected not causing a tripping hazard and that they are not laid in water, working area of moving equipment, materials and areas where they are walked on.
9. Keep cables off the ground suspend from structures where possible. It must be ensured that live cables are not in contact with metallic surfaces.
10. Do not stand in water while using the equipment and do not allow the equipment to get wet.
11. Check the power supply connections and make sure that the equipment is properly earthed.
12. Only Trained technicians who have full knowledge on how to operate the equipment are allowed to use.
13. Only qualified electrician must install and maintain the live electrical equipment.
14. Make sure that all equipment (If any used), cutting machine, bending machine and all other appliances (As Specified in MS Tool & Equipment Section) brought to the Site have relevant Test Certificates I Training.

8. Fire Risk

There is always a fire risk. However, the chances of fire can be reduced, and you will know what to do when a fire breaks out if you:

1. Always keep the workplace clean and tidy.
2. Handle machinery and tools that may generate sparks or heat carefully .
3. Do not smoke or use naked flames in any area where flammable and explosive substances are stored.

4. Know where fire extinguishers are
5. Located and how they are used.
6. Know the place of assembly for fire evacuation.
7. Provide portable fire extinguishers nearby the working area and all persons involved must be familiar how to operate the fire extinguisher (If Necessary or Advised by the HS officer)

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 Control Cables 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

- Not Applicable

8.2 Permits

- Not Applicable

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 Control Cables.
Material submittal for Tags & Markers.
Material submittal for Cable lugs.
Material Submittal for Cable Tray, Trunking ladder & Accessories.
Material submittal for GI Conduit, Flexible Metallic Conduit & Fittings, GI Back boxes.

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 Conduit, Flexible Metallic Conduits & Accessories
M002-RLR-ELE-MES-00006	Installation of Earthing & Bonding System
M002-RLR-ELE-MES-00005	Installation of Fire Alarm Cables
M002-RLR-ELE-MES-00007	Installation of Lightning Protection System
M002-RLR-ELE-MES-00008	Installation of Light Fixtures & Accessories-Back of House
M002-RLR-ELE-MES-00009	Installation of Light Fixtures & Accessories - Front of House Area
M002-RLR-ELE-MES-00010	Installation of Wiring Accessories & General Power
M002-RLR-ELE-MES-00011	Installation of LV Cables & Wires
M002-RLR-ELE-MES-00012	Installation of Automatic Transfer Switches (ATS)
M002-RLR-ELE-MES-00013	Installation of Isolating Switches
M002-RLR-ELE-MES-00014	Installation of MCC Panels & Accessories
M002-RLR-ELE-MES-00015	Installation of Distribution Boards & Accessories
M002-RLR-ELE-MES-00016	Installation of Sub main Distribution Boards (SDB)
M002-RLR-ELE-MES-00017	Installation of Control Cables

Specifications:

Document No.	Document Title
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-ELE-SPE-36013	Lusail Station - WP18.2 - DD2 - Earthing and Bonding. Specifications
QCS 2014	QCS 2014 Section 21 Part 25
M002-RLR-MEP-SPE-36303	Lusail Station - WP18.2 - DD2 – MEP Specifications
KAHRAMAA	Electrical and Water Design and Installation Regulations
BS EN 50174	Information technology — Cabling installation

Reports:

Document No.	Document Title
M002-RLR-MEP-RPT-27003	DD2- Qatar University Station Earthling & Bonding Report
M002-RLR-ELE-RPT-26000	DD2- Qatar University Station WP11.2 – MEP Design Report