EQUINIX

WHERE OPPORTUNITY CONNECTS

Global Commissioning & QA/QC  Playbook

| Name | Equinix Global Commissioning and M&E QA/QC Playbook |
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|---|---|
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Contents

# Introduction

## 1 Summary of Document

This Document will provide the basis of all Commissioning Agent / Authority activities across Equinix. This framework will provide a consistent and repeatable template of activities, requirements and expectations to ensure that all projects are commissioned to the highest standards of quality and are operationally sound.
This Playbook can be used as a catalogue of requirements that can be scaled from a small UPS upgrade or chiller replacement to a full IBX facility.

Section XX Tagging Requirements highlights the minimum required processes, checks, tests and acceptance criteria.
Standards and Regulations
Commissioning should be carried out in accordance with the appropriate EN/NFPA/NETA/ANSI International Standards/Code of Practice & Comply with all statutory regulations and local standards relating to the location of the facility. Where the EN/NFPA/NETA/ANSI International Standards/Code of Practice to local standards comparison is completed, the most onerous of the standards shall be applied to the installation and commissioning.
All authorities should be notified in accordance with their regulations and obtain any required approvals for the installation from local authorities and the engineer.

### 1.1 Documentation Language

All commissioning documentation through Cx levels 0 to 6 is mandatory to be written in English, local language can supplement the English language documents based on region specific requirements.

### 1.2 Acronyms and Abbreviations

The following are common acronyms used in this document:

| Acronyms | Definition |
|---|---|
| EQX CxM | Equinix Commissioning Manager |
| EoR | Engineer of Record (Design Consultants) |
| Cx | Testing & Commissioning of systems and their subsystems |
| CxA | Commissioning Agent / Authority |
| CxM | Commissioning Manager |
| GC | General Contractor |
| QA/QC | Quality Assurance / Quality Control |
| EQX GOE | Equinix Global Operations and Engineering Team |
| EQX OPS | Equinix Operations Team |
| EQX TFM | Equinix Technical Facility Management Team |
| FWT or FAT | Factory Witness Test or Factory Acceptance Test. |
| QAQC ELI | Factory QAQC End of Line Inspection |
| SFAT | Software Factory Acceptance Test |
| SAT | Site Acceptance Test also referred to as Commissioning Level 4. The detailed and thorough testing of the building systems and their interactions with the building components and other building systems. |
| FPT | Functional Performance Test |
| HLT | Heat Load Test is to be carried out as part of Commissioning Level 4. This is process is to verify the cooling capacity of the mechanical equipment supporting the critical rooms. (Example: Data Halls and Network Rooms) during normal and failure operations. This testing follows the completion of all related zones systems. |
| Pre IST | Pre - Integrated Systems Testing This is also referred to as Commissioning Level 5. This is process of expanding the functional testing from a system focus to a focus on how systems interact and how they affect each other. This testing follows the completion of all equipment and systems. |
| IST | Integrated Systems Testing This is also referred to as Commissioning Level 5. This is process of expanding the functional testing from a system focus to a focus on how systems interact and how they affect each other. This testing follows the completion of all equipment and systems. |
| IRL | Issues Resolution Log |
| SOR | Site Observation Reports |
| MCE | Main Capital Equipment |
| BOD | Basis of Design |
| SOO | Sequence of Operations |
| DCOS | Data Centre Operating System |
| PQM / PQA | Power Quality Meter / Power Quality Analyser |

# 2 Commissioning Scope of Works

It is key that the CxA services provided to projects and EQX OPS / TFM maintains its cost effectiveness and maintains a high quality of output to Equinix, to ensure operations are provided with the very best product.

This means that the CxA must be a focussed service that works solely within the scope and does not deviate from this core function. The CxA along with all other stakeholder's roles and responsibilities are clearly defined in the Equinix PARIS Matrix and this Commissioning & QAQC Playbook.

Should deviations arise that compromise this, these must be identified and escalated immediately so that they can be dealt with by the appropriate responsible party within Equinix.

## 2.1 Commissioning Agent / Authority scope

The CxA scope can be split into 4 phases, Design, Construction, Acceptance and Transition. Each phase is covered by the 0 – 6 levels of commissioning, as shown below

| | | |
|---|---|---|
| Design Phase | Commissionability Study/Design Review of Approved RIBA 4 | Level 0 |
| | Factory Acceptance/Witness Testing (FAT/FWT/QAQC ELI) | Level 1 |
| Construction Phase | Equipment placement QA/QC Checks & sign Off | Level 2A |
| | Pre-Energisation QA/QC Checks & Static Testing & Sign Off | Level 2B |
| | Start Up & Pre-Functional Testing & Sign off | Level 3 |
| Acceptance Phase | Functional & Performance testing & sign off | Level 4 |
| | Integrated Systems Testing & Sign off | Level 5 |
| Transition Phase | Training & Documentation | Level 6 |

## 2.2 Commissioning Deliverables

Table below provides a general overview example of the MEP equipment / systems requiring Testing and Commissioning and to which Commissioning level as a minimum:

| Items | Equipment | Level 1 | Level 2A | Level 2B | Level 3 | Level 4 | Cx L4 (Integration) | Level 5 | Level 6 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | High Voltage Panels | YES | YES | YES | YES | SAT | Mains Failure | YES | YES |
| 2 | Transformers | YES | YES | YES | YES | SAT | Inter tripping | YES | YES |
| 3 | Medium Voltage Panels | YES | YES | YES | YES | SAT | Mains Failure | YES | YES |
| 4 | Main Input Boards | YES | YES | YES | YES | SAT | Mains Failure | YES | YES |
| 5 | Main Output Boards | YES | YES | YES | YES | SAT | Mains Failure | YES | YES |
| 7 | STSSB Panels | YES | YES | YES | YES | SAT | Mains Failure | YES | YES |
| 6 | PDU Switchboard | YES | YES | YES | YES | SAT | Mains Failure for PDUs with ATS | YES | YES |
| 8 | Remote Power Panels | YES | YES | YES | YES | SAT | Mains Failure | YES | YES |
| 9 | Circuit Breakers | YES (Primary Inject Cert Required) | YES | YES | N/A | N/A | N/A | N/A | N/A |
| 10 | Generators | YES | YES | YES | YES | SAT + load test | Mains Failure | YES | YES |
| 11 | Generator Fuel System | YES | YES | YES | YES | SAT | Mains Failure | YES | YES |
| 12 | Generator Cooling System | YES | YES | YES | YES | SAT | Main Failure | YES | YES |
| 13 | Uninterrupted Power Supply (UPS) | YES | YES | YES | YES | SAT + Load Test + Battery Autonomy | Mains Failure & UPS units' sync, load share & system functional test including failure scenarios | YES | YES |
| 14 | Automatic Transfer Switches (ATS) | YES | YES | YES | YES | SAT | Mains Failure, Transfer, Functional test including failure scenarios | YES | YES |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 15 | Static Transfer Switches | YES | YES | YES | YES | SAT + Load Test | Mains Failure, Sync & out of sync Transfer, L4 test including failure scenarios | YES | YES |
| 16 | Battery Monitoring System | NO | YES | YES | YES | YES | Monitoring interface to electrical systems | YES | YES |
| 17 | Power Management System / EMS | YES | YES | YES | YES | SAT | All monitoring interface to electrical systems | YES | YES |
| 18 | Branch Circuit Management System (BCM) | NO | YES | YES | YES | SAT | All monitoring interface to electrical systems | YES | YES |
| 19 | Bus bar system | YES | YES | YES | YES | Load (SAT) | N/A | N/A | YES |
| 20 | Load bank connection system & controls | YES | YES | YES | YES | SAT | System functional test | YES | YES |
| 21 | 110 VDC Trip units | YES | YES | YES | YES | SAT | Mains Failure & functional + system autonomy | YES | YES |
| 22 | Lighting Controls | YES | YES | YES | YES | SAT | N/A | N/A | YES |
| 23 | Lighting & Emergency Lighting + Lux levels | YES | YES | YES | YES | SAT | N/A | N/A | YES |
| 24 | Small Power Electrical | YES | YES | YES | YES | N/A | N/A | N/A | N/A |
| 25 | Lightning Protection | NO | YES | YES | N/A | N/A | N/A | N/A | N/A |
| 22 | Earthing and Bonding | NO | YES | YES | N/A | N/A | N/A | N/A | N/A |
| 26 | Air handling Units & Ventilation Fans | YES | YES | YES | YES | SAT | Integration with DCOS controls | YES | YES |
| 27 | Fan Coil Units | YES | YES | YES | YES | SAT | Integration with DCOS controls | YES | YES |
| 28 | Dehumidifiers | YES | YES | YES | YES | SAT | Integration with DCOS controls | YES | YES |
| 29 | Hybrid Dry Air Coolers | YES | YES | YES | YES | SAT | Integration with DCOS controls | YES | YES |
| 30 | Chiller | YES | YES | YES | YES | SAT + Load Test | Integration with DCOS controls | YES | YES |
| 31 | Cooling Tower | YES | YES | YES | YES | SAT + Load Test | Integration with DCOS controls | YES | YES |
| 32 | Cooling pumps | YES | YES | YES | YES | SAT | Integration with DCOS controls | YES | N/A |
| 33 | Frost protection & trace heating | YES | YES | YES | YES | N/A | Integration with DCOS controls | N/A | N/A |
| 34 | Computer Room Air Handlers units (CRAH) | YES | YES | YES | YES | SAT + HLT | Integration with DCOS controls | YES | YES |
| 35 | Treated RO water | YES | YES | YES | YES | SAT | Integration with DCOS controls | N/A | YES |
| 36 | Above Ground Drainage SVP | NO | YES | YES | YES | N/A | N/A | N/A | N/A |
| 37 | Rainwater system | YES | YES | YES | YES | N/A | N/A | N/A | N/A |
| 38 | Leak detection | YES | YES | YES | YES | SAT | Integration with DCOS controls | N/A | YES |
| 39 | Building management system (DCOS) | YES | YES | YES | YES | SAT | Integration with other systems | YES | YES |
| 40 | Cooling Management System (CMS) | YES | YES | YES | YES | SAT | Integration with other systems / complete DESOPS testing | YES | YES |
| 41 | Access Control System | NO | YES | YES | YES | SAT | Integration with FAS | YES | YES |
| 42 | CCTV System | NO | YES | YES | YES | SAT | N/A | N/A | YES |
| 40 | PA System | NO | YES | YES | YES | NO | NO | N/A | YES |
| 43 | Fire Alarm System (FAS) | YES | YES | YES | YES | Cause & Effect | Integration with other systems | YES | YES |
| 44 | Water Mist System | YES | YES | YES | YES | SAT | Integration with FAS | YES | YES |
| 45 | Sprinkler (Dry / Wet) System | YES | YES | YES | YES | SAT | Integration with FAS | YES | YES |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 46 | Gas Suppression System | YES | YES | YES | YES | SAT | Integration with FAS | YES | YES |
| 47 | Dry Risers | NO | YES | YES | YES | N/A | N/A | N/A | N/A |
| 48 | Communication Network (BMS / EMS / DCOS | NO | YES | YES | YES | SAT | Functional resilience testing Core / access switch / fiber failures | N/A | N/A |
| 49 | Lifts | NO | YES | YES | YES | SAT | Integration with FA | YES | YES |
| 50 | Pressurisation Unit | YES | YES | YES | YES | YES | Integration with DCOS controls | | |
| 51 | Cool Array | YES | YES | ES | YES | SAT | Integration with DCOS controls | YES | YES |
| 52 | Air Scrubbers | YES | YES | YES | YES | YES | Integration with DCOS controls | YES | YES |
| 53 | DX CRACS | YES | YES | YES | YES | YES | Integration with DCOS controls | YES | YES |
| 54 | Harmonic Filters | YES | YES | YES | YES | YES | NO | N/A | YES |
| 55 | UPS Batteries | YES | YES | YES | YES | YES | NO | YES | YES |
| 56 | Vesda | YES | YES | YES | YES | YES | NO | N/A | YES |

## 2.3 Commissioning Levels Defined

Equinix Commissioning & QAQC Processes are defined as Cx Level 0 to Level 6.
A brief narrative of the activities and the required documentation and deliverables associated with the levels of commissioning, training & handover are outlined in the following subsections.

Note that the CxA's responsible sign off person shall be available at the required stages of commissioning for commissioning management, witness testing and acceptance sign off or inform their delegated representative to be in attendance.
Commissioning Level 0 Design stage.
The Commissioning process begins during the design of a project. During the design stage the EOR will define the project RIBA stage 4 design after which the CxA will undertake a commissionability design review and will develop the project commissioning plan.

The commissionability design review is to determine the level of design team quality control and conformance of the design. The review will consider all project specifications, technical submittals, issued for construction design drawings and SOO's available at the time of the review. The CxA will review all documents, using their knowledge and experience to identify any risks to commissioning, any obvious maintenance issues and any irregularities found in the design.

Once completed, a meeting will be held with the client and the EoR, to review the comments and action as necessary. Any changes required and actions to be taken should be managed by the EoR.

### 2.3.1 Commissioning Level 0 - Deliverables and Responsibilities Matrix

**Global Commissioning Roles and Responsibilities Analysis**

| | |
|---|---|
| P | Primary - Role responsible and accountable for the task |
| A | Assigned - Role assigned to support the Primary in analysis, development, completion and delivery of the task |
| R | Review Required - Roles that are required to review the task once work has been completed |
| I | Input required - Roles required to provide input to the task as the work proceeds |
| S | Signature - Role required to sign-off the completed task from a governance perspective; the Approver |

| STAGES DELIVERABLE | ACTIVITIES AND TASKS | Global Team: Construction | Global Team: Construction incl Health & Safety | Global Team: Design | Global Team: Design - Master Planning/Concept Design | Global Team: Design - Standard/Technical Review | Global Team: Commercial | Global Team: MCE/Utilities/Sustainability | Global Team: Hyperscale | Global Team: GOE | Global Team: Global Commissioning | Regional Team: Design | Regional Team: Construction incl H&S | Regional Team: Commercial | Regional Team: MCE/Procurement | Regional Team: Capacity management | Regional Team: Operations | Regional Team: Regional PMO | Regional Team: Regional Commissioning Manager | Project Team: Project Design Lead | Project Team: Project Commercial Lead | Project Team: Project Construction Manager incl H&S | GC/ Subs: Design Lead EoR | GC/ Subs: Mechanical | GC/ Subs: Electrical | GC/ Subs: BMS/EMS/CMS/Controls | GC/ Subs: IT | GC/ Subs: MCE/ GC Vendors | GC/ Subs: QA/QC & Cx Agent | GC/ Subs: General Contractor |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Equinix | | | | | | | | | | | | | | | | | | | | | EXTERNAL | | | | | | | |
| Inception / GENERAL | Cx Contract Award Recommendation | | | | | | | | | | S | | | | | | | | P | | S | S | | | | | | | | |
| | Lessons Learned Review | | | | | | | | | | | P | | | A | | | | A | | | | A | I | I | I | | | | |
| | Design Review | | | | | | | | | | S | | | | | | | | S | | | I | | | | | | P/A | | |
| | GDS Commit Compliance Checklist | | | | | | | | | | S | | | | | | | | S | | | I | | | | | | P/A | | |
| | Facility Grid Commissioning Software Platform | | | | | | | | | | I | | | | | | | | I | I | | I | I | A | A | A | A | A | P | A |
| | Commissioning Plan | | | | | | | | | | S | S | | | | | | | S | S | | I | S | I | I | I | I | P/A | I |
| | QA/QC Plan (Identify 'First in Place' reviews and integrate with project schedule. )Track on log and achieve signoff | | | | | | | | | | S | S | | | | | | | S | S | | I | I | A | A | A | A | I | P |
| | Deficiency Logs Develop and maintain a weekly log of project deficiencies and drive completion | | | | | | | | | | | | | | | | | | S | I | | I | I | A | A | A | A | I | P |
| | Cx Meetings Scoping & Coordinating meetings and providing minutes to document progress | | | | | | | | | | | | | | | | | | I | I | I | I | I | I | I | I | I | P | I |
| | Cx Issues Log Record / track of all commissioning related issues affecting functional testing and IST deficiencies | | | | | | | | | | | | | | | | | | S | I | | I | I | | | | I | P | I |
| | Commissioning Program | | | | | | | | | | | | | | | | | | S | S | | S | I | | | | | P | |
| | GC Program | | | | | | | | | | | | | | | | | | S | S | | S | I | I | I | I | I | I | P |
| | Amalgamation of GC and Commissioning Programs | | | | | | | | | | | | | | | | | | S | S | | S | | | | | | A | P |
| Commissioning Documents | List of Documents by T&C level | | | | | | | | | | | | | | | | | | S | I | | I | I | I | I | I | I | A/P | I |
| | Provide (Review) technical documentation and factory test certificate (MCE) | | | | | | | | | | | | | | | | | | I | I | | I | I | | | | A | P | I |
| | Provide (Review) technical documentation and factory test certificate (GC) | | | | | | | | | | | | | | | | | | I | I | | I | I | I | I | I | | I | P |
| | Collect MCE documents | | | | | | | | | | | | | | | | | | I | I | | I | R | | | | A | P | I |
| | Upload tests procedures on ASITE (Project Portal / Sharepoint) L1-L3 | | | | | | | | | | | | | | | | | | I | A | | A | A | A | A | A | A | R | P |
| | Upload tests certificates on ASITE (Project Portal / Sharepoint) L1-L3 | | | | | | | | | | | | | | | | | | I | A | | A | A | A | A | A | A | R | P |
| | Upload tests procedures on ASITE (Project Portal / Sharepoint) L4-L5 | | | | | | | | | | | | | | | | | | I | A | | A | A | A | A | A | A | P | A |
| | Upload tests certificates on ASITE (Project Portal / Sharepoint) L4-L5 | | | | | | | | | | | | | | | | | | I | A | | A | A | A | A | A | A | P | A |

## 2.4 Commissioning Level 1 - Factory Acceptance, Witness Testing & Inspections

There are four types of factory inspections: Global Factory Witness Tests (GFWT), Factory Witness Tests (FWT), Factory Acceptance Tests (FAT) and QAQC End of Line Inspections (ELI).

The Equinix Regional Commissioning Manager will liaise with the project team and CxA to determine what equipment needs an FWT/FAT/QAQC ELI, this is on a project-by-project basis. Refer to section XX

Global Factory Witness Tests (GFWT) is testing executed in the factory and witnessed by the Equinix's Global Operations and Engineering Team (GOE) to approve that the equipment has met all the performance parameters (capacity, efficiency, fault tolerance) according to the design, meet the Equinix operational requirements including firmware revision and settings. During this test the firmware and parameters are captured and locked down, this becomes an approved equipment type/model which can be procured on all future Equinix projects providing it has the same revision of firmware and settings installed from the GFWT.

Factory Witness Tests (FWT) is testing executed in the factory, witnessed and signed off by the CxA to approve that the equipment has met all the performance parameters (capacity, efficiency, fault tolerance) according to the design and meeting the Equinix operational requirements including firmware revision and settings.

Factory Acceptance Testing (FAT) is testing executed in the factory by the factory quality control personnel, (not witnessed by the CxA) however the FAT Cx documentation proving that the equipment has met all the performance parameters (capacity, efficiency, fault tolerance) according to the design and meeting the Equinix operational requirements including firmware revision and settings shall by reviewed and signed off by the CxA.

Software Factory Acceptance Testing (FAT) is software testing executed in the factory and witnessed and signed off by the factory quality control personnel and CxA

QA/QC End of Line Inspections (ELI) is a QA/QC end of line inspection of equipment prior to leaving the factory to capture any design discrepancies, incomplete work or obvious defects prior to shipment.

2.4.1 Commissioning Level 1 - Deliverables and Responsibilities Matrix

**Global Commissioning Roles and Responsibilities Analysis Matrix (v2)**

| | |
|---|---|
| P | Primary – Role responsible and accountable for the task |
| A | Assigned – Role assigned to support the Primary in analysis, development, completion and delivery of the task |
| R | Review Required – Roles that are required to review the task once work has been completed |
| I | Input required – Roles required to provide input to the task as the work proceeds |
| S | Signature – Role required to sign-off the completed task from a governance perspective; the Approver |

| | | | | Global Team | | | | | | | | | | Regional Team | | | | | | | Project Team | | | GC/ Subs | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Construction | Construction incl Health & Safety | Design | Design - Master Planning/Concept Design | Design - Standard/Technical Review | Commercial | MCE/Utilities/Sustainability | Hyperscale | GOE | xScale | Global Commissioning | Design | Construction incl H&S | Commercial | MCE/Procurement | Capacity management | Operations | Regional PMO | Regional Commissioning Manager | Project Design Lead | Project Commercial Lead | Project Construction Manager incl H&S | Design Lead EoR | Mechanical | Electrical | BMS/EMS/CMS/Controls | IT | MCE/ GC Vendors | QA/QC & Cx Agent | MCE Co-ordinator | General Contractor |
| STAGES | DELIVERABLE | ACTIVITIES AND TASKS | | Equinix | | | | | | | | | | | | | | | | | | | | | EXTERNAL | | | | | | | | |
| Cx Level 1 | Factory Testing (GFWT, SSFWT, FAT, & ELI) | GFWT | Planning and scheduling of the factory visit | | | I | P | A/S | | | I | A/S | | I | I | | | I | | I | | | | | | | | | | | | | |
| | | | Reviewing and approving of Method Statements | | | I | P | A/S | | | I | S | | I | I | | | I | | I | | | | | | | | | | | | | |
| | | | Organising the attendees from Equinix | | | I | P | I | | I | I | I | | I | I | | | I | | I | | | | | | | | | | | | | |
| | | | Attending the witness test | | | A | P | A | | I | I | A | | I | I | | | I | | I | | | | | | | | | | | | | |
| | | | Signing off and approving the final testing documentation | | | S | P | S | | | I | S | | I | I | | | I | | I | | | | | | | | | | | | | |
| | | | Updating the Global Firmware and Settings Library | | | I | I | I | | I | I | P | | I | I | | | I | | I | | | | | | | | | | | | | |
| | | SSFWT (MCE Equipment) | MCE Planning and scheduling of the factory visit | | | | | | | | | I | | | | | | | | I | | | | | | | | | | A | P | | I |
| | | | MCE Reviewing and approving of Method Statements | | | | | | | | | I | | | | | | | | I | | | | | | | | | | A | P/S | | I |
| | | | MCE Organising the attendees | | | | | | | | | I | | | A | | | I | | I | | I | I | I | I | I | I | I | I | A | P | | I |
| | | | MCE Attending the witness test | | | | | | | | | I | | | | | | | | I | | I | | | I | | | | | A | P | | A |
| | | | MCE Signing off and approving the final testing documentation | | | | | | | | | I | | | A | | | | | I | | | | | | | | | | | P/S | | |
| | | SSFWT (GC Equipment) | GC Planning and scheduling of the factory visit | | | | | | | | | I | | | I | | | | | I | | | I | | I | | | | | I | I/S | | P |
| | | | GC Reviewing and approving of Method Statements | | | | | | | | | I | | | I | | | | | I | | | | | A | A | A | A | A | A | R/S | | P |
| | | | GC Organising the attendees | | | | | | | | | I | | | I | | | | | I | | | I | | A | A | A | A | A | A | R/S | | P |
| | | | GC Attending the witness test | | | | | | | | | I | | | I | | | | | I | | | I | | A | A | A | A | A | A | A | | P |
| | | | GC Signing off and approving the final testing documentation | | | | | | | | | I | | | S | | | | | I | | | I | | A | A | A | A | A | A | S | | P |
| | | FAT | MCE FAT (factory Acceptance Test) Reports | | | | | | | | | | | | | | | I | | | | | I | | | | | | | A | P | | A |
| | | | FAT (factory Acceptance Test) Reports (GC and his subcontractors) | | | | | | | | | | | | I | | | | | | | | I | | | A | A | A | A | A | I/S | | P |
| | | ELI | Planning and scheduling of the factory visit | | | | | | | | | | | | | | | | | | | | | | | A | A | A | A | A | A | | P |
| | | | Reviewing and approving of Method Statements | | | | | | | | | | | | | | | | | | | | | | | | | | | | S | | P |
| | | | Organising the attendees | | | | | | | | | | | | | | | | | I | | | | | I | I | I | I | I | I | I | | P |
| | | | Attending the witness test | | | | | | | | | I | | | | | | | | I | | | | | I | I | I | I | I | I | P | | I |
| | | | Signing off and approving the final testing documentation | | | | | | | | | I | | | | | | | | I | | I | | | | A | A | A | A | A | S | | P |
| | | Cx Level 1 Completion certificate signed off before moving onto Cx level 2 | | | | | | | | | | I | | | | | | | | | I | I | | I | I | A | A | A | A | A | P/S | | A |

## 2.5 Commissioning Level 2 – Delivery, Installation Verification (QA/QC) & Static Testing

The Commissioning Level 2A process is to validate that the equipment/systems have been installed in accordance with the manufactures guidance, projects specifications and approved design and is free from deficiencies. The GC is to coordinate and manage the equipment/systems QA/QC process with the CxA and EOR input. The QA/QC approval and sign off the equipment/systems Red Tag is the responsibility of the CxA.

The Commissioning Level 2B process is to validate the static testing performed by the MCE and GC vendors. The approval and sign off the equipment/systems Yellow Tag is the responsibility of the CxA

The MCE and GC vendors are responsible for uploading the Cx level 2A and 2B test records and checklists onto the documentation platform for the CxA to review and approve. The CxA is responsible for uploading of all Level 2A & 2B test records onto Facility Grid prior to the commencement of Commissioning Level 3.

### 2.5.1 Commissioning Level 2A - Deliverables and Responsibilities Matrix

**Global Commissioning Roles and Responsibilities Analysis Matrix (v2)**

| | |
|---|---|
| P | Primary – Role responsible and accountable for the task |
| A | Assigned – Role assigned to support the Primary in analysis, development, completion and delivery of the task |
| R | Review Required – Roles that are required to review the task once work has been completed |
| I | Input required – Roles required to provide input to the task as the work proceeds |
| S | Signature – Role required to sign-off the completed task from a governance perspective; the Approver |

| | | | Global Team | | | | | | | | | | | | Regional Team | | | | | | | | Project Team | | | GC/ Subs | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Construction | Construction incl Health & Safety | Design | Design - Master Planning/Concept Design | Design - Standard/Technical Review | Commercial | MCE/Utilities/Sustainability | Hyperscale | GOE | xScale | Global Commissioning | Design | Construction incl H&S | Commercial | MCE/Procurement | Capacity management | Operations | Regional PMO | Regional Commissioning Manager | Project Design Lead | Project Commercial Lead | Project Construction Manager incl H&S | Design Lead EoR | Mechanical | Electrical | BMS/EMS/CMS/Controls | IT | MCE/ GC Vendors | QA/QC & Cx Agent | MCE Co-ordinator | General Contractor |
| STAGES | DELIVERABLE | ACTIVITIES AND TASKS | Equinix | | | | | | | | | | | | | | | | | | | | | | EXTERNAL | | | | | | | | |
| Cx Level 2A | Delivery, Installation Verification (QAQC) | Cx Level 2A Method statement submittals & approvals to be prepared by Vendor / General contractor (At least 1 month prior to Cx activity) | | | | | | | | | I | | | | | | | | | | I | I | | I | | A | A | A | A | A | P/R/S | A | A |
| | | Delivery inspections and acceptance of Equinix procured equipment that has been 'free issued' to the General Contractor (GC) | | | | | | | | | I | | | | | | | | | | I | I | | I | | A | A | A | A | I | R | A | P/S |
| | | Confirm FWT, FAT, Factory inspection issues have been resolved | | | | | | | | | I | | | | | | | | I | | I | I | | I | | | | | | A | P/R/S | I | A |
| | | Equipment first in place approval / benchmarking | | | | | | | | | I | | | | | | | | I | | I | I | | I | I | A | A | A | A | A | R/S | I | P |
| | | Equipment QA/QC inspections | | | | | | | | | I | | | | | | | | I | | I | I | | I | I | A | A | A | A | A | R | I | P/S |
| | | Equipment QA/QC inspections - Witness & sign off | | | | | | | | | | | | | | | | | | | I | I | | I | I | A | A | A | A | A | P/S | I | A |
| | | MCE Vendor Cx Level 2A final completed documentation uploaded to project documentation platform | | | | | | | | | I | | | | | | | | I | | I | I | | I | I | | | | | P | R/S | A | A |
| | | General Contractor Cx Level 2A final completed documentation uploaded to project documentation platform | | | | | | | | | I | | | | | | | | I | | I | I | | I | I | A | A | A | A | A | R/S | | P |
| | | Cx Level 2A final completed documentation uploaded to Equinix documentation platform | | | | | | | | | | | | | | | | | | | | | | | | | | | | | P | | I |
| | | Cx Level 2A issues have been resolved | | | | | | | | | | | | | | | | | | | I | I | | I | I | A | A | A | A | A | P/R/S | I | A |
| | | Cx L2A Checklist signed off and completed before moving onto Cx level 2B | | | | | | | | | I | | | | | | | | I | | I | I | | I | I | | | | | | P/S | | |

### 2.5.2 Commissioning Level 2B - Deliverables and Responsibilities Matrix

**Global Commissioning Roles and Responsibilities Analysis Matrix (v2)**

| | |
|---|---|
| P | Primary - Role responsible and accountable for the task |
| A | Assigned - Role assigned to support the Primary in analysis, development, completion and delivery of the task |
| R | Review Required - Roles that are required to review the task once work has been completed |
| I | Input required - Roles required to provide input to the task as the work proceeds |
| S | Signature - Role required to sign-off the completed task from a governance perspective; the Approver |

| | | | Global Team | | | | | | | | | | | | Regional Team | | | | | | | | Project Team | | | GC/ Subs | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Construction | Construction incl Health & Safety | Design | Design - Master Planning/Concept Design | Design - Standard/Technical Review | Commercial | MCE/Utilities/Sustainability | Hyperscale | GOE | xScale | Global Commissioning | Design | Construction incl H&S | Commercial | MCE/Procurement | Capacity management | Operations | Regional PMO | Regional Commissioning Manager | Project Design Lead | Project Commercial Lead | Project Construction Manager incl H&S | Design Lead EoR | Mechanical | Electrical | BMS/EMS/CMS/Controls | IT | MCE/ GC Vendors | QA/QC & Cx Agent | MCE Co-ordinator | General Contractor |
| STAGES | DELIVERABLE | ACTIVITIES AND TASKS | Equinix | | | | | | | | | | | | | | | | | | | | | | EXTERNAL | | | | | | | | |
| Cx Level 2B | Static Testing Ready For Start-Up | Cx Level 2B Method statement to be prepared by Vendor / General contractor (At least 1 month prior to Cx activity) | | | | | | | | | I | | | | | | | | | | I | I | | I | | A | A | A | A | A | P/R/S | A | A |
| | | Static testing of Equipment | | | | | | | | | I | | | | | | | | I | | I | I | | I | I | A | A | A | A | A | R | I | P/S |
| | | Static testing of field & Interface connections | | | | | | | | | | | | | | | | | | | I | I | | I | I | A | A | A | A | A | R | I | P/S |
| | | Final Equipment & installation QA/QC inspections | | | | | | | | | I | | | | | | | | I | | I | I | | I | I | A | A | A | A | A | R | I | P/S |
| | | Final Equipment & installation QA/QC inspections - Witness & sign off | | | | | | | | | | | | | | | | | | | I | I | | I | I | A | A | A | A | A | P/S | I | A |
| | | MCE Vendor Cx Level 2B final completed documentation uploaded to project documentation platform | | | | | | | | | I | | | | | | | | I | | I | I | | I | I | | | | | P | R/S | A | A |
| | | General Contractor Cx Level 2B final completed documentation uploaded to project documentation platform | | | | | | | | | I | | | | | | | | I | | I | I | | I | I | A | A | A | A | A | R/S | | P |
| | | Cx Level 2B final completed documentation uploaded to Equinix documentation platform | | | | | | | | | | | | | | | | | | | | | | | | | | | | | P | | I |
| | | Cx Level 2B issues have been resolved | | | | | | | | | | | | | | | | | | | I | I | | I | I | A | A | A | A | A | P/R/S | I | A |
| | | Cx L2B Checklist signed off and completed before moving onto Cx level 3 | | | | | | | | | I | | | | | | | | I | | I | I | | I | I | | | | | | P/S | | |

## 2.6 Commissioning Level 3 – Start-up & Pre-functional Testing

The Commissioning Level 3 process is to validate that the equipment/systems start up and pre-functional testing has been completed in accordance with the manufactures guidance, projects specifications and approved design. The GC is to coordinate and manage the equipment/systems Cx level 3 process with the CxA input. The Cx level 3 approval and sign off the equipment/systems Green Tag is the responsibility of the CxA.

The MCE and GC vendors are responsible for uploading the Cx level 3 test records and checklists onto the documentation platform for the CxA to review and approve. The CxA is responsible for uploading of all Level 3 test records onto Facility Grid prior to the commencement of Commissioning Level 4.

### 2.6.1 Commissioning Level 3 - Deliverables and Responsibilities Matrix

| Global Commissioning Roles and Responsibilities Analysis Matrix (v2) | |
|---|---|
| P | Primary - Role responsible and accountable for the task |
| A | Assigned - Role assigned to support the Primary in analysis, development, completion and delivery of the task |
| R | Review Required - Roles that are required to review the task once work has been completed |
| I | Input required - Roles required to provide input to the task as the work proceeds |
| S | Signature - Role required to sign-off the completed task from a governance perspective; the Approver |

| | | | Global Team | | | | | | | | | | | | Regional Team | | | | | | | | Project Team | | | GC/ Subs | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Construction | Construction incl Health & Safety | Design | Design - Master Planning/Concept Design | Design - Standard/Technical Review | Commercial | MCE/Utilities/Sustainability | Hyperscale | GOE | xScale | Global Commissioning | Design | Construction incl H&S | Commercial | MCE/Procurement | Capacity management | Operations | Regional PMO | Regional Commissioning Manager | Project Design Lead | Project Commercial Lead | Project Construction Manager incl H&S | Design Lead EoR | Mechanical | Electrical | BMS/EMS/CMS/Controls | IT | MCE/ GC Vendors | QA/QC & Cx Agent | MCE Co-ordinator | General Contractor |
| STAGES | DELIVERBALE | ACTIVITIES AND TASKS | Equinix | | | | | | | | | | | | | | | | | | | | | | EXTERNAL | | | | | | | | | |
| Cx Level 3 | Start-up & Pre-functional Testing | Cx Level 3 Method statement to be prepared by Vendor / General contractor (At least 1 month prior to Cx activity) | | | | | | | | | I | | | | | | | | | I | I | | I | | A | A | A | A | A | P/R/S | A | A |
| | | Room readiness approval | | | | | | | | | I | | | | | | | | I | I | I | | I | | I | I | I | I | I | P/R/S | I | A |
| | | Energisation approval | | | | | | | | | I | | | | | | | | I | I | I | | I | | I | I | I | I | I | P/R/S | | A |
| | | Equipment / system start up & Pre-functional Testing | | | | | | | | | I | | | | | | | | I | I | I | | I | | I | A | A | A | A | R | I | P/S |
| | | Equipment / system start up & Pre-functional Testing - Witness & sign off | | | | | | | | | | | | | | | | | | I | I | | I | | I | A | A | A | A | P/S | I | A |
| | | MCE Vendor Cx Level 3 final completed documentation uploaded to project documentation platform | | | | | | | | | I | | | | | | | | I | I | I | | I | | I | | | | P | R/S | A | A |
| | | General Contractor Cx Level 3 final completed documentation uploaded to project documentation platform | | | | | | | | | I | | | | | | | | I | I | I | | I | | I | A | A | A | A | R/S | | P |
| | | Cx Level 3 final completed documentation uploaded to Equinix documentation platform | | | | | | | | | | | | | | | | | | | | | | | | | | | | P | | I |
| | | Cx Level 3 issues have been resolved | | | | | | | | | | | | | | | | | | I | I | | I | | I | A | A | A | A | P/R/S | I | A |
| | | Cx Level 3 Checklist signed off and completed before moving onto Cx level 4 | | | | | | | | | I | | | | | | | | I | I | I | | I | | I | | | | | P/S | | |

## 2.7 Commissioning Level 4 – Functional & Performance Testing (SAT)

The Commissioning Level 4 process is to validate that the equipment/systems functional testing has been completed in accordance with the manufactures guidance, projects specifications and approved design. The CxA is to coordinate and manage the equipment/systems Cx level 4 process with the GC and MCE's input and participation. The Cx level 4 approval and sign off the equipment/systems Blue Tag is the responsibility of the CxA.

Functional Tests are intended to validate the sequences of operations, system performances / capacity and prove the interface with other systems (e.g. BMS/DCOS). These tests shall be rigorous enough to ensure that the systems and equipment will perform at its rated design capacity with required redundancy and respond to failure conditions per the design intent.

The MCE and GC vendors are responsible for uploading the Cx level 4 test records onto the documentation platform for the CxA to review and approve. The CxA is responsible for uploading of all Level 4 test records onto Facility Grid prior to the commencement of Commissioning Level 5.

Although the CxA is responsible for delivery of the Commissioning level 4 test scripts the GC and MCE are responsible for the coordination, execution and completion of Commissioning level 4 testing.

**Commissioning Level 4 - Deliverables and Responsibilities Matrix**

| Global Commissioning Roles and Responsibilities Analysis Matrix (v2) | |
|---|---|
| P | Primary - Role responsible and accountable for the task |
| A | Assigned - Role assigned to support the Primary in analysis, development, completion and delivery of the task |
| R | Review Required - Roles that are required to review the task once work has been completed |
| I | Input required - Roles required to provide input to the task as the work proceeds |
| S | Signature - Role required to sign-off the completed task from a governance perspective; the Approver |

| | | | Global Team | | | | | | | | | | | | Regional Team | | | | | | | | Project Team | | | GC/ Subs | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Construction | Construction incl Health & Safety | Design | Design - Master Planning/Concept Design | Design - Standard/Technical Review | Commercial | MCE/Utilities/Sustainability | Hyperscale | GOE | xScale | Global Commissioning | Design | Construction incl H&S | Commercial | MCE/Procurement | Capacity management | Operations | Regional PMO | Regional Commissioning Manager | Project Design Lead | Project Commercial Lead | Project Construction Manager incl H&S | Design Lead EoR | Mechanical | Electrical | BMS/EMS/CMS/Controls | IT | MCE/ GC Vendors | QA/QC & Cx Agent | MCE Co-ordinator | General Contractor |
| STAGES | DELIVERBALE | ACTIVITIES AND TASKS | Equinix | | | | | | | | | | | | | | | | | | | | | | EXTERNAL | | | | | | | | | |
| Cx Level 4 | Functional & Performance Testing (SAT) | Cx Level 4 System integration plans to be prepared by CxA (At least 3 months prior to Cx activity) | | | | | | | | | I | | | | | | | | R/S | | R/S | I | | I | I/R | A | A | A | A | A | P | I | I |
| | | Cx Level 4 Generation of Test Scripts by CxA on Equinix commissioning platform (At least 3 months prior to Cx activity) | | | | | | | | | I | | | | | | | | | | R/S | I | | I | | A | A | A | A | A | P | I | I |
| | | Cx Level 4 Method statement to be prepared by Vendor / General contractor (At least 3 month prior to Cx activity) | | | | | | | | | I | | | | | | | | | | I | I | | I | | A | A | A | A | A | R/S | I | P |
| | | Cx Level 4 Switching schedules to be prepared by Vendor / General contractor (At least 3 month prior to Cx activity) | | | | | | | | | I | | | | | | | | | | I | I | | I | | A | A | A | A | A | R | I | P/S |
| | | Execute Functional & Performance Testing (SAT) | | | | | | | | | I | | | | | | | | I | | I | I | | I | I | I | I | I | I | I | A/R/S | I | P |
| | | Cx Level 4 final completed documentation uploaded to project documentation platform | | | | | | | | | I | | | | | | | | I | | R/S | | | | | | | | | | P | | |
| | | Cx Level 4 final completed documentation with supporting evidence on Equinix documentation platform | | | | | | | | | | | | | | | | | | | R | | | | | I | I | I | I | I | P/S | | I |
| | | Cx Level 4 issues have been resolved | | | | | | | | | | | | | | | | | | | I | I | | I | I | A | A | A | A | A | P/R/S | I | A |
| | | Cx Level 4 Checklist signed off and completed before moving onto Cx level 5 | | | | | | | | | I | | | | | | | | I | | I | I | | I | I | | | | | | P/S | | |

## 2.8 Commissioning Level 5 – Integrated systems Testing (IST)

The Commissioning level 5 process is intended to validate the sequences of operations, system performances, redundancy and prove the interface with other systems. These tests shall be rigorous enough to ensure that the systems and equipment will perform as per design intent during all failure and maintenance scenarios. The CxA is to coordinate and manage the integrated systems test Cx level 5 process with the GC and MCE's input and participation. The Cx level 5 approval and sign off the systems White Tag is the responsibility of the CxA.

The MCE and GC vendors are responsible for uploading the Cx level 5 test records onto the documentation platform for the CxA to review and approve. The CxA is responsible for uploading of all Level 5 test records onto Facility Grid.

Although the CxA is responsible for delivery of the Commissioning level 5 test scripts the GC and MCE are responsible for the execution and completion of Commissioning level 5 testing.

### 2.8.1 Commissioning Level 5 - Deliverables and Responsibilities Matrix

| Global Commissioning Roles and Responsibilities Analysis Matrix (v2) | |
|---|---|
| P | Primary - Role responsible and accountable for the task |
| A | Assigned - Role assigned to support the Primary in analysis, development, completion and delivery of the task |
| R | Review Required - Roles that are required to review the task once work has been completed |
| I | Input required - Roles required to provide input to the task as the work proceeds |
| S | Signature - Role required to sign-off the completed task from a governance perspective; the Approver |

| | | | Global Team | | | | | | | | | | | | Regional Team | | | | | | | | Project Team | | | GC/ Subs | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Construction | Construction incl Health & Safety | Design | Design - Master Planning/Concept Design | Design - Standard/Technical Review | Commercial | MCE/Utilities/Sustainability | Hyperscale | GOE | xScale | Global Commissioning | Design | Construction incl H&S | Commercial | MCE/Procurement | Capacity management | Operations | Regional PMO | Regional Commissioning Manager | Project Design Lead | Project Commercial Lead | Project Construction Manager incl H&S | Design Lead EoR | Mechanical | Electrical | BMS/EMS/CWS/Controls | IT | MCE/ GC Vendors | QA/QC & Cx Agent | MCE Co-ordinator | General Contractor |
| STAGES | DELIVERABLE | ACTIVITIES AND TASKS | Equinix | | | | | | | | | | | | | | | | | | | | | | EXTERNAL | | | | | | | | | |
| Cx Level 5 | Integrated systems Testing (IST) | Cx Level 5 - IST plan to be prepared by CxA (At least 3 months prior) | | | | | | | | | I | | | | | | | | R/S | | R/S | I | | I | A | A | A | A | A | A | P | I | I |
| | | Cx Level 5 Generation of IST Test Script by CxA on Equinix commissioning platform (At least 3 months prior) | | | | | | | | | I | | | | | | | | | | R/S | I | | I | A | A | A | A | A | A | P | I | I |
| | | Execute Integrated System Test (IST) | | | | | | | | | I | | | | | | | | I | | I | I | | I | I | I | I | I | I | I | A/R/S | I | P |
| | | Cx Level 5 final completed documentation with supporting evidence on Equinix documentation platform | | | | | | | | | | | | | | | | | | | R | | | | | I | I | I | I | I | P/S | | I |
| | | Cx Level 5 final completed documentation uploaded to project documentation platform | | | | | | | | | I | | | | | | | | I | | R/S | | | | | | | | | | P | | |
| | | Cx Level 5 issues have been resolved | | | | | | | | | | | | | | | | | | | I | I | | I | I | A | A | A | A | A | P/R/S | I | A |
| | | IST Report / Completion statement | | | | | | | | | I | R/S | | | | | | | R/S | | R/S | I | | I | | | | | | | P/S | | |

## 2.9 Level 6 Transition Phase

The Commissioning level 6 process involves the handover of all project documentation via the Go-Live process including O&M manuals and as left settings and to undertake training for EQX Ops/TFM teams on all the equipment/systems throughout the facility. The CxA is to input into both the Go-Live process and review and approve the training manuals, the GC is to facilitate the training.

The CxA will provide a Lessons Learned tracker and participate in a lessons learned workshop to discuss and document project successes and identify opportunities for improvements for future projects.

### 2.9.1 Commissioning Level 6 - Deliverables and Responsibilities Matrix

| Global Commissioning Roles and Responsibilities Analysis Matrix (v2) | |
|---|---|
| P | Primary - Role responsible and accountable for the task |
| A | Assigned - Role assigned to support the Primary in analysis, development, completion and delivery of the task |
| R | Review Required - Roles that are required to review the task once work has been completed |
| I | Input required - Roles required to provide input to the task as the work proceeds |
| S | Signature - Role required to sign-off the completed task from a governance perspective; the Approver |

| | | | Global Team | | | | | | | | | | | | Regional Team | | | | | | | | Project Team | | | GC/ Subs | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Construction | Construction incl Health & Safety | Design | Design - Master Planning/Concept Design | Design - Standard/Technical Review | Commercial | MCE/Utilities/Sustainability | Hyperscale | GOE | xScale | Global Commissioning | Design | Construction incl H&S | Commercial | MCE/Procurement | Capacity management | Operations | Regional PMO | Regional Commissioning Manager | Project Design Lead | Project Commercial Lead | Project Construction Manager incl H&S | Design Lead EoR | Mechanical | Electrical | BMS/EMS/CWS/Controls | IT | MCE/ GC Vendors | QA/QC & Cx Agent | MCE Co-ordinator | General Contractor |
| STAGES | DELIVERABLE | ACTIVITIES AND TASKS | Equinix | | | | | | | | | | | | | | | | | | | | | | EXTERNAL | | | | | | | | | |
| Transition | Transition / Close-out / Handover | Facility ready sign-off | | | | | | | | | | | | | | | | | | | | | | P | A | | | | | | A | | A |
| | | Training | | | | | | | | | I | | | | | | | I | | S | | S | I | | I | | | | | A | P | | A |
| | | Supplier / Vendor Contact List | | | | | | | | | I | | | | | | | I | S | | | | P | | I | | | | | A | I | | A |
| | | Spare Parts | | | | | | | | | I | | | | | | | I | S | | | | P | | I | | | | | | I | | A |
| | | Warranty Documents | | | | | | | | | I | | | | | | | I | S | | | | I | | I | P | | | | | | I | | A |
| | | Pre-Purchased Service Contract | | | | | | | | | I | | | | | | | I | S | | | | I | | I | P | | | | | | I | | A |
| | | Signed off Defect Lists | | | | | | | | R | I | | | | | | | | R | | | S | R | | S | | | | | A | P | | A |
| | | Sustainability Submission | | | | | | | | | I | | | | | | | | | | | | S | | I | P | I | I | I | I | | | | I |
| | | As Built documents | | | | | | | | | I | | | | | | | | | | | | S | | I | P | I | I | I | I | | | | A |
| | | O&M Manuals | | | | | | | | | I | | | | | | | | | | | | R | | S | I | I | I | I | I | R | | | P |
| | | Equinix commissioning platform close out | | | | | | | | | | | | | | | | | | | R/S | | | | | | | | | | P | | | |
| | | Financial Close | | | | | | | | S | I | | | | S | S | | | | | | | | P | A | | | | | | | | | | I |
| | | Lessons Learned Review | | | | | | | | I | I | | | S | R | R | I | I | | | I | P | I | A | I | I | I | I | I | I | I | | | I |
| | | Day 2 Work Requests | | | | | | | | S | | | | | S | R | | R | | | I | R | R | P | I | I | I | I | I | I | I | | | A |

# 3 Commit Compliance Deliverables

Commit Compliance documentation will be generated at commencement of Commissioning Level 0 through to Level 6. This will be utilised and managed by the CxA throughout the life cycle of the project to ensure that key Commissioning deliverables are met, tracked accordingly and have been completed as per the approved timeframe agreed with EQX Cx Manager.
Documents are tracked on the Equinix Commissioning Portal and all approved documentation is attached to the relevant task. This allows direct access to all approved key commissioning documentation when required.

### 3.1 Commit Compliance Deliverables - Level 0

3.1.1 EOR RIBA 4 Design Complete, Including:
3.1.2 Coordination Study
3.1.3 Arc Flash Study
3.1.4 Low Load Strategy
3.1.5 CxA RIBA 4 Commissionability Study / Design Review Complete
3.1.6 GC Construction Program Review Complete
3.1.7 CxA Cx Durations Integrated into GC Program
3.1.8 CxA L4/L5 Commissioning Program Issued to GC
3.1.9 CxA Cost Report Tracker Complete
3.1.10 CxA Appointment Letter Issued
3.1.11 Review regional QA/QC compliance requirements

### 3.2 Commit Compliance Deliverables - Level 1

3.2.1 FWT/FAT/QAQC ELI Schedule Complete
3.2.2 FWT/FAT/ELI Documentation Uploaded to Equinix Document Control Platform
3.2.3 CxA KO Meeting Complete
3.2.4 CxA Commissioning Plan Complete
3.2.5 CxA Generator Load Strategy Complete
3.2.6 CxA UPS Load Strategy Complete
3.2.7 CxA STS Load Strategy Complete
3.2.8 CxA Busbar Load Strategies Complete
3.2.9 CxA Thermal Imaging Plan Complete
3.2.10 CxA CHW Plant Load Strategy Complete
3.2.11 CxA CRAH Load Strategy Complete
3.2.12 CxA HLT Strategy Complete
3.2.13 CxA L4/L5 Test Scripts Complete
3.2.14 CxA Training Tracker Complete
3.2.15 GC Flushing Strategy Complete

3.2.16 GC Benchmarks Inspections Tracker Complete
3.2.17 GC's Busduct Installation Manual Complete
3.2.18 GC LOTO Plan Complete
3.2.19 MCE/GC L2A Method Statement Submittal/Approval Complete
3.2.20 CxA Review of GC QAQC Checklist templates

### 3.3 Commit Compliance Deliverables - Level 2A

3.3.1 MCE/GC L2B Method Statement Submittal/Approval Complete
3.3.2 L2A Documentation Uploaded to Equinix Document Control Platform
3.3.3 MV L2A Checklists Complete
3.3.4 LV L2A Checklists Complete
3.3.5 DCOS/BMS L2A Checklists Complete
3.3.6 Mechanical L2A Checklists Complete
3.3.7 Fire Detection L2A Checklists Complete
3.3.8 Fire Suppression L2A Checklists Complete
3.3.9 Security L2A Checklists Complete
3.3.10 GC Benchmark Inspections Complete

### 3.4 Commit Compliance Deliverables - Level 2B

3.4.1 MCE/GC L3 Method Statement Submittal/Approval Complete
3.4.2 L2B Documentation Uploaded to Equinix Document Control Platform
3.4.3 Pressure Testing & Flushing Complete
3.4.4 MV L2B Checklists Complete
3.4.5 LV L2B Checklists Complete
3.4.6 DCOS/BMS L2B Checklists Complete
3.4.7 Mechanical L2B Checklists Complete
3.4.8 Fire Detection L2B Checklists Complete
3.4.9 Fire Suppression L2B Checklists Complete
3.4.10 Security L2B Checklists Complete
3.4.11 GC LOTO Plan Implemented

### 3.5 Commit Compliance Deliverables - Level 3

3.5.1 CxA L4 Test Scripts Approved by EQX Commissioning Manager
3.5.2 L3 Documentation Uploaded to Equinix Document Control Platform
3.5.3 MV L3 Checklists Complete
3.5.4 LV L3 Checklists Complete
3.5.5 DCOS/BMS L3 Checklists Complete
3.5.6 Mechanical L3 Checklists Complete
3.5.7 Fire Detection L3 Checklists Complete
3.5.8 Fire Suppression L3 Checklists Complete
3.5.9 Security L3 Checklists Complete
3.5.10 Review of P1 & P2 Open Issues Prior to Cx L4

### 3.6 Commit Compliance Deliverables Level 4

3.6.1 CxA L5 Test Scripts Approved by EQX Commissioning Manager
3.6.2 Raw Data Issued & Approved by CxA
3.6.3 L4 Documentation Uploaded to Equinix Document Control Platform
3.6.4 MV L4 Test Scripts Complete
3.6.5 LV L4 Test Scripts Complete
3.6.6 DCOS/BMS L4 Test Scripts Complete
3.6.7 Mechanical L4 Test Scripts Complete
3.6.8 Cause & Effect Test Script Complete
3.6.9 Review of P1 & P2 Open Cx Issues Prior to Cx L5

### 3.7 Commit Compliance Deliverables Level 5

3.7.1 L5 Documentation Uploaded to Equinix Document Control Platform
3.7.2 Raw Data Issued & Approved by CxA
3.7.3 IST Report Issued by CxA
3.7.4 Customer Conformity Letter Issued (if applicable)
3.7.5 All Cx Issues Closed

### 3.8 Commit Compliance Deliverables Level 6

3.8.1 CxA Final Close Out Report Complete
3.8.2 Training Complete
3.8.3 As Left Settings Issued
3.8.4 RCA's Uploaded to Equinix Commissioning Platform
3.8.5 Lesson Learned Complete
3.8.6 Go-Live CxA Deliverables Complete
3.8.7 Customer Cx Documentation Upload Complete (if applicable)
3.8.8 Facility Grid Project Complete & Archived

### 3.9 Commit Compliance Deliverables LEED

3.9.1 LEED Requirements Complete (Requested by All regions to be developed further)

## 4 Commissioning Documentation

### 4.1 Commissioning Schedule

It is the responsibility of the GC to produce a baseline construction program. This should detail all L1-L3 commissioning activities and an overview of L4-L5 testing.
This must be issued to the CxA who will develop a detailed sequenced schedule of all L4 & L5 testing requirement durations.

Once developed this must be issued for approval by Equinix Commissioning Manager, issued to the GC and then incorporated into the overall program by the GC.
The L4-L5 detailed sequenced commissioning schedule should be built working backwards from the RFS date with key milestones included.
If any of the key milestones highlight a problem or do not align with the construction program this should be raised to Equinix immediately.

The Commissioning schedule will be coordinated with the GC and the Contractors / Specialist contractors to ensure the commissioning of equipment and systems are ready for testing at the required times and that all Contractor / Specialist contractors are prepared to supply the required engineers to as per schedule.

### 4.2 Commissioning Audit Tracker

A commissioning audit tracker will be started at Commissioning Level 1 which will be utilised and managed by the CxA throughout the life cycle of the project to ensure the testing and commissioning deliverables of equipment and systems are tracked accordingly and have been completed timely.

# 5 QA/QC Issues and Issue resolution

## 5.1 M&E QA/QC installation Issues & Deficiencies

The CxA is responsible to review and provide report on the installation carried out by the GC and MCE, this however does not alleviate the GC / MCE and local design engineers from carrying out their own quality checks.

During the installation process, there will be deficiencies and issues. There are two different ways of recording them. The first is a “Deficiency”, this might be a scratch on a panel, paint overspray etc. These deficiency’s will be recorded on an electronic database system such as; Kaliti, Latista, Acconex, isnag, Conject etc. These lists are controlled and managed by the GC.
These deficiencies must be closed in a timely manner and all deficiencies must be closed before Level 5 testing.

The second type is an “Issue”, these are items that will prevent a piece of equipment receiving a Commissioning Tag. i.e. Permanent doors are not installed for a room or fire stopping incomplete. These are to be recorded on the “Issues Resolution Log (IRL) on the Commissioning Platform and is to be shared on a weekly basis with EQIX senior management.

All issues must be logged on the commissioning platform including issues found that are immediately corrected during the physical checks by the CxA

## 5.2 Commissioning QA/QC installation Issues & Deficiencies

The second type is an “Issue”, these are items that will prevent a piece of equipment receiving a Commissioning Tag. i.e. Permanent doors are not installed for a room or fire stopping incomplete. These are to be recorded on the “Issues Resolution Log (IRL) on the Commissioning Platform and is to be shared on a weekly basis with the Gc and the EQIX senior management.

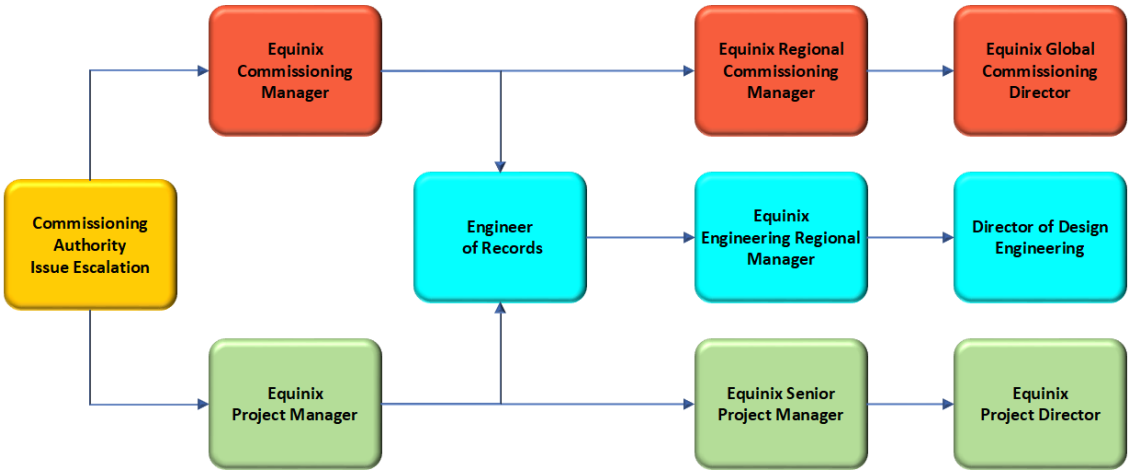
It is a requirement that all issues are logged on the commissioning platform. This includes issues found that are immediately corrected during the physical checks by the CxA.
All P1 & P2 outstanding issues must be addressed during the weekly commissioning meetings and target dates set for completion.

## 5.3 Escalation of issues

There are many triggers that can instigate escalation of issues, but for the avoidance of doubt, if it is not clear whether escalation is required – Escalate it.

**Escalation points Quality/Time/Design**

Concerns around Quality, Delay (Time) or Design can appear on site during any phase, but specifically during the L0-L3 testing/construction phase. Any concerns that need to be escalated shall be escalated as per the diagram below.



# 6 Test Method Statements / Checklists / Scripts / Commissioning Test Packs

## 6.1 Test Method Statements

The Commissioning Method Statements will consist of the following for all Assets/Systems. Each CMS will contain all necessary information like design info, drawings mark ups, checklists, calibration certs for any instruments used and empty forms etc.
All L1-5 method statements, Checklists and Scripts MUST meet the required levels of Testing and Commissioning for the equipment and systems and MUST conform with the Equinix global standards and approved design documents.
All method statements, Checklists and Scripts MUST be site specific.

The contents of the method statements shall include but not be limited to the following:

| |
|---|
| • **Front sheet that incorporates:**<br>Project title<br>Identification of the Asset/System<br>Test description.<br>Author of the document |
| • **The body of the method statement must incorporate:**<br>Index identifying the contents of the document.<br>Introduction – Brief Summary of the plant and location.<br>Plant schematics.<br>Installation drawings<br>Performance criteria/conformity statement, where applicable<br>Pass / Fail Criteria<br>Reference documents and procedures<br>The magnitude and duration of tests |
| • **The Method Statement Must Contain:**<br>Full description of how the pre-commissioning, commissioning and demonstration are to be carried out.<br>List of constraints or other interfacing elements that must be in place before pre-commissioning & commissioning can commence.<br>Duration and program for carrying out the pre-commissioning, commissioning and demonstration works. |
| • **Risk assessment that incorporates:**<br>Potential Risks<br>Control Measures<br>Access Requirements<br>Lighting<br>Tools & Equipment<br>Training Requirements<br>Hazardous Materials & substances (COSH)<br>Special Control Measures and emergency arrangements |

The method statements will be required to be issued at least 1 month prior to the commencement of any testing and commissioning activity, to allow sufficient time for review and comment by the required parties.
The method statements and associated documents must achieve “Approved” status 14 days prior to the commencement of any testing and commissioning activities.

It should be noted that a CMR is required for any integration into an existing “Live” system.
The CMR requires a detailed Method Statement which is prepared by the GC or MCE (Depending of type of equipment / system) and is to be issued no later than 37 days in advance.

Testing Procedure checklists / scripts / method statements for Commissioning L1 – L3 & training will be developed by the GC/CM/Specialist contractors.
The CxA shall review and comment on contents of the Commissioning L1- 3 checklists/scripts/method statements to see that the required levels of Testing and Commissioning for the equipment and systems are met in conformance with the Equinix global standards and approved design documents.

The CxA will execute, with assistance from the GC and MCE in the development of the detailed testing Procedures for Commissioning Level 4 TMS’s and the Commissioning L5 Integrated System Testing script.
The test Procedures developed will be specific to this project. The testing Procedures will include clear test steps, expected results, and the pass / fail criteria for each test.

The Commissioning L1 - L5 TMS’s will be submitted to the commissioning team via the document control system for review and comment at least 1 calendar month prior. The final approved versions are to be completed 14 days prior to the planned test execution. The Equinix Commissioning Manager and Engineering Team shall give final approval to the Commissioning L4-5 test scripts. The Equinix Commissioning Manager and Engineering Team will have access to the test procedure at its successful completion, as well as with the commissioning report provided as a part of the handover package.

### 6.2 Commissioning Test Packs

The contents of the commissioning Test pack shall include but not be limited to the following:

| |
|---|
| Project, test & Asset title |
| A record of visual observations of performance |
| A statement that the tests were carried out in accordance with the method statement |
| A statement describing any temporary works and whether in the judgment of the Specialist Contractors, or manufacturer, they influenced the results of the test.<br>Ambient conditions including temperature, before and after testing, where applicable |
| Control logic flow chart, where applicable |
| System commissioning sheets showing recorded values at time of test and inclusive of design data |
| Schedule of test equipment, including calibration certificates |
| Identify who will witness the system installation, pre-commissioning, commissioning and demonstrations. |
| Identify how, and at what stages in the commissioning process, the system is to be demonstrated. |
| Record any variation to the agreed Method Statement |
| Manufacturer's standard test certificates for ALL equipment |

### 6.3 Completed Commissioning Records

During the commissioning works, the checklists and procedures required will be used by GC to complete the tests and record the results. Copies of these documents must be included in the final report.

Every step in the checklists and procedures must be clearly checked by the CxA, with any deviations from the test plan clearly noted and subjected to the acceptance of Equinix Commissioning Manager. The forms should be the original records used by the GC on site during the commissioning. Accurate reflection of the testing is the primary concern. Any checklists questions marked N/A must be supported by a comment on the checklist sheet.

Completion certificates must be produced and signed off by the CxA at the completion of Commissioning Level 5. The completion certificate will be a one-page document identifying Commissioning activities completed and witnessed. The document will also detail / reference outstanding deficiencies and issues

## 7 Test Reports

Any equipment test reports produced or overseen by GC & Specialist contractors must be provided in the final report. Examples may include power quality or oscilloscope measurements of UPS, generators, or static transfer switches, thermography reports of critical electrical and mechanical systems, analysis reports, data loggers trending etc.

| TMS / Commissioning test pack Structure | Responsibility |
|---|---|
| QA/QC Installation checklist Red Tag | GC to issue test pack after each asset installation.<br>CxA to complete Facility Grid Checklist |
| Commissioning level 2B TMS | GC/Vendor to develop and issue onto project portal.<br>CxA to review & approve |
| Level 2B test & commissioning documentation & results | GC/Vendor to develop and issue onto project portal.<br>CxA to review data, complete Facility Grid Script, attach GC/Vendor test pack & sign off |
| Commissioning level 3 TMS | GC/Vendor to develop and issue onto project portal.<br>CxA to review & approve |
| Level 3 test & commissioning documentation & results | GC/Vendor to develop and issue onto project portal.<br>CxA to review data, complete Facility Grid Script, attach GC/Vendor test pack & sign off |
| Commissioning level 4 TMS (Test Script) | CxA to develop script on Facility Grid<br>Equinix to review & approve |
| Level 4 test & commissioning documentation & results | GC/Vendor to issue recorded data and issue onto project Portal<br>CxA to review data, complete Facility Grid Script, attach issued data & sign off |
| Commissioning level 5 TMS (Test Script) | CxA to develop IST script on Facility Grid<br>Equinix to review & approve |
| Level 5 test & commissioning documentation & results | GC/Vendor to issue recorded data and issue onto project Portal<br>CxA to review data, complete IST Script, attach issued data & sign off |

## 8 Progress Meetings

QAQC/ Commissioning meetings will be held on an agreed basis depending on the Commissioning level and progress of the commissioning is at and will require the attendance of the GC, MCE, EoR, and Commissioning Agent / Authority as described below:

CxA QA/QC Monthly Commissioning focus meetings will be held during the early stages of construction and installation. The intent is to look closely at detailed and specific commissioning issues. Attendance is anticipated to include GC, MCE, EoR, and CxA. The frequency of the meeting will be agreed by the Commissioning Team.

### 8.1 Weekly Commissioning Meetings:

To be held during level 2 design stage to Commissioning Level 5. This is to define the scope for Commissioning, FWT, TMS and development of Commissioning documentation and programme/schedule.

### 8.2 Weekly QA / QC Meetings and Site walks:

For Construction Quality Control (CQC), the CxA will provide, as defined, an onsite visual inspection and/or observation. This will assure the following scope of work maintains quality control focused on MEP and Fire Protection disciplines over suppliers, manufacturers, products, services, site conditions, and workmanship.

To be held during Level 2 to Level 5 Commissioning stages to discuss short term progress and immediate issues to be resolved. Attendance anticipated to include the the GC, MCE, EoRs and Commissioning Team. Any issues arising during the Commissioning process which have been recorded in IRL will be discussed and resolved where possible.

### 8.3 CxA Daily Workshop

These will be held as required, typically during Commissioning Level 4 and Level 5 stages to be certain of a coordinated immediate approach and to identify and address any impediment to the Commissioning Process. Attendance to include the GC, MCE, EoRs and Commissioning Team.

### 8.4 Commissioning Agent / Authority Reporting

Reports shall be produced for all active commissioning participation. The frequency will be dependent on the amount of Commissioning taking place. CxA will advise and comment on the content for each of the Commissioning Levels 1 to 5 activities. The activities that require a report include:

- Factory witness testing (Level 1) as required
- Construction site inspections (QA/QC) weekly
- Construction site inspections (Level 2) weekly
- Start-up verification (Level 3) weekly
- Start-up verification (Level 3) daily updates via email
- Site acceptance testing of standalone (SAT) and integrated equipment Commissioning (Level 4) weekly report and daily updates via email
- Integrated Systems Test (IST) (Level 5). Daily updates via email and preliminary report within 7 days.

The reports will:

- Health and Safety observations
- Summarise the day's activities
- Summary of the next day’s activities
- List the project team members in attendance
- Provide a detailed timeline of the day's events
- list all changes to the IRL in detail, including new and fixed items
- Observations and recommendations to be recorded
- Any deviations from the planned testing and approved commissioning procedures must also be described in the reports

### 8.5 Preliminary IST Report

Upon the completion of integrated systems testing, the CxA will provide a preliminary report stating whether the infrastructure meets the goals and is recommended for acceptance. The most recent copy of the commissioning issues log will be provided in this report, showing the outstanding deficiencies, along with a list of the equipment tested, and whether each system passed.
The final IST report is expected within 4 weeks upon completion of IST with all recorded data and required trending.

### 8.6 General Contractor / Specialist Contractors Notification Lead Times

The General Contractor shall notify the Commissioning team members from Level 1 through Level 5 activities. Notification protocols will involve both emails and project calendar events based on the need for coordination with the team members. Any issues raised shall be recorded on the IRL in Facility Grid.
Health & Safety
Health and Safety plays an important part in the project and all rules / regulations must be uphold and enforced throughout. The General Contractors site health and safety plan will be adhered to and maintained by the entire project team. Energised electrical switch rooms will be secured and managed by the GC (Access will be restricted to approved personnel). The CxA can pick up and record any health & safety issues and escalate it to the Equinix Project Manager or Commissioning Manager.

The CxA shall document any safety issues observed during the site walk or commissioning process and escalate it to Equinix Project Manager, Equinix Commissioning Manger and the GC.
Instruments
The Equipment vendors are responsible for providing their own required instruments for carrying out the Level 1 to Level 3 Commissioning activities.

The General Contractor/Vendor shall provide the required equipment and instrumentation which includes

- Load Banks
- Temperature / Humidity Data Loggers
- Thermo-hydro graphs required for Level 4 and Level 5 Commissioning activities.
- PQMs required for Level 4 and Level 5 Commissioning shall be provided by the MCE (UPS, ASTS and Generator supplier). The required quantity will be determined by the CxA and agree upon by Equinix Commissioning Manager.

Where thermal scanning is concerned, the GC or the electrical contractor shall be responsible for carrying out the thermal scans on their installation. Eg: Electrical Cables and terminations. The Switchgear, UPS, ASTS and Generator supplier or MCE will be responsible for conducting the thermal scans within their provided equipment which shall include internal bus bar connections and breakers.

# 9 CxA Equipment Tagging Process

The product of Tagging provides a reliable and accurate record of the status of the various systems, plant and equipment as the works progress from initial static completion through to final systems commissioning.

The Specialist Contractors responsible for the works are required to provide comprehensive documentation that demonstrates that the installations along with other relevant factors such as environment and construction are complete and tested as necessary before they can be tagged. It is imperative that a high standard of quality control, compliant with the design information is maintained. Close collaboration between the contractors is also necessary to iron out potential gaps and problems that could delay or disrupt system stage completions.

## 9.1 Equipment Tagging

A colour coded equipment tagging system shall be implemented that correlates to each of the Commissioning Levels. The tagging process will be implemented to provide progressive visual indication that each piece of equipment has been verified & has successfully completed each stage of the commissioning process. This process shall be followed for all sites except where special permissions have been granted for upgrades and updates to live sites. Permissions for all deviations must be approved by the Equinix Commissioning Manager.

The CxA shall be responsible for managing and implementing the tagging process including providing the tags and ensuring the equipment is properly signed off.

The coloured tags will be weatherproof stickers no larger than a credit card in size and professionally formatted with signature block for the person installing the tag.
A Tag status log will be maintained by the CxA, and all tags will be applied permanently to the equipment by the CxA.

The actual placement of the tags shall be reviewed and approved by the owner prior to placement and the tags shall be placed in a professional and level manner.

The tags will be attached to each piece of critical MEP equipment in the field per the master equipment list. If there is not a suitable place to fix the tags on the equipment, then the tags will be attached to a placard and the placard shall be attached to the equipment. This placard will be kept in a protective plastic document holder. The tags will be attached to the placard as appropriate.
Equipment shall not proceed to the next level of commissioning without having the preceding Quality Assurance/Quality Control (QA/QC) or Commissioning Tag installed.

## 9.2 Summary of the Tagging Process

| | |
|---|---|
| L2A Red Tag | Installation complete (Not Ready for Start-up) |
| L2B Yellow Tag | Ready for start-up |
| L3 Green Tag | Pre-Functional testing (PFT). |
| L4 Blue Tag | Functional testing Complete |
| L5 White Tag | Integrated Systems Testing |

## 9.3 Responsibility

The CxA will be responsible for managing and implementing the tagging process with the assistance of the GC including provision of the tags & ensuring the tags are signed off by each responsible party. The CxA will be responsible for installing all physical tags. An example is shown below

## 9.4 Tagging Process Overview

## 9.5 Red Tag Commissioning Level 2A Not Ready for Start-up (Installation complete):

9.5.1 **Definition**:

- The equipment has been set into place and anchored and the necessary inspections have been performed to ensure that it is ready to have Level 2 QA/QC inspections and tests performed.
- Any major deficiencies have been corrected; any outstanding items are documented on the Issue Resolution Log.

9.5.2 **Pre-Requisites**:

Equipment has met all the Level 1 requirements.
Equipment has been rigged into place and properly anchored.
Equipment has been inspected by the appropriate parties.

9.5.3 **Inspections:**

All Documentation: Approved submittals, FAT, FWT, and Delivery Inspection etc. are on file and uploaded.
The equipment matches the required contract documents.
Initial inspection has been performed by the Vendor/subcontractor. (where applicable)
Inspection has been performed by the GC and documented
CxA inspection in line with the Red Tag checklists and sign off
All required documentation to include GC/Vendor inspection documentation has been received, uploaded to project portal, reviewed by the CxA & attached to the relevant checklist on the Commissioning Portal.

9.5.4 **Sign Off (Acceptance)**

The Red Tag checklist shall be completed and be signed off by the CxA when all inspections have been completed. Once the Red Tag verification has been undertaken the Facility Grid checklists status should be moved to 'Awaiting Documentation' where the CxA is awaiting the GC/Vendor completed test pack and providing the Verification was acceptable.

Once the supporting documentation has been received, reviewed and attached to the relevant checklist the checklist status should be moved to 'Signed Off'

Checklists with a status of 'Awaiting Documentation' will restrict fixing a Red Tag to the asset and restrict the asset from starting the Yellow Tagging process. 7 days

Any exceptions to the process or outstanding issues shall be documented and submitted to the Equinix Commissioning Manager for agreement and the approval signed in writing by the Equinix Commissioning Manager before proceeding. Once approved the issues will be added to the Issue Resolution Log (IRL).

## 10 Yellow Tag – Commissioning Level 2B Ready for start-up:

### 10.1 Yellow Tag Definition:

- All Electrical and Mechanical inspections and static tests have been completed and the system is ready to be energized.
- Field inspections are completed by the manufacturer's representative and/or the installation contractor.
- All inspections and test forms have been submitted and reviewed.
- Any major deficiencies have been corrected; any outstanding items are documented on the Issue Resolution Log.

### 10.2 Yellow Tag Pre-Requisites:

- Equipment has met all the Level 2 requirements
- Pre-start-up inspections have been performed by the vendor and the Installer.
- Level 2 documents have been submitted, uploaded and have been reviewed.
- Level 2 issues have been corrected.

### 10.3 Yellow Tag Inspections:

- All Level 2B inspections are completed, and the results uploaded
- All P1 and P2 Issues from L2A have been corrected and verified
- Equipment is clean and free of debris.
- All electrical and mechanical connections are correctly installed.
- All control cables are correctly installed.
- All accessories are correctly installed.
- All protective covers are installed
- All protection devices are correct – Fuse sizes, circuit breaker and relay settings.
- All proper signage and tagging installed
- The equipment is safe to energise and ready to proceed to Level 3 start-up
- Pre-start-up inspections had been performed by the vendor/Installer and documented
- Inspection has been undertaken by the GC & documented
- Inspection by the CxA & Documented on Facility Grid
- Level 2B documents have been submitted, uploaded and have been reviewed by CxA
- Multiple pictures shall be taken of the electrical cubicle prior to closing the covers and uploaded. These pictures shall show the overall electrical connections as well as detailed photos that capture connections, torque marks, terminal crimps, grounding, bonding, conduit or wire entrances and cable supports etc.

### 10.4 Yellow Tag Acceptance:

- The Yellow Tag Checklist shall be completed and be signed off by the CxA when all inspections have been undertaken. Once Yellow Tag verification has been undertaken the Facility Grid checklists status should be moved to 'Awaiting Documentation' where the CxA is awaiting the GC/Vendor issued Test pack (provided the Verification was acceptable)
- Once the supporting documentation has been received, reviewed and attached to the relevant checklist, the checklist status should be moved to 'Signed Off'
- Checklists with a status of 'Awaiting Documentation' should not restrict fixing a Yellow Tag to the asset or restrict the asset to start the Green Tagging process.
- Any exceptions to the process or outstanding issues shall be documented and submitted to the Equinix Commissioning Manager for agreement and the approval signed in writing by both the Equinix Commissioning Manager before proceeding. Once approved the issues will be added to the Issue Resolution Log (IRL).
- Any exceptions to the process or outstanding issues shall be documented and submitted to the Equinix Commissioning Manager for agreement and the approval signed in writing by both the Equinix Commissioning Manager before proceeding. Once approved the issues will be added to the Issue Resolution Log (IRL).

## *11* Green Tag – Level 3 Pre-Functional testing (PFT)

### 11.1 Green Tag Definition:

- All Level 3 start-up inspections have been completed and the system is ready for functional testing.
- Start-up documentation has been submitted, uploaded and has been reviewed.
- All inspections and test forms have been submitted, uploaded and have been reviewed.
- Any major deficiencies have been corrected; any outstanding items are documented on the Issue Resolution Log.

### *11.2* Green Tag Requisites:

- All Level 3 start-up inspections have been completed and the system is ready for functional testing.

- Start-up documentation has been submitted, uploaded and has been reviewed.
- All inspections and test forms have been submitted, uploaded and have been reviewed.
- Any major deficiencies have been corrected; any outstanding items are documented on the Issue Resolution Log.

### 11.3 Green Tag Inspections:

- Level 3 Manufacturers start-up is completed.
- Equipment is fully integrated with other required systems associated with the system.
- Safety Interlocks have been tested.
- LOTO system has been agreed with the Contractors, CxA and Equinix Commissioning Manager.
- Level 3 start-up report and results have been submitted, reviewed and approved.
- All issues affecting the performance or safety of the equipment have been corrected.
- The equipment is ready to proceed to Level 4 Functional Performance Testing.
- Documentation has been received and uploaded. This should include Completed Level 3 start-up Forms, Additional Inspection Forms & Reports as required and O&M Manuals.

### 11.4 Green tag Acceptance:

- The Green Tag Checklist shall be completed and be signed off by the CxA when all inspections have been undertaken. Once Yellow Tag verification has been undertaken the Facility Grid checklists status should be moved to 'Awaiting Documentation' where the CxA is awaiting the GC/Vendor issued Test pack (provided the Verification was acceptable.)
- Once the supporting documentation has been received, reviewed and attached to the relevant checklist, the checklist status should be moved to 'Signed Off'
- Checklists with a status of 'Awaiting Documentation' should restrict fixing a Green Tag to the asset.
- Any exceptions to the process or outstanding issues shall be documented and submitted to the Equinix Commissioning Manager for agreement and the approval signed in writing by the Equinix Commissioning Manager before proceeding. Once approved any issues will be added to the Issue Resolution Log (IRL).

## 12 Blue Tag – Level 4 functional testing:

### 12.1 Blue Tag Definition:

- All Level 4 Functional Testing inspections have been completed and the system is ready for Integrated System Testing.
- All Level 4 Functional Testing documentation has been uploaded and has been reviewed.
- All inspections, test results, raw data and test forms have been submitted, uploaded and have been reviewed.
- Any deficiencies and issues have been corrected; any outstanding items are documented on the Issue Resolution Log. (IRL)

### 12.2 Requisites:

- Level 4 Functional Testing has been performed by CxA
- The Equipment has met all the Level 4 Functional Testing requirements.
- Level 4 Functional Testing documents have been submitted, uploaded and reviewed by the CxA.
- Level 4 Functional Testing issues have been corrected and retested as required.

### 12.3 Inspections:

- Level 4 Functional Performance Testing is completed.
- Level 4 Functional Performance Test report and results have been submitted, uploaded and have been reviewed and approved.
- All related issues on the issue Resolution Log are completed and closed.
- The equipment is ready to proceed to Level 5 Integrated Systems Testing.
- Documentation has been received and uploaded. This should include completed Level 4 Functional Performance Tests, Level 4 Functional Performance Test Data from PQM's, Power Meters, BMS / EMS Screen Captures & Data Loggers, Additional Inspection Forms & Reports as required and O&M Manuals.

### 12.4 Acceptance:

- The Blue Tag script shall be completed and be signed off by the CxA when all inspections have been completed. Once Blue Tag verification has been undertaken the Facility Grid checklists status should be moved to 'Awaiting Documentation' where the CxA is awaiting the GC/Vendor completed Test pack providing the Verification was acceptable.
- Once the supporting documentation has been received, reviewed and attached to the relevant checklist, the checklist status should be moved to 'Signed Off'
- All documentation should have been issued reviewed and attached to the Blue Tag Scripts before Level 5 testing is started. The Blue Tag should only be attached to the asset once the Script has been moved to 'Signed Off'
- There should be no outstanding issues on the completion of the Blue Tag Testing. Any issues must be documented and submitted to the Equinix Commissioning Manager for agreement and the approval signed in writing by the Equinix Commissioning Manager before signing off. Once approved the issues will be added to the Issue Resolution Log (IRL)

## 13 White Tag – Level 5 Integrated Systems Test (IST):

### 13.1 Definition:

- Meeting the requirements of the drawings and specifications with testing.
- All Level 5 Integrated Systems Tests have been completed.
- All Level 5 Integrated Systems Test documentation and Test Data has been submitted, uploaded and reviewed by the CxA.
- All issues that were identified for this system have been corrected.

### 13.2 Requisites:

- Level 5 Integrated Systems Testing has been witnessed by CxA and successfully completed.
- The Equipment has met all the Level 5 Integrated Systems Testing requirements.
- Level 5 Integrated Systems Testing documents and Test Data have been submitted, uploaded been reviewed by the CxA
- Level 5 Integrated Systems Testing issues have been corrected and retested as required.

### 13.3 Inspections:

- Level 5 Integrated Systems Testing is successfully completed.
- Level 5 Integrated Systems Test report, raw data and results have been submitted, reviewed, approved and uploaded.
- Level 5 Integrated Systems Test Data has been collected, verified & uploaded.
- Documentation has been received and uploaded. This should include Completed Level 5 Integrated Systems Tests, Additional Inspection Forms & Reports as required and Integrated Systems Test Data from PQM's, Power Meters, BMS / EMS Screen Captures and Data Loggers.

### 13.4 Acceptance:

- Level 5 Integrated Systems Testing is successfully completed.
- Level 5 Integrated Systems Test report, raw data and results have been submitted, reviewed, approved and uploaded.
- Level 5 Integrated Systems Test Data has been collected, verified & uploaded.
- Documentation has been received and uploaded.
- This should include
- Completed Level 5 Integrated Systems Test script
- Additional Inspection Forms & Reports as required
- Integrated Systems Test Data from:
- PQM's,
- Power Meters
- DCOS Screen Captures

The White Tag script shall be completed, signed off by the CxA and reviewed and approved by the EQX CxM when all inspections have been completed and the documentation has been uploaded.

## 14 Conditional Yellow Tag (CYT): Conditional L2B

In construction when working on fast track builds, we sometimes come into a which comes first scenario, i.e. Chicken and Egg. Thus, we have what is referred to as a Conditional Yellow Tag. These are not granted every day and must be authorised and signed off by a member of the Equinix Commissioning team.

The CxA can apply to the Equinix Commissioning managers, for a Conditional Yellow Tag. This is only granted when a piece of equipment requires a temporary supply to allow for the initial start-up of units to be completed prior to Full Energisation, one example of this is the supplies related to 110v/24v power for control circuits. In this situation, the GC & CxA must prove that there are no outstanding deficiency's that can affect safety, and that all warning notices are in place, a safe system of working is agreed, and the system is safe to energise.

This is NOT a reason to part finish an installation to get it energised. Another example is for temporary power to energise valves that are required for flushing. Level 3 testing cannot be completed under a CYT. A CYT shall only be signed off by Equinix Commissioning or Equinix Engineering personnel, this is to ensure the safety of everyone involved in the project.

# Asset Tagging Requirements: Electrical MV

## 15 HV/MV Cable Testing Requirements

The following tests and checks to be undertaken contractor and verified by CxA prior to continuing to Level 2B, with appropriate documentation provided.

### 15.1 HV/MV Cable Pre-requisites:

(All below prerequisites **MUST** be available prior to commencing red tag)

15.1.1 Verify the technical submittals and as built drawings have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
15.1.2 Verify the shop drawings have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
15.1.3 Verify the cable schedules have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
15.1.4 Verify the Cx level 2B static testing method statement and risk assessment (RAMS) have been uploaded to Equinix document control platform by the GC/vendor and approved by the CxA.
15.1.5 GC to compile a test pack in line with Equinix document matrix (refer to document matrix section XX).

### 15.2 HV/MV Cable Inspections:

15.2.1 Perform a visual inspection of the full length of cable to check for damages and adequate fixing arrangement.
15.2.2 Verify cable grouping arrangement is as per design specification.
15.2.3 Verify all cables are installed with appropriate glands as per design, manufacturers guidance and approved technical submittals.
15.2.4 Verify all cables bending radiuses are as per manufacturers guidance.
15.2.5 Verify all cables are installed with appropriate termination kits as per design, manufacturers guidance and approved technical submittals.
15.2.6 Verify all cables are torqued to the correct value as per manufacturers guidance.
15.2.7 Verify cable braid is routed correctly for the core balance CT (CBCT).
15.2.8 Verify all cables are labelled as per design specification.

### 15.3 HV/MV Cable Testing Required (below tests are the minimum requirement):

15.3.1 Perform sheath integrity test
15.3.2 Perform phase polarity identification
15.3.3 Perform 5kV insulation resistance test before and after dielectric test.
15.3.4 Perform dielectric withstand tests, test voltage and time to be determined by cable manufacturer guidance.
15.3.5 VLF dielectrics withstand test
**Note:** if VLF dielectric withstand test equipment is not available a DC Hi-pot dielectric withstand test is acceptable.

### 15.4 HV/MV Cables Documents Required:

(All documents **MUST** be available prior to sign off red tag)

15.4.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 15.5 HV/MV Cables Acceptance & Sign off:

15.5.1 All required documentation is uploaded to the Equinix document control platform by GC or Vendor.
15.5.2 All required documentation is uploaded to commissioning management platform by CxA

## 16 HV / MV Main Panels

**HV / MV Main Panels L2A Commissioning – Red Tag**

The following tests and checks to be undertaken by Equipment Vendor / contractor and verified by CxA prior to continuing to Yellow Tag, with appropriate documentation provided

### 16.1 HV/MV Panels Red Tag Pre-Requisites

(All below prerequisites MUST be available prior to commencing red tag)

16.1.1 Verify the technical submittals and as built drawings have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
16.1.2 Verify the shop drawings have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
16.1.3 Verify the cable schedules/cable interface schedules have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
16.1.4 Verify the DCOS/BMS points list have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
16.1.5 Verify the FAT/FWT documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA. Any issues raised in FAT/FWT have been addressed. (Routine FAT QAQC documentation acceptable where FWT testing has not been procured).
16.1.6 Verify the electrical protection study is approved and have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
16.1.7 Verify the Cx level 2B static testing method statement and risk assessment (RAMS) have been uploaded to Equinix document control platform by the GC/vendor and approved by the CxA.
16.1.8 Verify the material delivery receipt has been uploaded to Equinix document control platform by the GC, GC to identify upon kerbside delivery any defects/damages during transit.
16.1.9 GC to compile a test pack in line with Equinix document matrix (refer to document matrix section XX).

### 16.2 HV/MV Panels Red Tag Physical Checks

16.2.1 Confirm all deficiencies/comments from FWT/FAT have been closed.
16.2.2 Confirm room/area condition is acceptable as per the Equinix room readiness checklist
16.2.3 Confirm equipment has been installed/positioned as per approved design drawings, manufactures specifications and approved technical submittals
16.2.4 Confirm the unit is correct dimensionally, handed correctly and accessible for operation and maintenance as per local code
16.2.5 Confirm the equipment has the correct ratings, components, protective devices, interlocks (if applicable) as per approved design drawings, manufactures specifications and approved technical submittals
16.2.6 Confirm all gland plates are correct as per the approved technical submittal
16.2.7 Confirm appropriate warning/safety labels are in place.
16.2.8 Confirm all device labelling is correct as per approved Equinix naming convention
16.2.9 Confirm no damage has occurred in transit and all transit bolts, wedges etc. have been removed
16.2.10 Carry out all external and internal quality checks of the equipment
16.2.11 Confirm equipment IPXX ratings are correct as per the approved technical submittals
16.2.12 Confirm network interface card has been supplied as per the approved technical submittals
16.2.13 Confirm system and equipment grounding installation is as per the approved design drawings and the approved technical submittals
16.2.14 Record all equipment details as per the Equinix provided template on the equipment parameter list within commissioning management platform.
16.2.15 Verify Cx level 2A Installation and QAQC inspection checklist has been carried out as per the Equinix approved checklist.

### 16.3 HV/MV Panels Documents Required:

16.3.1 (All documents MUST be available prior to sign off red tag)
16.3.2 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 16.4 HV/MV Panel Red Tag Sign Off

16.4.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA
16.4.2 All required documentation is uploaded to commissioning management platform by CxA
16.4.3 CxA to sign off checklist as Approved on commissioning management platform
16.4.4 Red tag applied to the equipment and signed by CxA

**HV / MV Main Panels L2A Commissioning – Yellow Tag**

### 16.5 HV/MV Panels Level 2B Yellow Tag Pre-Requisites

The following tests and checks to be undertaken contractor and verified by CxA prior to continuing to Level 3, with appropriate documentation provided

(All below prerequisites MUST be available prior to commencing yellow tag)

16.5.1 Verify red tag has been applied to the equipment and signed off by the CxA.
16.5.2 Verify yellow tag has been applied to the BTU and signed off by the CxA.
16.5.3 Verify yellow tag has been applied to the HV/MV earthing system and signed off by the CxA.
16.5.4 Verify the Cx level 3 start-up/pre functional testing method statement and risk assessment (RAMS) have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
16.5.5 Verify electrical protection study is approved and uploaded to Equinix document control platform by the EOR and approved by the Equinix Design Manager.
16.5.6 Verify the ARC flash study is approved and uploaded to Equinix document control platform by the EOR and approved by the Equinix Design Manager
16.5.7 Verify key interlocking scheme is uploaded to Equinix document control platform by the vendor and approved by the EOR.
16.5.8 Confirm As-Built documentation (if applicable) have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
16.5.9 Verify approved DCOS/BMS & automation points lists have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
16.5.10 GC to compile a test pack in line with Equinix document matrix (refer to document matrix section XX).

### 16.6 HV/MV Panels Level 2B Yellow Tag Physical Checks

16.6.1 Confirm earthing systems comply with Equinix Global Design Standards and/or design drawings.
16.6.2 Confirm power cables have been dead tested (refer to section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA
16.6.3 Confirm control/monitoring cables have been dead tested (refer to section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA
16.6.4 Confirm control/monitoring cables have been point to point tested, signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA
16.6.5 Confirm all cables are identified with permanent labels, soundly fixed (glands/cable ties/cleats) identifying source, load, size & type as per the project specification provided by the EOR
16.6.6 Verify all cable connections pull test & tightness test is found satisfactory
16.6.7 Verify all connections are torqued correctly (if applicable) and double marked.
16.6.8 Confirm all trunking covers and equipment terminal/protection covers are in place and secured.
16.6.9 Confirm supply breaker/fuse has an equal or greater current capacity than the incoming breaker/fuse of the distribution board.
16.6.10 Confirm all protection settings are set for the equipment as per approved protection study.
16.6.11 Confirm cable entry box (if applicable) is installed as per approved design drawings, manufactures specifications, and approved technical submittals
16.6.12 Confirm PTW/LOTO procedures are implemented correctly by the GC's approved SAP/AP
16.6.13 Confirm all equipment labelling and circuit identification is present and correct
16.6.14 Confirm Construction clean of room and of equipment
16.6.15 Cx level 2B equipment static testing MUST consist of as a minimum:
16.6.16 Continuity & polarity test
16.6.17 Low OHM resistance testing of all connections (contact resistance test)
16.6.18 Insulation resistance measurement (before and after HV pressure test).
16.6.19 High voltage pressure/dielectric test.
16.6.20 CT magnetisation curves certification to be included in FWT/FAT/QAQC reports
16.6.21 (if not, this needs to be done on site).
16.6.22 CT and VT Insulation resistance tests
16.6.23 CT and VT ratio and polarity tests by primary injection
16.6.24 Verification of mechanical operation.
16.6.25 Prove safety interlocks (mechanical and electrical)
16.6.26 Verify Insulation resistance tests of AC & DC control and protection internal control cables (if applicable).
16.6.27 Confirm primary & secondary injection protection scheme testing of all breakers/relays (if applicable) and security seal along with protection settings label applied by CxA
16.6.28 Verify HMI mimic and operation
16.6.29 Verify firmware/software revisions meet Equinix global design standards
16.6.30 Confirm interface with DNO is complete (if applicable)

### 16.7 HV/MV Panels Level 2B Documents Required:

(All documents **MUST** be available prior to sign off red tag)
16.7.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 16.8 HV/MV Panel Yellow Tag Sign Off:

16.8.1 All required documentation is uploaded to the Equinix document control platform by GC or Vendor.
16.8.2 All required documentation is uploaded to commissioning management platform by CxA.
16.8.3 CxA to sign off checklist as Approved on commissioning management platform.
16.8.4 Red tag applied to the equipment and signed by CxA.

## HV / MV Main Panels L3 Commissioning – Green Tag

### 16.9 HV/MV Panels Green Tag Pre-Requisites

(All below prerequisites **MUST** be available prior to commencing green tag)
16.9.1 Verify yellow tag has been applied to the HV/MV equipment and signed by the CxA.
16.9.2 Verify green tag has been applied to the automation system and signed off by the CxA.
16.9.3 Verify the Cx level 4 functional & performance test script have been uploaded to Equinix commissioning management platform by CxA.
16.9.4 Verify switching schedule and energisation plan is implemented by the GC's approved SAP/AP.
16.9.5 Verify approved SOO have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
16.9.6 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
16.9.7 GC to compile a test pack in line with Equinix document matrix.

### 16.10 HV/MV Panel Physical Checks

16.10.1 Confirm LOTO procedures are implemented correctly by the GC's approved SAP/AP.
16.10.2 Verify metering accuracy
16.10.3 Verify protection relays readings
16.10.4 Verify HMI mimic readings
16.10.5 Verify 100% of automation graphics
16.10.6 Verify vendor Cx level 3 start-up/pre-functional testing has been carried out as per the vendors Cx level 3 start-up/pre functional method statement approved by the CxA.
16.10.7 Verify Cx level 3 start-up/pre-functional testing has been carried out as per the Equinix approved checklist
16.10.8 Confirm all vendor Cx level 3 checks/tests are complete and all documentation has been uploaded to Equinix document control platform by the vendor and approved by the CxA.

### 16.11 HV/MV Panel Documents Required

(All documents **MUST** be available prior to commencing yellow tag)

16.11.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### HV/MV Panel Green tag Sign off

16.11.2 All required documentation is uploaded to commissioning management platform by CxA. (refer to section XX documentation matrix)
16.11.3 CxA to sign off checklist as Approved on commissioning management platform.
16.11.4 Green tag applied to the equipment and signed by CxA.

## HV / MV Main Panels L4 Commissioning – Blue Tag

The following tests and checks to be undertaken contractor and verified by CxA prior to continuing to L5, with appropriate documentation provided. All testing carried out with max available load (load banks connected plus building load)

### 16.12 HV / MV Main Panels Prerequisites:

(All below prerequisites **MUST** be available prior to commencing blue tag)

16.12.1 Verify green tag has been applied to the HV/MV equipment and signed off by the CxA.
16.12.2 Verify green tag has been applied to the BTU and signed off by the CxA.
16.12.3 Verify green tag has been applied to the automation system and signed off by the CxA.
16.12.4 Verify green tag has been applied to the generator and signed off by the CxA.
16.12.5 Verify all related P1 Cx issues are closed on the IRL
16.12.6 Confirm DCOS/BMS verifications are complete and alarm free

### 16.13 HV/MV Panel Physical Checks

16.13.1 Verify green tag has been applied to the BTU and signed off by the CxA
16.13.2 Verify green tag has been applied to the automation system and signed off by the CxA.
16.13.3 Verify green tag has been applied to the generator and signed off by the CxA.
16.13.4 Verify all related P1 & P2 Cx issues are closed on the IRL
16.13.5 Confirm DCOS/BMS verifications are complete and alarm free
16.13.6 Verify 100% functional testing of automation/system controls as per SOO including all maintenance scenarios, load bank scenarios, failure scenarios and interlocking.
16.13.7 Verify full power block shutdowns and isolation scenarios including circuits earths
16.13.8 Verify all automation/system controls redundancy by means of testing
16.13.9 Verify all automation/system controls redundancy by means of testing

### 16.14 HV/MV Panel Documents Required:

(All documents **MUST** be available prior to sign off tag)

16.14.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 16.15 Sign off:

16.15.1 All required documentation is uploaded to commissioning management platform by CxA. (refer to section XX documentation matrix)
16.15.2 CxA to sign off checklist as Approved on commissioning management platform.
16.15.3 Blue tag applied to the equipment and signed by CxA.

## 17 HV/MV/LV/Earthing Transformers (Cast resin)

## HV/MV/LV Earthing Transformers (Cast Resin) Level 2A Red Tag

All below prerequisites MUST be complete prior to commencing red tag)

### 17.1 Cast Resin Transformer L2A Pre-Requisites

(All below prerequisites **MUST** be complete prior to commencing red tag)

17.1.1 Verify the technical submittals and as built drawings have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
17.1.2 Verify the shop drawings have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
17.1.3 Verify the cable schedules/cable interface schedules have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
17.1.4 Verify the DCOS/BMS points list have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
17.1.5 Verify the FAT/FWT documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA. Any issues raised in FAT/FWT have been addressed. (Routine FAT QAQC documentation acceptable where FWT testing has not been procured).
17.1.6 Verify the electrical protection study is approved and have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
17.1.7 Verify the Cx level 2B static testing method statement and risk assessment (RAMS) have been uploaded to Equinix document control platform by the GC/vendor and approved by the CxA.
17.1.8 Verify the material delivery receipt has been uploaded to Equinix document control platform by the GC, GC to identify upon kerbside delivery any defects/damages during transit.
17.1.9 GC to compile a test pack in line with Equinix document matrix (refer to document matrix section XX).

### 17.2 Cast Resin Transformer L2A Physical checks:

17.2.1 Confirm all deficiencies/comments from FWT/FAT have been closed.
17.2.2 Confirm room/area condition is acceptable as per the Equinix room readiness checklist.
17.2.3 Confirm equipment has been installed/positioned as per approved design drawings, manufactures specifications and approved technical submittals
17.2.4 Confirm the unit is correct dimensionally, handed correctly and accessible for operation and maintenance as per local code.
17.2.5 Confirm the equipment has the correct ratings, components, protective devices, interlocks (if applicable) as per approved design drawings, manufactures specifications and approved technical submittals
17.2.6 Confirm all gland plates are correct as per the approved technical submittals
17.2.7 Confirm appropriate warning/safety labels are in place.

17.2.8 Confirm all device labelling is correct as per approved Equinix naming convention.
17.2.9 Confirm no damage has occurred in transit and all transit bolts, wedges etc. have been removed.
17.2.10 Carry out all external and internal quality checks of the equipment.
17.2.11 Confirm equipment IPXX ratings are correct as per the approved technical submittals
17.2.12 Confirm network interface card for TMU has been supplied as per the approved technical submittals
17.2.13 Confirm interlocking is present (if applicable)
17.2.14 Confirm transformer enclosure/cage clearances meet local code
17.2.15 Confirm system and equipment grounding installation is as per the approved design drawings and the approved technical submittals
17.2.16 Record all equipment details as per the Equinix provided template on the equipment parameter list within commissioning management platform.
17.2.17 Verify Cx level 2A Installation and QAQC inspection checklist has been carried out as per the Equinix approved checklist.

### 17.3 Cast Resin Transformer L2A Documents Required:

(All documents **MUST** be complete prior to commencing yellow tag)
17.3.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 17.4 Cast Resin Transformer L2A Sign Off:

17.4.1 All required documentation is uploaded to the Equinix document control platform by GC or Vendor.
17.4.2 All required documentation is uploaded to commissioning management platform by CxA.
17.4.3 CxA to sign off checklist as Approved on commissioning management platform.
17.4.4 Red tag applied to the equipment and signed by CxA

## HV/MV/LV Earthing Transformers (Cast Resin) Level 2B Yellow Tag

The following tests and checks to be undertaken by Equipment Vendor / contractor and verified by CxA prior prior to continuing to L3, with appropriate paperwork provided

### 17.1 Cast Resin Transformer L2B Pre-Requisites

(All below prerequisites MUST be complete prior to commencing yellow tag)
17.1.1 Verify red tag has been applied to the equipment and signed off by the CxA.
17.1.2 Verify yellow tag has been applied to the HV/MV earthing system and signed off by the CxA.
17.1.3 Verify yellow tag has been applied to the MV/LV switchgear and signed off by the CxA.

17.1.4 Verify the Cx level 3 start-up/pre functional testing method statement and risk assessment (RAMS) have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
Verify electrical protection study is approved and uploaded to Equinix document control platform by the EOR and approved by the Equinix Design Manager.
17.1.5 Verify the ARC flash study is approved and uploaded to Equinix document control platform by the EOR and approved by the Equinix Design Manager
17.1.6 Verify key interlocking scheme is uploaded to Equinix document control platform by the vendor and approved by the EOR.
17.1.7 Confirm As-Built documentation (if applicable) have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
17.1.8 Verify approved DCOS/BMS & automation points lists have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
17.1.9 GC to compile a test pack in line with Equinix document matrix (refer to document matrix section XX).

### 17.2 Cast Resin Transformer L2B Physical checks:

17.2.1 Confirm earthing systems comply with Equinix Global Design Standards and/or design drawings.
17.2.2 Confirm power cables have been dead tested (refer to section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
17.2.3 Confirm busduct have been dead tested (refer to busduct section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
17.2.4 Confirm control/monitoring cables have been dead tested (refer to section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
17.2.5 Confirm control/monitoring cables have been point to point tested, signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA
17.2.6 Confirm all power cables and control/monitoring cabling identification are present as per approved cable schedule and cable interfacing schedule.
17.2.7 Confirm all cables are identified with permanent labels, soundly fixed (glands/cable ties/cleats) identifying source, load, size & type as per the project specification provided by the EOR.
17.2.8 Verify all cable connections pull test & tightness test is found satisfactory
17.2.9 Verify all connections are torqued correctly (if applicable) and double marked
17.2.10 Confirm all trunking covers and equipment terminal/protection covers are in place and secured.
17.2.11 Confirm all protection settings are set for the equipment as per approved protection study.
17.2.12 Confirm PTW/LOTO procedures are implemented correctly by the GC's approved SAP/AP.
17.2.13 Confirm all equipment labelling and circuit identification is present and correct
17.2.14 Construction clean of room and of equipment

17.2.15 Cx level 2B equipment static testing **MUST** consist of as a minimum:

- High voltage pressure/dielectric tests (Insulation resistance test HV-MV, MV-LV & LV-Ground) Record tap selection

17.2.16 Prove transformer temperature monitoring unit (TMU) settings and operation including inter tripping
17.2.17 Prove restrictive earth fault (REF) operation (if applicable)
17.2.18 Prove safety interlocks operation (if applicable)
17.2.19 Confirm transformer room cooling/ventilation is ready for service
17.2.20 Conduct a White Glove Inspection to ensure equipment is clean and free of debris or foreign materials and the appropriate protection is in place prior to energisation.
17.2.21 Verify vendor Cx level 2B static testing has been carried out as per the vendors Cx level 2B static testing method statement approved by the CxA.
17.2.22 Verify Cx level 2B static testing has been carried out as per the Equinix approved checklist
17.2.23 Confirm all vendor Cx level 2B checks/tests are complete and all documentation has been uploaded to Equinix document control platform by the vendor and approved by the CxA.

### 17.3 Cast Resin Transformer Documents Required:

(All documents **MUST** be complete prior to commencing yellow tag)
17.3.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by CxA

### 17.4 Cast Resin Transformer L2B Sign Off:

17.4.1 All required documentation is uploaded to the Equinix document control platform by GC or Vendor.
17.4.2 All required documentation is uploaded to commissioning management platform by CxA.
17.4.3 CxA to sign off checklist as Approved on commissioning management platform.
17.4.4 Yellow tag applied to the equipment and signed by CxA

## HV/MV/LV Earthing Transformers (Cast Resin) Level 23 Green Tag

The following tests and checks to be undertaken by Equipment Vendor / contractor and verified by CxA prior to continuing to L3, with appropriate paperwork provided

### 17.5 Cast Resin Transformer L3 Pre-Requisites

(All below prerequisites **MUST** be available prior to commencing green tag)
17.5.1 Verify the Cx level 4 functional test script have been uploaded to Equinix commissioning management platform by CxA.
17.5.2 Verify switching schedule and energisation plan is implemented by the GC's approved SAP/AP.
17.5.3 Verify all related test reports are complete, signed and uploaded to Equinix document control platform and approved by the CxA.
17.5.4 GC to compile a test pack in line with Equinix document matrix.

### 17.6 Cast Resin Transformer L3 Physical Checks:

17.6.1 Confirm LOTO procedures are implemented correctly by the GC's approved SAP/AP.
17.6.2 Verify transformer temperature alarms and trip points including transformer fan operation (if applicable)
17.6.3 Verify and record transformer secondary off load voltages as per Equinix global design standards
17.6.4 Verify safety interlocks operation (if applicable)
17.6.5 Verify transformer room cooling/ventilation is operational
17.6.6 Bucholtz alarm simulation (if applicable).
17.6.7 PTemperature and/or pressure devices alarms and trips to HV/MV protection and to SCADA, DCOS (if applicable).
17.6.8 PCheck oil containment measures (if applicable)
17.6.9 Confirm DCOS/BMS point to graphic testing is complete, signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA
17.6.10 Verify vendor Cx level 3 start-up/pre-functional testing has been carried out as per the vendors Cx level 3 start-up/pre functional method statement approved by the CxA.
17.6.11 Verify Cx level 3 start-up/pre-functional testing has been carried out as per the Equinix approved checklist
17.6.12 Confirm all vendor Cx level 3 checks/tests are complete and all documentation has been uploaded to Equinix document control platform by the vendor and approved by the CxA.

### 17.7 Cast Resin Transformer L3 Documents Required:

(All documents **MUST** be available prior to commencing yellow tag)

17.7.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 17.8 Cast Resin Transformer L3 Sign off:

17.8.1 All required documentation is uploaded to commissioning management platform by CxA. (refer to section XX documentation matrix)
17.8.2 CxA to sign off checklist as Approved on commissioning management platform.
17.8.3 Green tag applied to the equipment and signed by CxA.

## HV/MV/LV Earthing Transformers (Cast Resin) Level 4 Blue Tag

The following tests and checks to be undertaken contractor and verified by CxA prior to continuing to L5, with appropriate documentation provided. All testing carried out with max available load (load banks connected plus building load)

### 17.9 Cast Resin Transformer Prerequisites:

(All below prerequisites **MUST** be available prior to commencing blue tag)

17.9.1 Verify 100% load is available
17.9.2 Verify all related P1 Cx issues are closed on the IRL
17.9.3 Confirm DCOS/BMS verifications are complete and alarm free

### 17.10 Cast Resin Transformer Physical checks:

17.10.1 100% load test of transformer for a duration of 4 hours
17.10.2 Verify and record transformer secondary on load voltages as per Equinix global design standards
17.10.3 Verify transformer temperature monitoring unit (TMU) operation on load
17.10.4 Verify transformer room cooling/ventilation systems are maintaining room temperatures as per Equinix global design standards

### 17.11 Cast Resin Transformer Documents Required:

(All documents **MUST** be available prior to commencing yellow tag)

17.11.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 17.12 Cast Resin Transformer Sign off:

17.12.1 All required documentation is uploaded to commissioning management platform by CxA. (refer to section XX documentation matrix)
17.12.2 CxA to sign off checklist as Approved on commissioning management platform.
17.12.3 Blue tag applied to the equipment and signed by CxA

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# 18 HV/MV/LV/Earthing Transformers (Oil Filled)

## HV/MV/LV Earthing Transformers (Oil Filled) Level 2A Red Tag

The following tests and checks to be undertaken by Equipment Vendor / contractor and verified by CxA prior to continuing to Yellow Tag, with appropriate documentation provided.

### 18.1 Oil Filled Transformer L2A Prerequisites:

(All below prerequisites **MUST** be complete prior to commencing red tag)

18.1.1 Verify the technical submittals and as built drawings have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
18.1.2 Verify the shop drawings have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
18.1.3 Verify the cable schedules/cable interface schedules have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
18.1.4 Verify the DCOS/BMS points list have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
18.1.5 Verify the FAT/FWT documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA. Any issues raised in FAT/FWT have been addressed. (Routine FAT QAQC documentation acceptable where FWT testing has not been procured).
18.1.6 Verify the electrical protection study is approved and have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
18.1.7 Verify the Cx level 2B static testing method statement and risk assessment (RAMS) have been uploaded to Equinix document control platform by the GC/vendor and approved by the CxA.
18.1.8 Verify the material delivery receipt has been uploaded to Equinix document control platform by the GC, GC to identify upon kerbside delivery any defects/damages during transit.
18.1.9 GC to compile a test pack in line with Equinix document matrix (refer to document matrix section XX).

### 18.2 Oil Filled Transformer L2A Physical checks:

18.2.1 Confirm all deficiencies/comments from FWT/FAT have been closed.
18.2.2 Confirm room/area condition is acceptable as per the Equinix room readiness checklist.
18.2.3 Confirm equipment has been installed/positioned as per approved design drawings, manufactures specifications and approved technical submittals
18.2.4 Confirm the unit is correct dimensionally, handed correctly and accessible for operation and maintenance as per local code.
18.2.5 Confirm the equipment has the correct ratings, components, protective devices, interlocks (if applicable) as per approved design drawings, manufactures specifications and approved technical submittals
18.2.6 Confirm antivibration pads are correct as per the approved technical submittals) if applicable)
18.2.7 Confirm all gland plates are correct as per the approved technical submittals
18.2.8 Confirm appropriate warning/safety labels are in place.
18.2.9 Confirm all device labelling is correct as per approved Equinix naming convention.
18.2.10 Confirm no damage has occurred in transit and all transit bolts, wedges etc. have been removed.
18.2.11 Carry out all external and internal quality checks of the equipment.

18.2.12 Confirm equipment IPXX ratings are correct as per the approved technical submittals
18.2.13 Confirm network interface card has been supplied as per the approved technical submittals
18.2.14 Confirm interlocking is present (if applicable)
18.2.15 Confirm transformer enclosure/cage clearances meet local code
18.2.16 Confirm system and equipment grounding installation is as per the approved design drawings and the approved technical submittals
18.2.17 Record all equipment details as per the Equinix provided template on the equipment parameter list within commissioning management platform.
18.2.18 Verify Cx level 2A Installation and QAQC inspection checklist has been carried out as per the Equinix approved checklist.

### 18.3 Oil Filled Transformer Documents Required:

(All documents **MUST** be complete prior to commencing yellow tag)

18.3.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 18.4 Oil Filled Transformer L2A Sign Off:

18.4.1 All required documentation is uploaded to the Equinix document control platform by GC or Vendor.
18.4.2 All required documentation is uploaded to commissioning management platform by CxA.
18.4.3 CxA to sign off checklist as Approved on commissioning management platform.
18.4.4 Red tag applied to the equipment and signed by CxA.

## HV/MV/LV Earthing Transformers (Oil Filled) Level 2B Yellow Tag

The following tests and checks to be undertaken by Equipment Vendor / contractor and verified by CxA prior to continuing to Yellow Tag, with appropriate documentation provided.

### 18.5 Oil Filled Transformer L2B Prerequisites:

(All below prerequisites **MUST** be complete prior to commencing yellow tag)

18.5.1 Verify red tag has been applied to the equipment and signed off by the CxA.
18.5.2 Verify yellow tag has been applied to the HV/MV earthing system and signed off by the CxA.
18.5.3 Verify yellow tag has been applied to the MV/LV switchgear and signed off by the CxA.
18.5.4 Verify the Cx level 3 start-up/pre functional testing method statement and risk assessment (RAMS) have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
18.5.5 Verify electrical protection study is approved and uploaded to Equinix document control platform by the EOR and approved by the Equinix Design Manager.
18.5.6 Verify the ARC flash study is approved and uploaded to Equinix document control platform by the EOR and approved by the Equinix Design Manager
18.5.7 Verify key interlocking scheme is uploaded to Equinix document control platform by the vendor and approved by the EOR.
18.5.8 Confirm As-Built documentation (if applicable) have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
18.5.9 Verify approved DCOS/BMS & automation points lists have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
18.5.10 GC to compile a test pack in line with Equinix document matrix (refer to document matrix section XX).

### 18.6 Oil Filled Transformer L2B Physical checks:

18.6.1 Confirm earthing systems comply with Equinix Global Design Standards and/or design drawings.
18.6.2 Confirm power cables have been dead tested (refer to section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
18.6.3 Confirm busduct have been dead tested (refer to busduct section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
18.6.4 Confirm control/monitoring cables have been dead tested (refer to section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
18.6.5 Confirm control/monitoring cables have been point to point tested, signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA
18.6.6 Confirm all power cables and control/monitoring cabling identification are present as per approved cable schedule and cable interfacing schedule.
18.6.7 Confirm all cables are identified with permanent labels, soundly fixed (glands/cable ties/cleats) identifying source, load, size & type as per the project specification provided by the EOR.
18.6.8 Verify all cable connections pull test & tightness test is found satisfactory
18.6.9 Verify all connections are torqued correctly (if applicable) and double marked.
18.6.10 Confirm all trunking covers and equipment terminal/protection covers are in place and secured.
18.6.11 Confirm all protection settings are set for the equipment as per approved protection study.
18.6.12 Confirm PTW/LOTO procedures are implemented correctly by the GC's approved SAP/AP.
18.6.13 Confirm all equipment labelling and circuit identification is present and correct
18.6.14 Construction clean of room and of equipment

18.6.15 Cx level 2B equipment static testing **MUST** consist of as a minimum:
- High voltage pressure/dielectric tests (Insulation resistance test HV-MV, MV-LV & LV-Ground)
- Transformer ratio/vector group test
- CT Ratio and magnetisation curves (if applicable).
- Tangent delta test (if applicable).
- Sweep Frequency Response Analysis (SFRA) for comparison to factory results

18.6.16 Record tap selection
18.6.17 Check oil levels and gauges
18.6.18 Verify over pressure relief/Bucholtz alarm simulation (if applicable)
18.6.19 Check oil containment measures and sump operation (if applicable)
18.6.20 Prove transformer winding and oil temperature monitoring operation including inter tripping (if applicable)
18.6.21 Prove restrictive earth fault (REF) operation (if applicable)
18.6.22 Prove safety interlocks operation (if applicable)
18.6.23 Confirm transformer room cooling/ventilation is ready for service (if applicable)
18.6.24 Conduct a White Glove Inspection to ensure equipment is clean and free of debris or foreign materials and the appropriate protection is in place prior to energisation.
18.6.25 Verify vendor Cx level 2B static testing has been carried out as per the vendors Cx level 2B static testing method statement approved by the CxA.
18.6.26 Verify Cx level 2B static testing has been carried out as per the Equinix approved checklist
18.6.27 Confirm all vendor Cx level 2B checks/tests are complete and all documentation has been uploaded to Equinix document control platform by the vendor and approved by the CxA.

### 18.7 Oil Filled Transformer Documents Required:

(All documents **MUST** be complete prior to commencing Green tag)
18.7.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 18.8 Oil Filled Transformer L2A Sign Off:

18.8.1 All required documentation is uploaded to the Equinix document control platform by GC or Vendor.
18.8.2 All required documentation is uploaded to commissioning management platform by CxA.
18.8.3 CxA to sign off checklist as Approved on commissioning management platform.
18.8.4 Yellow tag applied to the equipment and signed by CxA.

HV/MV/LV Earthing Transformers (Oil Filled) Level 3 Green Tag

The following tests and checks to be undertaken by Equipment Vendor / contractor and verified by CxA prior to continuing to Yellow Tag, with appropriate documentation provided.

### 18.9 Oil Filled Transformer L3 Prerequisites:

(All below prerequisites **MUST** be available prior to commencing green tag)

18.9.1 Verify the Cx level 4 functional & performance test script have been uploaded to Equinix commissioning management platform by CxA.
18.9.2 Verify switching schedule and energisation plan is implemented by the GC's approved SAP/AP.
18.9.3 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
18.9.4 GC to compile a test pack in line with Equinix document matrix.

### 18.10 Oil Filled Transformer L3 Physical Checks:

18.10.1 Confirm LOTO procedures are implemented correctly by the GC's approved SAP/AP.
18.10.2 Verify transformer temperature alarms and trips points including transformer fan operation (if applicable)
18.10.3 Verify and record transformer secondary off load voltages as per Equinix global design standards
18.10.4 Check oil levels and samples, verify results as per manufacturers specifications
18.10.5 Verify safety interlocks operation (if applicable)
18.10.6 Verify transformer room cooling/ventilation is operational
18.10.7 Confirm DCOS/BMS point to graphic testing is complete, signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA
18.10.8 Verify vendor Cx level 3 start-up/pre-functional testing has been carried out as per the vendors Cx level 3 start-up/pre functional method statement approved by the CxA.
18.10.9 Verify Cx level 3 start-up/pre-functional testing has been carried out as per the Equinix approved checklist
18.10.10 Confirm all vendor Cx level 3 checks/tests are complete and all documentation has been uploaded to Equinix document control platform by the vendor and approved by the CxA.

### 18.11 Oil Filled Transformer Documents Required:

(All documents MUST be available prior to commencing Blue tag*)*

18.11.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 18.12 Oil Filled Transformer L3 Sign off:

18.12.1 All required documentation is uploaded to commissioning management platform by CxA. (refer to section XX documentation matrix)
18.12.2 CxA to sign off checklist as Approved on commissioning management platform.
18.12.3 Green tag applied to the equipment and signed by CxA.

**HV/MV/LV Earthing Transformers (Oil Filled) Level 4 Blue Tag**

The following tests and checks to be undertaken contractor and verified by CxA prior to continuing to L5, with appropriate documentation provided. All testing carried out with max available load (load banks connected plus building load)

### 18.13 Oil Filled Transformer L4 Prerequisites:

(All below prerequisites **MUST** be available prior to commencing blue tag)

18.13.1 Verify 100% load is available
18.13.2 Verify all related P1 Cx issues are closed on the IRL
18.13.3 Confirm DCOS/BMS verifications are complete and alarm free

### 18.14 Oil Filled Transformer L4 Physical checks:

18.14.1 100% load test of transformer for a duration of 4 hours
18.14.2 Check oil and winding temperatures at 100% load
18.14.3 Verify and record transformer secondary on load voltages as per Equinix global design standards
18.14.4 Verify transformer room cooling/ventilation systems are maintaining room temperatures as per Equinix global design standards (if applicable).

### 18.15 Oil Filled Transformer Documents Required:

*(All documents **MUST** be available prior to commencing Level 5 IST)*

18.15.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 18.16 Oil Filled Transformer L4 Sign off:

18.16.1 All required documentation is uploaded to commissioning management platform by CxA. (refer to section XX documentation matrix)
18.16.2 CxA to sign off checklist as Approved on commissioning management platform.
18.16.3 Blue tag applied to the equipment and signed by CxA.

## 19 MV/LV Generators

MV/LV Generators Level 2A Red Tag

The following tests and checks to be undertaken by Equipment Vendor / contractor and verified by CxA prior to continuing to Yellow Tag, with appropriate documentation provided.

### 19.1 Generator L2A Prerequisites:

(All below documentation **MUST** be available prior to commencing red tag)

19.1.1 Verify the technical submittals and as built drawings have been uploaded to Equinix document control platform and approved by the EOR.
19.1.2 Verify the shop drawings have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
19.1.3 Verify the cable schedules/cable interface schedules have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
19.1.4 Verify the DCOS/BMS & Automation points list have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
19.1.5 Verify the FAT/FWT documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA. Any issues raised in FAT/FWT have been addressed. (Routine FAT QAQC documentation acceptable where FWT testing has not been procured).
19.1.6 Verify the circuit breaker primary injection reports for breakers of *(225A US) & (250A EMEA)* and above have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
19.1.7 Verify the electrical protection study is approved and have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
19.1.8 Verify the Cx level 2B static testing method statement and risk assessment (RAMS) have been uploaded to Equinix document control platform by the GC/vendor and approved by the CxA.
19.1.9 Verify the material delivery receipt has been uploaded to Equinix document control platform by the GC, GC to identify upon kerbside delivery any defects/damages during transit.
19.1.10 GC to compile a test pack in line with Equinix document matrix.

### 19.2 Generator L2A Physical checks:

19.2.1 Confirm all deficiencies/comments from FWT/FAT have been closed.
19.2.2 Confirm room/area condition is acceptable as per the Equinix room readiness checklist.
19.2.3 Confirm equipment has been installed/positioned as per approved design drawings, manufactures specifications and approved technical submittals
19.2.4 Confirm the unit is correct dimensionally, handed correctly and accessible for operation and maintenance as per local code.
19.2.5 Confirm the equipment has the correct ratings, components, protective devices, interlocks (if applicable) as per approved design drawings, manufactures specifications and approved technical submittals
19.2.6 Confirm all gland plates are correct as per the approved technical submittals
19.2.7 Confirm appropriate warning/safety labels are in place.
19.2.8 Confirm all device labelling is correct as per approved Equinix naming convention.
19.2.9 Confirm no damage has occurred in transit and all transit bolts, wedges etc. have been removed.
19.2.10 Carry out all external and internal quality checks of the equipment.
19.2.11 Confirm equipment IPXX ratings are correct as per the approved technical submittals
19.2.12 Confirm network interface card has been supplied as per the approved technical submittals
19.2.13 Confirm system and equipment grounding installation is as per the approved design drawings and the approved technical submittals
19.2.14 Record all equipment details as per the Equinix provided template on the equipment parameter list within commissioning management platform.
19.2.15 Verify Cx level 2A Installation and QAQC inspection has been carried out as per the Equinix approved checklist.

### 19.3 Generator L2A Documents Required:

(All documents **MUST** be available prior to commencing yellow tag)
19.3.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 19.4 Generator L2A Sign Off:

19.4.1 All required documentation is uploaded to the Equinix document control platform by GC or Vendor.
19.4.2 All required documentation is uploaded to commissioning management platform by CxA.
19.4.3 CxA to sign off checklist as Approved on commissioning management platform.
19.4.4 Red tag applied to the equipment and signed by CxA.

**MV/LV Generators Level 2B Yellow Tag**

The following tests and checks to be undertaken by Equipment Vendor / contractor and verified by CxA prior prior to continuing to L3, with appropriate paperwork provided

### 19.5 Generator L2B Prerequisites:

(All below documentation **MUST** be available prior to commencing yellow tag)
19.5.1 Verify red tag has been applied to the equipment and signed off by the CxA.
19.5.2 Verify yellow tag has been applied to the earthing system and signed off by the CxA.
19.5.3 Verify the Cx level 3 start-up/pre functional testing method statement and risk assessment (RAMS) have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
19.5.4 Verify electrical protection study is approved and uploaded to Equinix document control platform by the EOR and approved by the Equinix Design Manager.
19.5.5 Verify the ARC flash study is approved and uploaded to Equinix document control platform by the EOR and approved by the Equinix Design Manager
19.5.6 Verify key interlocking scheme is uploaded to Equinix document control platform by the vendor and approved by the EOR.
19.5.7 Confirm As-Built documentation (if applicable) have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
19.5.8 Confirm local authority environmental permits are secured.
19.5.9 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
19.5.10 GC to compile a test pack in line with Equinix document matrix.

### 19.6 Generator L2B Physical checks:

19.6.1 Confirm earthing systems comply with Equinix Global Design Standards and/or design drawings.
19.6.2 Confirm power cables have been dead tested (refer to section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
19.6.3 Confirm control/monitoring cables have been dead tested (refer to section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
19.6.4 Confirm control/monitoring cables have been point to point tested, signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA
19.6.5 Confirm all power cables and control/monitoring cabling identification are present as per approved cable schedule and cable interfacing schedule.
19.6.6 Confirm ALL cables are identified with permanent labels, soundly fixed (glands/cable ties/cleats) identifying source, load, size & type as per the project specification provided by the EOR.
19.6.7 Verify all cable connections pull test is found satisfactory
19.6.8 Verify all connections are torqued correctly (if applicable) and double marked.
19.6.9 Confirm all trunking covers and equipment terminal/protection covers are in place and secured.

19.6.10 Confirm supply breaker/fuse has an equal or greater current capacity than the incoming breaker/fuse of the distribution board.
19.6.11 Confirm all protection settings are set for the equipment as per approved protection study.
19.6.12 Confirm secondary injection protection testing of all breakers/relays (if applicable) and security seal along with protection settings label applied by CxA.
19.6.13 Confirm fusible link rating of fuel system drop valve
19.6.14 Confirm battery charger supply breaker rating and type
19.6.15 Verify generator day tank (if applicable) fuel level sensors are set as per Equinix approved global design standards.
19.6.16 Confirm generator AUX distribution board Cx level 2B is complete and ready for service.
19.6.17 Confirm generator cooling system (if applicable) is filled and ready for service
19.6.18 Confirm generator emissions system (if applicable) is ready for service
19.6.19 Confirm generator air ventilation system (if applicable) is ready for service
19.6.20 Confirm all cable entry points are sealed and watertight as per approved design drawings, manufactures specifications and approved technical submittals
19.6.21 Confirm cable entry box (if applicable) is installed as per approved design drawings, manufactures specifications and approved technical submittals
19.6.22 Confirm PTW/LOTO procedures are implemented correctly by the GC's approved SAP/AP.
19.6.23 Conduct a White Glove Inspection to ensure equipment is clean and free of debris or foreign materials and the appropriate protection is in place prior to energisation.
19.6.24 Verify vendor Cx level 2B static testing has been carried out as per the vendors Cx level 2B static testing method statement approved by the CxA.
19.6.25 Verify Cx level 2B static testing has been carried out as per the Equinix approved checklist
19.6.26 Confirm all vendor Cx level 2B checks/tests are complete and all documentation has been uploaded to Equinix document control platform by the vendor and approved by the CxA.

### 19.7 Generator L2B Documents Required:

(All documents **MUST** be available prior to commencing yellow tag)
19.7.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 19.8 Generator L2B Sign Off:

19.8.1 All required documentation is uploaded to the Equinix document control platform by GC or Vendor.
19.8.2 All required documentation is uploaded to commissioning management platform by CxA.
19.8.3 CxA to sign off checklist as Approved on commissioning management platform.
19.8.4 Yellow tag applied to the equipment and signed by CxA.

**MV/LV Generators Level 3 Green Tag**

The following tests and checks to be undertaken and verified by contractor prior to continuing to L4, with appropriate documentation provided

### 19.9 Generator L3 Prerequisites:

(All below documentation **MUST** be available prior to commencing green tag)
19.9.1 Verify yellow tag has been applied to the generator and signed by the CxA.
19.9.2 Verify yellow tag has been applied to the fuel system and signed by the CxA.
19.9.3 Verify the Cx level 4 functional & performance test script have been uploaded to Equinix commissioning management platform by CxA.
19.9.4 Confirm CxA load bank strategy is approved by Equinix CxM and incorporated into the Cx plan.
19.9.5 Verify switching schedule and energisation plan is implemented by the GC's approved SAP/AP.
19.9.6 Verify approved SOO have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
19.9.7 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
19.9.8 GC to compile a test pack in line with Equinix document matrix.

### 19.10 Generator L3 Physical Checks:

19.10.1 Confirm LOTO procedures are implemented correctly by the GC's approved SAP/AP.
19.10.2 Confirm supply cables have been live tested (refer to section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
19.10.3 Confirm DCOS/BMS and automation point to graphic testing is complete, signed off and documentation has been uploaded to Equinix document control platform by the vendor and approved by the CxA.
19.10.4 Verify Generator settings comply with latest approved Equinix global design standards
19.10.5 Verify firmware versions for all generator controllers comply with approved Equinix global design standards (if applicable).
19.10.6 Record firmware versions for all generator controllers on checklist within commissioning management platform.
19.10.7 Verify fuel system operation and alarms in accordance with approved SOO and approved Equinix global design standards.
19.10.8 Verify fire alarm system is operational

19.10.9 Take oil and coolant samples before and following completion of commissioning and perform laboratory evaluation to determine the presence of unwanted metals and liquids.\
19.10.10 Verify alternator insulation resistance by polarisation index test
19.10.11 Verify fuel water separator operation
19.10.12 Verify battery and charger system operation, record voltages and confirm all chargers are monitored/generate an alarm
19.10.13 Verify fail to crank test is completed with 3 cranks (10 second cycles), ensure generator starts correctly after resetting fault.
19.10.14 Verify all auxiliary alarms and generator shutdowns
19.10.15 Perform generator load steps as per approved Equinix global design standards recorded via Power Quality Analyser (refer to power quality analyser section XX)

- 0%-25%-0%
- 0%-50%-0%
- 0%-75%-0%
- 0%-100%-0%

19.10.16 Perform generator ISO steps as detailed in the ISO 8528-5 ensuring that the generator meets the G performance class as per project specification, recorded via Power Quality Analyser (refer to power quality analyser section XX)
19.10.17 Perform 4-hour 100% load test the following values should be recorded every 15 minutes, along with Power Quality Analyser capturing power data every minute (refer to power quality analyser section XX)

- Voltage line to line and line to neutral
- Current on L1, L2, L3
- Power kW and KVA.
- Frequency.
- Power Factor.
- Oil pressure.
- Engine hours run.
- Temperatures – ambient, coolant, oil, alternator windings and bearings.
- Fuel rate.

**Note:**
1. 100% generator capacity @ unity PF for standalone generators.
2. 100% generator capacity @ 0.8 PF for synchronised

19.10.18 Perform thermal imaging every 30 minutes during 100% load test (refer to thermal imaging section XX)
19.10.19 Verify vibration during 100% load test.
19.10.20 Verify generator noise levels comply with local code (if applicable)
19.10.21 Verify that backpressure at full-rated load is within the manufacturer's written allowable limits for the diesel engine.
19.10.22 Verify generator emissions system correct operation and emissions levels comply with local code (if applicable)
19.10.23 Hot Swapping of fuel filter while the generator is running at full load if the functionality is provided.
19.10.24 Verify vendor Cx level 3 start-up/pre-functional testing has been carried out as per the vendors Cx level 3 start-up/pre functional method statement approved by the CxA.
19.10.25 Verify Cx level 3 start-up/pre-functional testing has been carried out as per the Equinix approved checklist
19.10.26 Confirm all vendor Cx level 3 checks/tests are complete and all documentation has been uploaded to Equinix document control platform by the vendor and approved by the CxA.

### 19.11 Generator L3 Documents Required:

(All documents **MUST** be available prior to commencing yellow tag)
19.11.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 19.12 Generator L3 Sign off:

19.12.1 All required documentation is uploaded to commissioning management platform by CxA. (refer to section XX documentation matrix)
19.12.2 CxA to sign off checklist as Approved on commissioning management platform.
19.12.3 Green tag applied to the equipment and signed by CxA.

## MV/LV Generators Level 4 Blue Tag

The following tests and checks to be undertaken contractor and verified by CxA prior to continuing to L5, with appropriate documentation provided. All testing carried out with max available load (load banks connected plus building load)

### 19.13 Generator L4 Prerequisites:

(All below documentation **MUST** be available prior to commencing blue tag)

19.13.1 Verify green tag has been applied to the generator and signed off by the CxA.
19.13.2 Verify green tag has been applied to the relevant switchboards and signed off by the CxA.
19.13.3 Verify green tag has been applied to the fuel system and signed off by the CxA.
19.13.4 Verify green tag has been applied to the automation system and signed off by the CxA.
19.13.5 Verify all related P1 Cx issues are closed on the IRL
19.13.6 Confirm DCOS/BMS verifications are complete and alarm free

### 19.14 Generator L4 Physical checks:

19.14.1 Verify 100% functional testing of automation/system controls as per SOO including all maintenance scenarios, load bank scenarios, failure scenarios and interlocking.
19.14.2 Verify full power block shutdowns and isolation scenarios including circuits earths.
19.14.3 Verify all automation/system controls redundancy by means of testing
19.14.4 Verify communication network redundancy failures
19.14.5 Verify fuel system is operational
19.14.6 Verify generator performance during UPS transient load steps
19.14.7 Verify generator load sharing, phasing and load steps (if applicable)

### 19.15 Generator L4 Documents Required:

(All documents **MUST** be available prior to commencing yellow tag)
19.15.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 19.16 Generator L4 Sign off:

19.16.1 All required documentation is uploaded to commissioning management platform by CxA. (refer to section XX documentation matrix)
19.16.2 CxA to sign off checklist as Approved on commissioning management platform.
19.16.3 Blue tag applied to the equipment and signed by CxA.

## 20 NER Switchboard

**NER Switchboard Level 2A Red Tag**

The following tests and checks to be undertaken by Equipment Vendor / contractor and verified by CxA prior to continuing to Yellow Tag, with appropriate documentation provided.

### 20.1 NER Switchboard L2A Prerequisites:

(All below prerequisites **MUST** be available prior to commencing red tag)
20.1.1 Verify the technical submittals and as built drawings have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
20.1.2 Verify the shop drawings have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
20.1.3 Verify the cable schedules/cable interface schedules have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
20.1.4 Verify the DCOS/BMS points list have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
20.1.5 Verify the FAT/FWT documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA. Any issues raised in FAT/FWT have been addressed. (Routine FAT QAQC documentation acceptable where FWT testing has not been procured).
20.1.6 Verify the electrical protection study is approved and have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
20.1.7 Verify the Cx level 2B static testing method statement and risk assessment (RAMS) have been uploaded to Equinix document control platform by the GC/vendor and approved by the CxA.
20.1.8 Verify the material delivery receipt has been uploaded to Equinix document control platform by the GC, GC to identify upon kerbside delivery any defects/damages during transit.
20.1.9 GC to compile a test pack in line with Equinix document matrix (refer to document matrix section XX).

### 20.2 NER Switchboard L2A Physical Checks:

20.2.1 Visual inspection of switchboard and ancillary – ensure no transit damage on arrival
20.2.2 Verify equipment has been installed / positioned as per approved shop drawings
20.2.3 Visual inspection of generator, including alternator (Confirming alternator class rating)
20.2.4 Factory Testing documentation is available, Issues raised have been addressed (QA documentation acceptable where FAT testing has not been procured)
20.2.5 Prove earth connections meet global standard details (reference EES-5)
20.2.6 Vendor Dead testing method statement is submitted and approved
20.2.7 Interface Schedule has been submitted & approved
20.2.8 Cable Schedule has been submitted and approved
20.2.9 Calibration certificates used to carry out the tests are uploaded to Equinix document control
20.2.10 Confirm all device labelling is correct as per site labelling schedule
20.2.11 Confirm the correct equipment as per design specification has been delivered and record nameplate information. Check serial numbers and other identification and appropriate warning labels are in place.
20.2.12 Confirm no damage has occurred in transit and all transit bolts, wedges etc. have been removed
20.2.13 Confirm the unit is correct dimensionally
20.2.14 Confirm the unit is handed correctly
20.2.15 Confirm equipment has been Installed/ positioned as per approved design drawings
20.2.16 Check no debris or foreign materials have entered the equipment
20.2.17 Confirm all necessary cabling is correctly glanded to ensure the characteristics of the enclosure (e.g. IP56) which the cable enters can be maintained adequately.
20.2.18 Confirm all cabling has appropriate strain relief in place.
20.2.19 Confirm the correct BMS interface card has been supplied
20.2.20 Confirm system and equipment grounding installation is per approved Equinix grounding installation drawing
20.2.21 Check no debris or foreign materials have entered the equipment

### 20.3 NER Switchboard L2A Documents Required:

(All documents **MUST** be available prior to commencing yellow tag)
Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 20.4 NER Switchboard L2A Sign Off:

20.4.1 All required documentation is uploaded to the Equinix document control platform by GC or Vendor.
20.4.2 All required documentation is uploaded to commissioning management platform by CxA.
20.4.3 CxA to sign off checklist as Approved on commissioning management platform.
20.4.4 Yellow tag applied to the equipment and signed by CxA.

## NER Switchboard Level 2B Yellow Tag

The following tests and checks to be undertaken contractor and verified by CxA prior to continuing to Level 3, with appropriate documentation provided

### 20.5 NER Switchboard Level 2B Prerequisites:

(All below prerequisites **MUST** be available prior to commencing yellow tag)
20.5.1 Verify red tag has been applied to the equipment and signed off by the CxA.
20.5.2 Verify the Cx level 3 start-up/pre functional testing method statement and risk assessment (RAMS) have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
20.5.3 Verify electrical protection study is approved and uploaded to Equinix document control platform by the EOR and approved by the Equinix Design Manager.
20.5.4 Verify the ARC flash study is approved and uploaded to Equinix document control platform by the EOR and approved by the Equinix Design Manager
20.5.5 Confirm As-Built documentation (if applicable) have been uploaded to Equinix document control platform and approved by the EOR.
20.5.6 Verify approved DCOS/BMS & automation points lists have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
20.5.7 GC to compile a test pack in line with Equinix document matrix (refer to document matrix section XX).

### 20.6 NER Switchboard L2B Physical Checks:

20.6.1 Verify protection settings meet latest discrimination study
20.6.2 Low OHM resistance tests of joints
20.6.3 Verify cable connections are torqued correctly and marked
20.6.4 Prove earth connections meet global standard details (reference EES-5, Ref Section 4.8 Earthing Systems)
20.6.5 Earth connection for Star point, good bare metal contact between lug and chassis bond point
20.6.6 Insulation resistance
20.6.7 OHM measurement of resistor
20.6.8 Factory QA/QC documentation
20.6.9 Continuity checks and contact resistance
20.6.10 Secondary wiring tightness checks
20.6.11 Continuity checks and contact resistance
20.6.12 Yellow tag applied to the equipment and signed, recorded accordingly

### 20.7 NER Switchboard L2B Documents Required:

(All documents **MUST** be available prior to commencing yellow tag)
20.7.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 20.8 NER Switchboard L2B Sign Off:

20.8.1 Verify all related test reports are complete, signed and uploaded to Equinix document control platform and approved by the CxA
20.8.2 All required documentation is uploaded to commissioning management platform by CxA
20.8.3 CxA to sign off checklist as Approved on commissioning management platform

**NER Switchboard Level 3 Green Tag**

### 20.9 NER Switchboard L3 Prerequisites:

(All below prerequisites **MUST** be available prior to commencing green tag)

20.9.1 Verify yellow tag has been applied to the equipment and signed by the CxA.
20.9.2 Verify switching schedule and energisation plan is implemented by the GC's approved SAP/AP.
20.9.3 Verify approved SOO have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
20.9.4 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
20.9.5 GC to compile a test pack in line with Equinix document matrix

### 20.10 NER Switchboard L3 Physical Checks

20.10.1 CT Ratio and magnetisation curve
20.10.2 Protection relay secondary injection
20.10.3 Mechanical checks
20.10.4 Interlocking proven (electrical and mechanical)
20.10.5 Functional testing (manual and automatic)
20.10.6 SCADA / EMS Monitoring Points & Metering Verification
20.10.7 Green tag applied to the equipment and signed, recorded accordingly

### 20.11 NER Switchboard L3 Documents Required:

20.11.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by

**NER Switchboard Level 4 Blue Tag**

Refer to Generator blue Tag

## 21 SCADA Control System

The following tests and checks to be undertaken by Equipment Vendor / contractor and verified by CxA prior to continuing to Yellow Tag, with appropriate documentation provided

**SCADA Control Level 2A Red Tag**

### 21.1 SCADA Control L2A Prerequisites:

(All below prerequisites **MUST** be available prior to commencing red tag)

21.1.1 Verify the technical submittals and as built drawings have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
21.1.2 Verify the shop drawings have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
21.1.3 Verify the cable schedules/cable interface schedules have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
21.1.4 Verify the DCOS/BMS points list have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
21.1.5 Verify the SFAT documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA. Any issues raised in SFAT have been addressed.
21.1.6 Verify the Cx level 2B static testing method statement and risk assessment (RAMS) have been uploaded to Equinix document control platform by the GC/vendor and approved by the CxA.
21.1.7 Verify the material delivery receipt has been uploaded to Equinix document control platform by the GC, GC to identify upon kerbside delivery any defects/damages during transit.
21.1.8 GC to compile a test pack in line with Equinix document matrix (refer to document matrix section XX).

### 21.2 SCADA Control L2A Control Physical checks:

21.2.1 Confirm all deficiencies/comments from SFAT have been closed.
21.2.2 Confirm room/area condition is acceptable as per the Equinix room readiness checklist.
21.2.3 Confirm equipment has been installed/positioned as per approved design drawings, manufactures specifications and approved technical submittals
21.2.4 Confirm the unit is correct dimensionally, handed correctly and accessible for operation and maintenance as per local code.
21.2.5 Confirm the equipment has the correct ratings, components, protective devices, interlocks (if applicable) as per approved design drawings, manufactures specifications and approved technical submittals
21.2.6 Confirm all gland plates are correct as per the approved technical submittals
21.2.7 Confirm appropriate warning/safety labels are in place.
21.2.8 Confirm all device labelling is correct as per approved Equinix naming convention.
21.2.9 Confirm no damage has occurred in transit and all transit bolts, wedges etc. have been removed.
21.2.10 Carry out all external and internal quality checks of the equipment.
21.2.11 Confirm equipment IPXX ratings are correct as per the approved technical submittals
21.2.12 Confirm network interface card has been supplied as per the approved technical submittals
21.2.13 Confirm system and equipment grounding installation is as per the approved design drawings and the approved technical submittals
21.2.14 Record all equipment details as per the Equinix provided template on the equipment parameter list within commissioning management platform.
21.2.15 Verify Cx level 2A Installation and QAQC inspection checklist has been carried out as per the Equinix approved checklist.

### 21.3 SCADA Control L2A Documents Required:

(All documents **MUST** be available prior to commencing yellow tag)

21.3.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

**SCADA Control L2A Sign Off:**

21.3.2 All required documentation is uploaded to the Equinix document control platform by GC or Vendor.
21.3.3 All required documentation is uploaded to commissioning management platform by CxA.
21.3.4 CxA to sign off checklist as Approved on commissioning management platform.
21.3.5 Red tag applied to the equipment and signed by CxA.

# Asset Tagging Requirements: Electrical LV

## 22 LV Cable Testing Requirements

The following tests and checks to be undertaken contractor and verified by CxA prior to continuing to Level 2B & Level 3, with appropriate documentation provided.

### 22.1 LV Cable Pre-requisites:

(All below prerequisites **MUST** be available prior to commencing red tag)

22.1.1 Verify the technical submittals and as built drawings have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
22.1.2 Verify the shop drawings have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
22.1.3 Verify the cable schedules have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
22.1.4 Verify the Cx level 2B static testing method statement and risk assessment (RAMS) have been uploaded to Equinix document control platform by the GC/vendor and approved by the CxA.
22.1.5 Verify the Cx level 3 start up and pre-functional and testing method statement and risk assessment (RAMS) have been uploaded to Equinix document control platform by the GC/vendor and approved by the CxA.
22.1.6 GC to compile a test pack in line with Equinix document matrix (refer to document matrix section XX).

### 22.2 LV Cable Physical Checks:

22.2.1 Perform a visual inspection of the full length of cable to check for damages and adequate fixing arrangement.
22.2.2 Verify cable grouping arrangement is as per design specification.
22.2.3 Verify all cables are installed with appropriate glands as per design, manufacturers guidance and approved technical submittals.
22.2.4 Verify all cables bending radiuses are as per manufacturers guidance.
22.2.5 Verify all cables are installed with appropriate terminations and accessories as per design, manufacturers guidance and approved technical submittals.
22.2.6 Verify all cables are torqued to the correct value as per manufacturers guidance.
22.2.7 Verify all cables are labelled as per design specification.

### 22.3 LV Cable Testing Required (below tests are the minimum requirement):

All LV cable inspection & testing is to comply with local code and documented in agreed format.

#### Dead Tests:

22.3.1 Perform continuity test by means of measuring the circuit resistance and record the Ohm value (R1+R2).
22.3.2 Perform polarity test, can be verified in above test.
22.3.3 Perform insulation resistance test.

| Circuit Nominal Voltage (V) | Test Voltage DC (V) | Minimum Insulation Resistance (MΩ) |
|---|---|---|
| SELV and PELV | 250 | 0.5 |
| Up to and including 500V with the exception of the above systems | 500 | 1.0 |
| Above 500V | 1000 | 1.0 |

#### LV Cable Live Tests:

22.3.4 Verify voltage.
22.3.5 Perform phase rotation test.
22.3.6 Perform earth loop impedance test (Ze/Zs). For main distribution boards use a high current earth loop impedance test instrument with resolution of 0.1m Ohm and up to 50kA required for this test.
22.3.7 Perform prospective short circuit current test (PSCC)
22.3.8 Perform prospective earth fault current test (PFC)
22.3.9 Perform RCD tests (if applicable).

**Note:** If live cable testing is not practical, calculation is accepted by means of Zs = Ze + (R1+R2).

### 22.4 LV Cable Documents Required:

(All documents **MUST** be available prior to sign off red tag)

22.4.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 22.5 LV Cable Sign Off:

22.5.1 All required documentation is uploaded to the Equinix document control platform by GC or Vendor.
22.5.2 All required documentation is uploaded to commissioning management platform by CxA.

### 22.6 Circuit Breakers

22.6.1 If Primary injection testing is not carried out in the factory then it must be performed on site for each circuit breakers feeding critical equipment (e.g. UPS, ATS, ASTS, PDU, etc.) greater than (225A US) (250A EMEA) setting shall be tested on site utilizing primary current injection method)
22.6.2 Secondary injection test shall be carried out for all circuit breakers both in the factory and on site.
22.6.3 Primary injection testing is performed on each breaker during manufacturer QA testing in factory prior to shipping. - This will be validated with documentation presented by manufacturer, date and time stamped.
22.6.4 Ensure no transit damage on arrival. - This will be validated by thorough inspection of switchboard on arrival at site.
22.6.5 Prove operation of tripping circuit by Secondary injection testing during onsite Commissioning process.
22.6.6 Circuit breakers shall be tested and labelled per the approved local authority having jurisdiction for testing and certification standard requirements by a certified contractor.
22.6.7 Verify that each circuit breaker tested is labelled, dated and signed-off by the testing agency.

## 23 Earthing System

**Earthing System Level 2A Red Tag**

### 23.1 Earthing System L2A Pre-requisites:

(All below prerequisites **MUST** be available prior to commencing red tag)
23.1.1 Verify the technical submittals and as built drawings have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
23.1.2 Verify the shop drawings have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
23.1.3 Verify the cable schedules have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
23.1.4 Verify the Cx level 2B static testing method statement and risk assessment (RAMS) have been uploaded to Equinix document control platform by the GC/vendor and approved by the CxA.
23.1.5 GC to compile a test pack in line with Equinix document matrix (refer to document matrix section XX).

### 23.2 Earthing System L2A Physical checks:

23.2.1 Confirm room/area condition is acceptable as per the Equinix room readiness checklist.
23.2.2 Confirm earth bars has been installed/positioned as per approved design drawings, manufactures specifications and approved technical submittals
23.2.3 Confirm earth bars is correct dimensionally, handed correctly and accessible for operation and maintenance as per local code.
23.2.4 Confirm appropriate warning/safety labels are in place.
23.2.5 Confirm earth bar fixed correctly and no damage is visible.
23.2.6 Confirm earthing system and equipment grounding installation is as per the approved design drawings and the approved technical submittals
23.2.7 Confirm all earth cables have been installed for all earthing systems MV/LV, main and supplementary bonding and raised access floor (if applicable) as per approved design drawings.
23.2.8 Confirm all earth cables have been installed with adequate fixing arrangement.
23.2.9 Verify all cables bending radiuses are as per manufacturers guidance.
23.2.10 Verify all cables are installed with appropriate terminations and accessories as per design, manufacturers guidance and approved technical submittals.
23.2.11 Verify earth matts/electrodes and earth pits (if applicable) are installed as per as per approved design drawings, manufactures specifications and approved technical submittals.
23.2.12 Record all earthing system details as per the Equinix provided template on the equipment parameter list within commissioning management platform.
23.2.13 Verify Cx level 2A Installation and QAQC inspection checklist has been carried out as per the Equinix approved checklist.

### 23.3 Earthing System L2A Documents Required:

(All documents **MUST** be available prior to sign off red tag)
23.3.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 23.4 Earthing System L2A Sign Off:

23.4.1 All required documentation is uploaded to the Equinix document control platform by GC or Vendor.
23.4.2 All required documentation is uploaded to commissioning management platform by CxA.
23.4.3 CxA to sign off checklist as Approved on commissioning management platform.
23.4.4 Red tag applied to the equipment and signed by CxA.

**Earthing System Level 2B Yellow Tag**

The following tests and checks to be undertaken contractor and verified by CxA prior to continuing to Level 3, with appropriate documentation provided

### 23.5 Earthing System L2B Prerequisites:

(All below prerequisites **MUST** be available prior to commencing yellow tag)

23.5.1 Verify red tag has been applied to the equipment and signed off by the CxA.
23.5.2 Confirm As-Built documentation (if applicable) have been uploaded to Equinix document control platform and approved by the EOR.
23.5.3 GC to compile a test pack in line with Equinix document matrix (refer to document matrix section XX).

### 23.6 Earthing System L2B Physical checks:

23.6.1 Confirm earthing systems comply with Equinix Global Design Standards and approved design drawings.
23.6.2 Verify all cable connections pull test & tightness test is found satisfactory
23.6.3 Verify all connections are torqued to the correct value as per manufacturers guidance and double marked.
23.6.4 Verify vendor Cx level 2B static testing has been carried out as per the vendors Cx level 2B static testing method statement approved by the CxA.
23.6.5 Verify Cx level 2B static testing has been carried out as per the Equinix approved checklist
23.6.6 Confirm all vendor Cx level 2B checks/tests are complete and all documentation has been uploaded to Equinix document control platform by the vendor and approved by the CxA.
23.6.7 **Testing Required** (below tests are the minimum requirement)**:**

**Note:** All earthing cable inspection & testing is to comply with local code and documented in agreed format.

#### Dead Tests:

- Perform continuity test by means of measuring the earthing cable resistance for MV/LV earthing, main and supplementary bonding and raised access floor (if applicable).
- Perform earth electrode resistance testing (if applicable) and record the Ohm value.
- For HV/MV substations verify touch and step potential test values do not exceed safety limits.

### 23.7 Earthing System L2B Documents Required:

(All documents **MUST** be available prior to sign off yellow tag)
23.7.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 23.8 Earthing System L2B Sign Off:

23.8.1 All required documentation is uploaded to the Equinix document control platform by GC or Vendor.
23.8.2 All required documentation is uploaded to commissioning management platform by CxA.
23.8.3 CxA to sign off checklist as Approved on commissioning management platform.
23.8.4 Yellow tag applied to the equipment and signed by CxA

## 24 Low Voltage Switchboards

**Low Voltage Switchboards Level 2A Red Tag**

The following tests and checks to be undertaken by Equipment Vendor / contractor and verified by CxA prior to continuing to Yellow Tag, with appropriate documentation provided

### 24.1 Low Voltage Switchboards L2A Prerequisites:

(All below prerequisites **MUST** be available prior to commencing red tag)
24.1.1 Verify the technical submittals and as built drawings have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
24.1.2 Verify the shop drawings have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
24.1.3 Verify the cable schedules/cable interface schedules have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
24.1.4 Verify the DCOS/BMS points list have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
24.1.5 Verify the FAT/FWT documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA. Any issues raised in FAT/FWT have been addressed. (Routine FAT QAQC documentation acceptable where FWT testing has not been procured).
24.1.6 Verify the electrical protection study is approved and have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
24.1.7 Verify the Cx level 2B static testing method statement and risk assessment (RAMS) have been uploaded to Equinix document control platform by the GC/vendor and approved by the CxA.
24.1.8 Verify the material delivery receipt has been uploaded to Equinix document control platform by the GC, GC to identify upon kerbside delivery any defects/damages during transit.
24.1.9 GC to compile a test pack in line with Equinix document matrix (refer to document matrix section XX).

### 24.2 Low Voltage Switchboards L2A Physical checks:

24.2.1 Confirm all deficiencies/comments from FWT/FAT have been closed.
24.2.2 Confirm room/area condition is acceptable as per the Equinix room readiness checklist.
24.2.3 Confirm equipment has been installed/positioned as per approved design drawings, manufactures specifications and approved technical submittals

24.2.4 Confirm the unit is correct dimensionally, handed correctly and accessible for operation and maintenance as per local code.
24.2.5 Confirm the equipment has the correct ratings, components, protective devices, interlocks (if applicable) as per approved design drawings, manufactures specifications and approved technical submittals
24.2.6 Confirm all gland plates are correct as per the approved technical submittals
24.2.7 Confirm switchboard mimic lines as per GA drawings
24.2.8 Confirm appropriate warning/safety labels are in place.
24.2.9 Confirm all device labelling is correct as per approved Equinix naming convention.
24.2.10 Confirm no damage has occurred in transit and all transit bolts, wedges etc. have been removed.
24.2.11 Carry out all external and internal quality checks of the equipment.
24.2.12 Confirm equipment IPXX ratings are correct as per the approved technical submittals
24.2.13 Confirm network interface card has been supplied as per the approved technical submittals
24.2.14 Confirm system and equipment grounding installation is as per the approved design drawings and the approved technical submittals
24.2.15 Record all equipment details as per the Equinix provided template on the equipment parameter list within commissioning management platform.
24.2.16 Verify Cx level 2A Installation and QAQC inspection checklist has been carried out as per the Equinix approved checklist.

### 24.3 Low Voltage Switchboards L2A Documents Required:

(All documents **MUST** be available prior to commencing yellow tag)
24.3.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 24.4 Low Voltage Switchboards L2A Sign Off:

24.4.1 All required documentation is uploaded to the Equinix document control platform by GC or Vendor.
24.4.2 All required documentation is uploaded to commissioning management platform by CxA.
24.4.3 CxA to sign off checklist as Approved on commissioning management platform.
24.4.4 Red tag applied to the equipment and signed by CxA.

## Low Voltage Switchboards Level 2B Yellow Tag

The following tests and checks to be undertaken contractor and verified by CxA prior to continuing to Level 3, with appropriate documentation provided

### 24.5 Low Voltage Switchboards L2B Pre-requisites:

(All below prerequisites **MUST** be available prior to commencing yellow tag)
24.5.1 Verify red tag has been applied to the equipment and signed off by the CxA.
24.5.2 Verify green tag has been applied to the associated BTU and signed off by the CxA (if applicable).
24.5.3 Verify the Cx level 3 start-up/pre functional testing method statement and risk assessment (RAMS) have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
24.5.4 Verify electrical protection study is approved and uploaded to Equinix document control platform by the EOR and approved by the Equinix Design Manager.
24.5.5 Verify the ARC flash study is approved and uploaded to Equinix document control platform by the EOR and approved by the Equinix Design Manager
24.5.6 Verify key interlocking scheme is uploaded to Equinix document control platform by the vendor and approved by EOR.
24.5.7 Confirm As-Built documentation (if applicable) have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
24.5.8 Verify approved DCOS/BMS & automation points lists have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
24.5.9 GC to compile a test pack in line with Equinix document matrix (refer to document matrix section XX).
24.5.10 Verify red tag has been applied to the equipment and signed off by the CxA.
24.5.11 Verify green tag has been applied to the associated BTU and signed off by the CxA (if applicable).
24.5.12 Verify the Cx level 3 start-up/pre functional testing method statement and risk assessment (RAMS) have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
24.5.13 Verify electrical protection study is approved and uploaded to Equinix document control platform by the EOR and approved by the Equinix Design Manager.
24.5.14 Verify the ARC flash study is approved and uploaded to Equinix document control platform by the EOR and approved by the Equinix Design Manager
24.5.15 Verify key interlocking scheme is uploaded to Equinix document control platform by the vendor and approved by EOR.
24.5.16 Confirm As-Built documentation (if applicable) have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
Verify approved DCOS/BMS & automation points lists have been uploaded to Equinix document control platform and approved by the EOR
24.5.17 GC to compile a test pack in line with Equinix document matrix (refer to document matrix section XX).

24.5.18 Verify red tag has been applied to the equipment and signed off by the CxA.
Verify green tag has been applied to the associated BTU and signed off by the CxA (if applicable).
24.5.19 Verify the Cx level 3 start-up/pre functional testing method statement and risk assessment (RAMS) have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
24.5.20 Verify electrical protection study is approved and uploaded to Equinix document control platform by the EOR and approved by the Equinix Design Manager.
24.5.21 Verify the ARC flash study is approved and uploaded to Equinix document control platform by the EOR and approved by the Equinix Design Manager
24.5.22 Verify key interlocking scheme is uploaded to Equinix document control platform by the vendor and approved by EOR.
24.5.23 Confirm As-Built documentation (if applicable) have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
24.5.24 Verify approved DCOS/BMS & automation points lists have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
24.5.25 GC to compile a test pack in line with Equinix document matrix (refer to document matrix section XX).
24.5.26 Verify red tag has been applied to the equipment and signed off by the CxA.
24.5.27 Verify green tag has been applied to the associated BTU and signed off by the CxA (if applicable).
24.5.28 Verify the Cx level 3 start-up/pre functional testing method statement and risk assessment (RAMS) have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
24.5.29 Verify electrical protection study is approved and uploaded to Equinix document control platform by the EOR and approved by the Equinix Design Manager.
24.5.30 Verify the ARC flash study is approved and uploaded to Equinix document control platform by the EOR and approved by the Equinix Design Manager
24.5.31 Verify key interlocking scheme is uploaded to Equinix document control platform by the vendor and approved by EOR.
24.5.32 Confirm As-Built documentation (if applicable) have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
Verify approved DCOS/BMS & automation points lists have been uploaded to Equinix document control platform and approved by the EOR
24.5.33 GC to compile a test pack in line with Equinix document matrix (refer to document matrix section XX).

### 24.6 Low Voltage Switchboards L2B Physical checks:

24.6.1 Confirm earthing systems comply with Equinix Global Design Standards and/or design drawings.
24.6.2 Confirm power cables have been dead tested (refer to cable section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
24.6.3 Confirm busduct have been dead tested (refer to busduct section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
24.6.4 Confirm control/monitoring cables have been dead tested (refer to cable section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
24.6.5 Confirm control/monitoring cables have been point to point tested, signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA
24.6.6 Confirm DC supply control circuits are as per Equinix Global Design Standards
24.6.7 Confirm all power cables and control/monitoring cabling identification are present as per approved cable schedule and cable interfacing schedule.
24.6.8 Confirm all cables are identified with permanent labels, soundly fixed (glands/cable ties/cleats) identifying source, load, size & type as per the project specification provided by the EOR.
24.6.9 Verify all cable connections pull test & tightness test is found satisfactory
24.6.10 Verify all connections are torqued correctly (if applicable) and double marked.
24.6.11 Confirm all trunking covers and equipment terminal/protection covers are in place and secured.
24.6.12 Confirm supply breaker/fuse has an equal or greater current capacity than the incoming breaker/fuse of the distribution board.
24.6.13 Confirm all protection settings are set for the equipment as per approved protection study.
24.6.14 Confirm cable entry box (if applicable) is installed as per approved design drawings, manufactures specifications and approved technical submittals
24.6.15 Confirm PTW/LOTO procedures are implemented correctly by the GC's approved SAP/AP.
24.6.16 Confirm all equipment labelling and circuit identification is present and correct
24.6.17 Construction clean of room and of equipment
24.6.18 **Cx level 2B equipment static testing <u>MUST</u> consist of as a minimum:**
- Continuity & polarity test
- Low OHM resistance testing of all connections (contact resistance test).
- Pressure/dielectric tests (Insulation resistance test)

24.6.19 Verification of mechanical operation.
24.6.20 Prove safety interlocks (mechanical and electrical).
24.6.21 Confirm primary & secondary injection protection scheme testing of all breakers/relays (if applicable) and security seal along with protection settings label applied by CxA.
24.6.22 Verify firmware/software revisions meet Equinix global design standards
24.6.23 Conduct a White Glove Inspection to ensure equipment is clean and free of debris or foreign materials and the appropriate protection is in place prior to energisation.
24.6.24 Verify vendor Cx level 2B static testing has been carried out as per the vendors Cx level 2B static testing method statement approved by the CxA.
24.6.25 Verify Cx level 2B static testing has been carried out as per the Equinix approved checklist
24.6.26 Confirm all vendor Cx level 2B checks/tests are complete and all documentation has been uploaded to Equinix document control platform by the vendor and approved by the CxA.

### 24.7 Low Voltage Switchboards L2B Documents Required:

(All documents **<u>MUST</u>** be available prior to commencing yellow tag)

24.7.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 24.8 Low Voltage Switchboards L2B Sign Off:

24.8.1 All required documentation is uploaded to the Equinix document control platform by GC or Vendor.
24.8.2 All required documentation is uploaded to commissioning management platform by CxA.
24.8.3 CxA to sign off checklist as Approved on commissioning management platform.
24.8.4 Yellow tag applied to the equipment and signed by CxA.

**Low Voltage Switchboards Level L3 Green Tag**

The following tests and checks to be undertaken and verified by contractor prior to continuing to L4, with appropriate documentation provided

### 24.9 Low Voltage Switchboards L3 Prerequisites:

(All below prerequisites **MUST** be available prior to commencing green tag)

24.9.1 Verify yellow tag has been applied to the equipment and signed by the CxA.
24.9.2 Verify the Cx level 4 functional & performance test script have been uploaded to Equinix commissioning management platform by CxA.
24.9.3 Verify switching schedule and energisation plan is implemented by the GC's approved SAP/AP.
24.9.4 Verify approved SOO have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
24.9.5 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
24.9.6 GC to compile a test pack in line with Equinix document matrix.

### 24.10 Low Voltage Switchboards L3 Physical Checks:

24.10.1 Confirm LOTO procedures are implemented correctly by the GC's approved SAP/AP.
24.10.2 Confirm power cables have been live tested (refer to cable section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
24.10.3 Confirm busduct have been live tested (refer to busduct section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
24.10.4 Verify metering
24.10.5 Verify HMI mimic and PLC operation as per Equinix global design standards
24.10.6 Verify safety interlocks (mechanical and electrical).
24.10.7 Confirm DCOS/BMS point to graphic testing is complete, signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA
24.10.8 Verify vendor Cx level 3 start-up/pre-functional testing has been carried out as per the vendors Cx level 3 start-up/pre functional method statement approved by the CxA.
24.10.9 Verify Cx level 3 start-up/pre-functional testing has been carried out as per the Equinix approved checklist
24.10.10 Confirm all vendor Cx level 3 checks/tests are complete and all documentation has been uploaded to Equinix document control platform by the vendor and approved by the CxA.

### 24.11 Low Voltage Switchboards L3Documents Required:

(All documents **MUST** be available prior to commencing yellow tag)

24.11.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 24.12 Low Voltage Switchboards L3Sign off:

24.12.1 All required documentation is uploaded to commissioning management platform by CxA. (refer to section XX documentation matrix)
24.12.2 CxA to sign off checklist as Approved on commissioning management platform.
24.12.3 Green tag applied to the equipment and signed by CxA.

**Low Voltage Switchboards Level L4 Blue Tag**

The following tests and checks to be undertaken contractor and verified by CxA prior to continuing to L5, with appropriate documentation provided. All testing carried out with max available load (load banks connected plus building load)

### 24.13 Low Voltage Switchboards L4 Prerequisites:

(All below prerequisites **MUST** be available prior to commencing blue tag)

24.13.1 Verify green tag has been applied to the equipment and signed off by the CxA.
24.13.2 Verify green tag has been applied to the generator and signed off by the CxA.
24.13.3 Verify all related P1 Cx issues are closed on the IRL
24.13.4 Confirm DCOS/BMS verifications are complete and alarm free

### 24.14 Low Voltage Switchboards L4 Physical checks:

24.14.1 100% load test of LV switchgear for a duration of 4 hours
24.14.2 Perform thermal imaging of LV switchgear (refer to thermal imaging section XX)
24.14.3 Verify 100% functional testing of automation/system controls as per SOO including all maintenance scenarios, load bank scenarios, failure scenarios and interlocking.
24.14.4 Verify all automation/system controls redundancy by means of testing
24.14.5 Verify communication network redundancy failures

### 24.15 Low Voltage Switchboards L4 Documents Required:

(All documents **MUST** be available prior to commencing yellow tag)
24.15.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 24.16 Low Voltage Switchboards L4 Sign off:

24.16.1 All required documentation is uploaded to commissioning management platform by CxA. (refer to section XX documentation matrix)
24.16.2 CxA to sign off checklist as Approved on commissioning management platform.
24.16.3 Blue tag applied to the equipment and signed by CxA

## 25 Uninterruptable Power Supply (UPS)

**Uninterruptable Power Supply Level 2A Red Tag**

The following tests and checks to be undertaken by Equipment Vendor / contractor and verified by CxA prior to continuing to Yellow Tag, with appropriate documentation provided

### 25.1 UPS L2A Pre-requisites:

(All below documentation **MUST** be available prior to commencing red tag)
25.1.1 Verify the technical submittals and as built drawings have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
25.1.2 Verify the shop drawings have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
25.1.3 Verify the cable schedules/cable interface schedules have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
25.1.4 Verify the DCOS/BMS points list have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
25.1.5 Verify the FAT/FWT documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA. Any issues raised in FAT/FWT have been addressed. (Routine FAT QAQC documentation acceptable where FWT testing has not been procured).
25.1.6 Verify the Cx level 2B static testing method statement and risk assessment (RAMS) have been uploaded to Equinix document control platform by the GC/vendor and approved by the CxA.
25.1.7 Verify the material delivery receipt has been uploaded to Equinix document control platform by the GC, GC to identify upon kerbside delivery any defects/damages during transit.
25.1.8 Refer to UPS batteries section XXXX.
25.1.9 GC to compile a test pack in line with Equinix document matrix (refer to section XXX).

### 25.2 UPS L2A Physical checks:

25.2.1 Confirm all deficiencies/comments from FWT/FAT have been closed.
25.2.2 Confirm room/area condition is acceptable as per the Equinix room readiness checklist (refer to section XXX).
25.2.3 Confirm equipment has been installed/positioned as per approved design drawings, manufactures specifications and approved technical submittals
25.2.4 Confirm the unit is correct dimensionally, handed correctly and accessible for operation and maintenance as per local code.
25.2.5 Confirm the equipment has the correct ratings, components, protective devices, interlocks (if applicable) as per approved design drawings, manufactures specifications and approved technical submittals
25.2.6 Confirm all gland plates are correct as per the approved technical submittals
25.2.7 Confirm all busbar flanges are correct as per the approved technical submittals and approved shop drawings
25.2.8 Confirm appropriate warning/safety labels are in place.
25.2.9 Confirm all device labelling is correct as per approved Equinix naming convention.
25.2.10 Confirm no damage has occurred in transit and all transit bolts, wedges etc. have been removed.
25.2.11 Carry out all external and internal quality checks of the equipment.
25.2.12 Confirm equipment IPXX ratings are correct as per the approved technical submittals
25.2.13 Confirm network interface card has been supplied as per the approved technical submittals
25.2.14 Confirm system and equipment grounding installation is as per the approved design drawings and the approved technical submittals
25.2.15 Record all equipment details as per the Equinix provided template on the equipment parameter list within commissioning management platform.
25.2.16 Confirm suitable protection is in position after L2A visual inspection.
25.2.17 Verify Cx level 2A Installation and QAQC inspection has been carried out as per the Equinix approved checklist.

### 25.3 UPS L2A Documents Required:

(All documents **MUST** be available prior to sign off of red tag)
25.3.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 25.4 UPS L2A Sign Off:

25.4.1 All required documentation is uploaded to the Equinix document control platform by GC or Vendor.
25.4.2 All required documentation is uploaded to commissioning management platform by CxA.
25.4.3 CxA to sign off checklist as Approved on commissioning management platform.
25.4.4 Red tag applied to the equipment and signed by CxA.

**Uninterruptable Power Supply Level 2B Yellow Tag**

The following tests and checks to be undertaken by Equipment Vendor / contractor and verified by CxA prior prior to continuing to L3, with appropriate paperwork provided

## UPS L2B Prerequisites:

(All below documentation **MUST** be available prior to commencing yellow tag)

25.4.5 Verify red tag has been applied to the equipment and signed off by the CxA.
25.4.6 Verify yellow tag has been applied to the earthing system and signed off by the CxA.
25.4.7 Verify the Cx level 3 start-up/pre functional testing method statement and risk assessment (RAMS) have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
25.4.8 Verify electrical protection study is approved and uploaded to Equinix document control platform by the EOR and approved by the Equinix Design Manager.
25.4.9 Verify the ARC flash study is approved and uploaded to Equinix document control platform by the EOR and approved by the Equinix Design Manager
25.4.10 Verify key interlocking scheme is uploaded to Equinix document control platform by the vendor and approved by the EOR.
25.4.11 Confirm As-Built documentation (if applicable) have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
25.4.12 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
25.4.13 GC to compile a test pack in line with Equinix document matrix.

### 25.5 UPS L2B Physical checks:

25.5.1 Confirm earthing systems comply with Equinix Global Design Standards and/or design drawings.
25.5.2 Confirm busbar have been dead tested (refer to section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
25.5.3 Confirm AC/DC power cables have been dead tested (refer to section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
25.5.4 Confirm control/monitoring cables have been dead tested (refer to section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
25.5.5 Confirm control/monitoring cables have been point to point tested, signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA
25.5.6 Confirm all power cables and control/monitoring cabling identification are present as per approved cable schedule and cable interfacing schedule.
25.5.7 Confirm ALL cables are identified with permanent labels, soundly fixed (glands/cable ties/cleats) identifying source, load, size & type as per the project specification provided by the EOR.
25.5.8 Verify all cable connections pull test is found satisfactory
25.5.9 Verify all connections are torqued correctly (if applicable) and double marked.
25.5.10 Confirm all trunking covers and equipment terminal/protection covers are in place and secured.
25.5.11 Confirm supply breaker/fuse has an equal or greater current capacity than the incoming breaker/fuse of the distribution board.
25.5.12 Confirm all protection settings are set for the equipment as per approved protection study.
25.5.13 Confirm secondary injection protection testing of all breakers/relays (if applicable) and security seal along with protection settings label applied by CxA.
25.5.14 Confirm UPS and UPS batteries interfaces and safety interlocking.
25.5.15 Confirm UPS batteries is Cx Level 2B is complete.
25.5.16 Confirm the cooling system is Cx level 2B complete and operational for both UPS switchroom and battery room.
25.5.17 Confirm PTW/LOTO procedures are implemented correctly by the GC's approved SAP/AP.
25.5.18 UPS vendor to conduct a deep clean of UPS and provide report
25.5.19 Conduct a White Glove Inspection to ensure equipment is clean and free of debris or foreign materials and the appropriate protection is in place prior to energisation.
25.5.20 Verify vendor Cx level 2B static testing has been carried out as per the vendors Cx level 2B static testing method statement approved by the CxA.
25.5.21 Verify Cx level 2B static testing has been carried out as per the Equinix approved checklist
25.5.22 Confirm all vendor Cx level 2B checks/tests are complete and all documentation has been uploaded to Equinix document control platform by the vendor and approved by the CxA.

### 25.6 UPS L2B Documents Required:

(All documents **MUST** be available prior to commencing yellow tag)

25.6.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 25.7 UPS L2B Sign Off:

25.7.1 All required documentation is uploaded to the Equinix document control platform by GC or Vendor.
25.7.2 All required documentation is uploaded to commissioning management platform by CxA.
25.7.3 CxA to sign off checklist as Approved on commissioning management platform.
25.7.4 Yellow tag applied to the equipment and signed by CxA.

## Uninterruptable Power Supply Level 3 Green Tag

The following tests and checks to be undertaken and verified by contractor prior to continuing to L4, with appropriate documentation provided

### UPS L3 Prerequisites:

(All below documentation **MUST** be available prior to commencing green tag)

25.7.5 Verify yellow tag has been applied to the UPS and signed by the CxA.
25.7.6 Verify yellow tag has been applied to the Batteries and signed by the CxA.
25.7.7 Verify the Cx level 4 functional & performance test script have been uploaded to Equinix commissioning management platform by CxA.
25.7.8 Confirm CxA load bank & thermal imaging strategy is approved by Equinix CxM and incorporated into the Cx plan.
25.7.9 Verify switching schedule and energisation plan is implemented by the GC's approved SAP/AP.
25.7.10 Verify approved SOO have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
25.7.11 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
25.7.12 GC to compile a test pack in line with Equinix document matrix.

### 25.8 UPS L3 Physical Checks:

25.8.1 Confirm LOTO procedures are implemented correctly by the GC's approved SAP/AP.
25.8.2 Confirm AC/DC supply cables have been live tested (refer to section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
25.8.3 Confirm busbars have been live tested (refer to section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
25.8.4 Confirm DCOS/BMS point to graphic testing is complete, signed off and documentation has been uploaded to Equinix document control platform by the vendor and approved by the CxA.
25.8.5 Verify UPS settings comply with latest approved Equinix global design standards
25.8.6 Verify firmware versions for UPS comply with approved Equinix global design standards (if applicable).
25.8.7 Record firmware versions for UPS on checklist within commissioning management platform.
25.8.8 Verify castell key / interlocking functionality and battery inter-trips.
25.8.9 Verify batteries are charging.
25.8.10 Verify load transfers between UPS Inverter/Static Bypass & return.
25.8.11 Verify load sharing across UPS modules
25.8.12 Confirm UPS output voltage is as per approved GDS and recorded.
25.8.13 Verify vendor Cx level 3 start-up/pre-functional testing has been carried out as per the vendors Cx level 3 start-up/pre functional method statement approved by the CxA.
25.8.14 Verify Cx level 3 start-up/pre-functional testing has been carried out as per the Equinix approved checklist
25.8.15 Confirm all vendor Cx level 3 checks/tests are complete and all documentation has been uploaded to Equinix document control platform by the vendor and approved by the CxA.

### 25.9 UPS L3 Documents Required:

(All documents **MUST** be available prior to commencing yellow tag)

25.9.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 25.10 UPS L3 Sign off:

25.10.1 All required documentation is uploaded to commissioning management platform by CxA. (refer to section XX documentation matrix)
25.10.2 CxA to sign off checklist as Approved on commissioning management platform.
25.10.3 Green tag applied to the equipment and signed by CxA

## Uninterruptable Power Supply Level 4 Blue Tag

The following tests and checks to be undertaken contractor and verified by CxA prior to continuing to L5, with appropriate documentation provided. All testing carried out with max available load (load banks connected plus building load)

### 25.11 UPS L4 Pre-requisites:

(All below documentation **MUST** be available prior to commencing blue tag)

25.11.1 Verify green tag has been applied to the UPS and signed off by the CxA.
25.11.2 Verify green tag has been applied to the Batteries and signed off by the CxA.
25.11.3 Verify green tag has been applied to the relevant switchboards and signed off by the CxA.
25.11.4 Verify green tag has been applied to the relevant Generators and signed off by the CxA.
25.11.5 Verify green tag has been applied to the cooling system and signed off by the CxA.
25.11.6 Verify all related P1 Cx issues are closed on the IRL
25.11.7 Confirm DCOS/BMS verifications are complete and alarm free

### 25.12 UPS L4 Physical checks:

25.12.1 Confirm a calibrated PQM is installed on both the UPS input and the UPS output.
25.12.2 If UPSs are in parallel, both UPS require a PQM to be installed on both the UPS input and the UPS output.
25.12.3 PQM's are to be provided by the UPS vendor and set up correctly (refer to PQM section XXXX).
25.12.4 Perform transient load steps as per global standards on both Utility and Generator sources.

- 0%-25%-0%
- 0%-50%-0%
- 0%-75%-0%
- 0%-100%-0%

25.12.5 Perform UPS steady states at 25%, 50%, 75% & 100% load on both utility and generator source and record UPS parameters.
25.12.6 Perform 100% full design load test of the UPS through each power path with thermal imaging of UPS to be conducted. (refer to thermal imaging section XXXX).

- 4 hours inverter
- 4 hours static bypass
- 4 hours maintenance bypass

**Note**: refer to CRAH Cx level 4 section XXXX for room cooling redundancy testing

25.12.7 Perform 100% full load transfers while monitoring input / output voltages and frequency.
25.12.8 Transfer from inverter to static bypass on utility
25.12.9 Transfer from static bypass to maintenance bypass on utility
25.12.10 Transfer from maintenance bypass to inverter on utility
25.12.11 Transfer from inverter to static bypass on generator
25.12.12 Transfer from static bypass to maintenance bypass on generator
25.12.13 Transfer from maintenance bypass to inverter on generator
25.12.14 Verify system overload transfer to static bypass.
25.12.15 Perform full load battery discharge test per module/string to meet battery end of life design.
25.12.16 Battery vendor to remove covers to allow for thermal imaging and reinstate.
25.12.17 Battery vendor to take screenshot of battery monitoring system before & after discharge test and provide report.
25.12.18 Verify battery monitoring system during battery discharge test.
25.12.19 Perform thermal imaging of batteries directly after discharge test and provide report.
25.12.20 Perform UPS system full load battery discharge test to prove automatic recovery on system restoration.
25.12.21 Record battery charging current and recharge time
25.12.22 Verify Automatic transfers under mains failure and mains return (where applicable)
25.12.23 Verify load sharing between modules.
25.12.24 Verify UPS module operation in parallel mode (if applicable)
25.12.25 Verify module communication failure (if applicable)
25.12.26 Verify transfer between normal to ECO modes occurs without power disruption (If applicable)
25.12.27 Verify Castell key signals – Inverter inhibit and Castell release when on STS
25.12.28 Verify rectifier walk-in test
25.12.29 Perform core redundancy test
25.12.30 Verify communication network redundancy failures
25.12.31 Confirm DCOS/BMS point to graphic testing is complete and screenshots captured for all of the above tests.

### 25.13 UPS L4 Documents Required:

(All documents **MUST** be available prior to commencing yellow tag)
25.13.1 Verify all related test reports including raw data files are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

## UPS L4 Sign off:

25.13.2 All required documentation is uploaded to commissioning management platform by CxA. (refer to section XX documentation matrix)
25.13.3 CxA to sign off checklist as Approved on commissioning management platform.
25.13.4 Blue tag applied to the equipment and signed by CxA.

# 26 Low Voltage Distribution Board

## Low Voltage Distribution Board Level 2A Red Tag

The following tests and checks to be undertaken by Equipment Vendor / contractor and verified by CxA prior to continuing to Yellow Tag, with appropriate documentation provided.

### 26.1 Low Voltage Distribution Board L2A Prerequisites:

(All below prerequisites **MUST** be available prior to commencing red tag)

26.1.1 Verify the technical submittals and as built drawings have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
26.1.2 Verify the shop drawings have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
26.1.3 Verify the cable schedules/cable interface schedules have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
26.1.4 Verify the DCOS/BMS points list have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
26.1.5 Verify the FAT/FWT documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA. Any issues raised in FAT/FWT have been addressed. (Routine FAT QAQC documentation acceptable where FWT testing has not been procured).
26.1.6 Verify the electrical protection study is approved and have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
26.1.7 Verify the Cx level 2B static testing method statement and risk assessment (RAMS) have been uploaded to Equinix document control platform by the GC/vendor and approved by the CxA.
26.1.8 Verify the material delivery receipt has been uploaded to Equinix document control platform by the GC, GC to identify upon kerbside delivery any defects/damages during transit.
GC to compile a test pack in line with Equinix document matrix (refer to document matrix section XX).

### 26.2 Low Voltage Distribution Board L2A Physical checks:

26.2.1 Confirm all deficiencies/comments from FWT/FAT have been closed.
26.2.2 Confirm room/area condition is acceptable as per the Equinix room readiness checklist.
26.2.3 Confirm equipment has been installed/positioned as per approved design drawings, manufactures specifications and approved technical submittals
26.2.4 Confirm the unit is correct dimensionally, handed correctly and accessible for operation and maintenance as per local code.
26.2.5 Confirm the equipment has the correct ratings, components, protective devices, interlocks (if applicable) as per approved design drawings, manufactures specifications and approved technical submittals
26.2.6 Confirm all gland plates are correct as per the approved technical submittals
26.2.7 Confirm appropriate warning/safety labels are in place.
26.2.8 Confirm all device labelling is correct as per approved Equinix naming convention.
26.2.9 Confirm no damage has occurred in transit and all transit bolts, wedges etc. have been removed.
26.2.10 Carry out all external and internal quality checks of the equipment.
26.2.11 Confirm equipment IPXX ratings are correct as per the approved technical submittals
26.2.12 Confirm network interface card has been supplied as per the approved technical submittals
26.2.13 Confirm system and equipment grounding installation is as per the approved design drawings and the approved technical submittals
26.2.14 Record all equipment details as per the Equinix provided template on the equipment parameter list within commissioning management platform.
26.2.15 Verify Cx level 2A Installation and QAQC inspection checklist has been carried out as per the Equinix approved checklist.

### 26.3 Low Voltage Distribution Board L2A Documents Required:

(All documents **MUST** be available prior to commencing yellow tag)

26.3.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 26.4 Low Voltage Distribution Board L2A Sign Off:

26.4.1 All required documentation is uploaded to the Equinix document control platform by GC or Vendor.
26.4.2 All required documentation is uploaded to commissioning management platform by CxA.
26.4.3 CxA to sign off checklist as Approved on commissioning management platform.
26.4.4 Red tag applied to the equipment and signed by CxA.

## Low Voltage Distribution Board Level 2B Yellow Tag

The following tests and checks to be undertaken contractor and verified by CxA prior to continuing to Level 3, with appropriate documentation provided

### 26.5 Low Voltage Distribution Board L2B Prerequisites:

(All below prerequisites **MUST** be available prior to commencing yellow tag)

26.5.1 Verify red tag has been applied to the equipment and signed off by the CxA.
26.5.2 Verify the Cx level 3 start-up/pre functional testing method statement and risk assessment (RAMS) have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
26.5.3 Verify electrical protection study is approved and uploaded to Equinix document control platform by the EOR and approved by the Equinix Design Manager.

26.5.4 Verify the ARC flash study is approved and uploaded to Equinix document control platform by the EOR and approved by the Equinix Design Manager
26.5.5 Confirm As-Built documentation (if applicable) have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
26.5.6 Verify approved DCOS/BMS & automation points lists have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
26.5.7 GC to compile a test pack in line with Equinix document matrix (refer to document matrix section XX)

### 26.6 Low Voltage Distribution Board L2B Physical checks:

26.6.1 Confirm earthing systems comply with Equinix Global Design Standards and/or design drawings.
26.6.2 Confirm power cables have been dead tested (refer to cable section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
26.6.3 Confirm control/monitoring cables have been dead tested (refer to cable section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
26.6.4 Confirm control/monitoring cables have been point to point tested, signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA
26.6.5 Confirm all power cables and control/monitoring cabling identification are present as per approved cable schedule and cable interfacing schedule.
26.6.6 Confirm all cables are identified with permanent labels, soundly fixed (glands/cable ties/cleats) identifying source, load, size & type as per the project specification provided by the EOR.
26.6.7 Verify all cable connections pull test & tightness test is found satisfactory
26.6.8 Verify all connections are torqued correctly (if applicable) and double marked.
26.6.9 Confirm all trunking covers and equipment terminal/protection covers are in place and secured.
26.6.10 Confirm supply breaker/fuse has an equal or greater current capacity than the incoming breaker/fuse of the distribution board.
26.6.11 Confirm all protection settings are set for the equipment as per approved protection study.
26.6.12 Confirm cable entry box (if applicable) is installed as per approved design drawings, manufactures specifications and approved technical submittals
26.6.13 Confirm PTW/LOTO procedures are implemented correctly by the GC's approved SAP/AP.
26.6.14 Confirm all equipment labelling and circuit identification is present and correct
26.6.15 Construction clean of room and of equipment
26.6.16 Cx level 2B equipment static testing **MUST** consist of as a minimum:

- Continuity & polarity test
- Insulation resistance test

26.6.17 Verification of mechanical operation.
26.6.18 Confirm primary & secondary injection protection scheme testing of all breakers/relays (if applicable) and security seal along with protection settings label applied by CxA.
26.6.19 Conduct a White Glove Inspection to ensure equipment is clean and free of debris or foreign materials and the appropriate protection is in place prior to energisation.
26.6.20 Verify vendor Cx level 2B static testing has been carried out as per the vendors Cx level 2B static testing method statement approved by the CxA.
26.6.21 Verify Cx level 2B static testing has been carried out as per the Equinix approved checklist
26.6.22 Confirm all vendor Cx level 2B checks/tests are complete and all documentation has been uploaded to Equinix document control platform by the vendor and approved by the CxA.

### 26.7 Low Voltage Distribution Board L2B Documents Required:

(All documents **MUST** be available prior to commencing yellow tag)
26.7.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 26.8 Low Voltage Distribution Board L2B Sign Off:

26.8.1 All required documentation is uploaded to the Equinix document control platform by GC or Vendor.
26.8.2 All required documentation is uploaded to commissioning management platform by CxA.
26.8.3 CxA to sign off checklist as Approved on commissioning management platform.
26.8.4 Yellow tag applied to the equipment and signed by CxA.

## Low Voltage Distribution Board Level 3 Green Tag

The following tests and checks to be undertaken and verified by contractor prior to continuing to L4, with appropriate documentation provided

### 26.9 Low Voltage Distribution Board L3 Pre-requisites:

(All below prerequisites **MUST** be available prior to commencing green tag)
26.9.1 Verify yellow tag has been applied to the equipment and signed by the CxA.
26.9.2 Verify switching schedule and energisation plan is implemented by the GC's approved SAP/AP.
26.9.3 Verify approved SOO have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
26.9.4 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
26.9.5 GC to compile a test pack in line with Equinix document matrix.

### 26.10 Low Voltage Distribution Board L3 Physical Checks:

26.10.1 Confirm LOTO procedures are implemented correctly by the GC's approved SAP/AP.
26.10.2 Confirm power cables have been live tested (refer to cable section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
26.10.3 Verify metering (if applicable)
26.10.4 Confirm DCOS/BMS point to graphic testing is complete, signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA
26.10.5 Verify vendor Cx level 3 start-up/pre-functional testing has been carried out as per the vendors Cx level 3 start-up/pre functional method statement approved by the CxA.
26.10.6 Verify Cx level 3 start-up/pre-functional testing has been carried out as per the Equinix approved checklist
26.10.7 Confirm all vendor Cx level 3 checks/tests are complete and all documentation has been uploaded to Equinix document control platform by the vendor and approved by the CxA.

### 26.11 Low Voltage Distribution Board L3 Documents Required:

(All documents **MUST** be available prior to commencing yellow tag)
26.11.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 26.12 Low Voltage Distribution Board L3 Sign off:

26.12.1 All required documentation is uploaded to commissioning management platform by CxA. (refer to section XX documentation matrix)
26.12.2 CxA to sign off checklist as Approved on commissioning management platform.
26.12.3 Green tag applied to the equipment and signed by CxA.

## 27 Power Distribution Board (PDU) & Remote Power Panel (RPP)

**PDU & RPP Level 2A Red Tag**

Verify Cx level 2A Installation and QAQC inspection checklist has been carried out as per the Equinix approved checklist

### 27.1 PDU & RPP L2A Pre-requisites:

(All below prerequisites **MUST** be available prior to commencing red tag)
27.1.1 Verify the technical submittals and as built drawings have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
27.1.2 Verify the shop drawings have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
27.1.3 Verify the cable schedules/cable interface schedules have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
27.1.4 Verify the DCOS/BMS points list have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
27.1.5 Verify the FAT/FWT documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA. Any issues raised in FAT/FWT have been addressed. (Routine FAT QAQC documentation acceptable where FWT testing has not been procured).
27.1.6 Verify the electrical protection study is approved and have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
27.1.7 Verify the Cx level 2B static testing method statement and risk assessment (RAMS) have been uploaded to Equinix document control platform by the GC/vendor and approved by the CxA.
27.1.8 Verify the material delivery receipt has been uploaded to Equinix document control platform by the GC, GC to identify upon kerbside delivery any defects/damages during transit.
27.1.9 GC to compile a test pack in line with Equinix document matrix (refer to document matrix section XX)

### 27.2 PDU & RPP L2A Physical checks:

27.2.1 Confirm all deficiencies/comments from FWT/FAT have been closed.
27.2.2 Confirm room/area condition is acceptable as per the Equinix room readiness checklist.
27.2.3 Confirm equipment has been installed/positioned as per approved design drawings, manufactures specifications and approved technical submittals
27.2.4 Confirm the unit is correct dimensionally, handed correctly and accessible for operation and maintenance as per local code.
27.2.5 Confirm the equipment has the correct ratings, components, protective devices, interlocks (if applicable) as per approved design drawings, manufactures specifications and approved technical submittals
27.2.6 Confirm all gland plates are correct as per the approved technical submittals
27.2.7 Confirm appropriate warning/safety labels are in place.
27.2.8 Confirm all device labelling is correct as per approved Equinix naming convention.
27.2.9 Confirm no damage has occurred in transit and all transit bolts, wedges etc. have been removed.
27.2.10 Carry out all external and internal quality checks of the equipment.
27.2.11 Confirm equipment IPXX ratings are correct as per the approved technical submittals
27.2.12 Confirm network interface card has been supplied as per the approved technical submittals
27.2.13 Confirm system and equipment grounding installation is as per the approved design drawings and the approved technical submittals
27.2.14 Record all equipment details as per the Equinix provided template on the equipment parameter list within commissioning management platform.
27.2.15 Verify Cx level 2A Installation and QAQC inspection checklist has been carried out as per the Equinix approved checklist.

### 27.3 PDU & RPP L2A Documents Required:

(All documents **MUST** be available prior to commencing yellow tag)

27.3.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 27.4 PDU & RPP L2A Sign Off:

27.4.1 All required documentation is uploaded to the Equinix document control platform by GC or Vendor.
27.4.2 All required documentation is uploaded to commissioning management platform by CxA.
27.4.3 CxA to sign off checklist as Approved on commissioning management platform.
27.4.4 Red tag applied to the equipment and signed by CxA.

## PDU & RPP Level 2B Red Tag

The following tests and checks to be undertaken contractor and verified by CxA prior to continuing to Level 3, with appropriate documentation provided

### PDU & RPP L2B Prerequisites:

(All below prerequisites **MUST** be available prior to commencing yellow tag)

27.4.5 Verify red tag has been applied to the equipment and signed off by the CxA.
27.4.6 Verify the Cx level 3 start-up/pre functional testing method statement and risk assessment (RAMS) have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
27.4.7 Verify electrical protection study is approved and uploaded to Equinix document control platform by the EOR and approved by the Equinix Design Manager.
27.4.8 Verify the ARC flash study is approved and uploaded to Equinix document control platform by the EOR and approved by the Equinix Design Manager
27.4.9 Confirm As-Built documentation (if applicable) have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
27.4.10 Verify approved DCOS/BMS & automation points lists have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
27.4.11 GC to compile a test pack in line with Equinix document matrix (refer to document matrix section XX).

### 27.5 PDU & RPP L2B Physical checks:

27.5.1 Confirm earthing systems comply with Equinix Global Design Standards and/or design drawings.
27.5.2 Confirm power cables have been dead tested (refer to cable section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
27.5.3 Confirm control/monitoring cables have been dead tested (refer to cable section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
27.5.4 Confirm control/monitoring cables have been point to point tested, signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA
27.5.5 Confirm all power cables and control/monitoring cabling identification are present as per approved cable schedule and cable interfacing schedule.
27.5.6 Confirm all cables are identified with permanent labels, soundly fixed (glands/cable ties/cleats) identifying source, load, size & type as per the project specification provided by the EOR.
27.5.7 Verify all cable connections pull test & tightness test is found satisfactory
27.5.8 Verify all connections are torqued correctly (if applicable) and double marked.
27.5.9 Confirm all trunking covers and equipment terminal/protection covers are in place and secured.
27.5.10 Confirm supply breaker/fuse has an equal or greater current capacity than the incoming breaker/fuse of the distribution board.
27.5.11 Confirm all protection settings are set for the equipment as per approved protection study.
27.5.12 Confirm cable entry box (if applicable) is installed as per approved design drawings, manufactures specifications and approved technical submittals
27.5.13 Confirm PTW/LOTO procedures are implemented correctly by the GC's approved SAP/AP.
27.5.14 Confirm all equipment labelling and circuit identification is present and correct
27.5.15 Construction clean of room and of equipment
27.5.16 Verification of mechanical operation.
27.5.17 Conduct a White Glove Inspection to ensure equipment is clean and free of debris or foreign materials and the appropriate protection is in place prior to energisation.
27.5.18 Verify vendor Cx level 2B static testing has been carried out as per the vendors Cx level 2B static testing method statement approved by the CxA.
27.5.19 Verify Cx level 2B static testing has been carried out as per the Equinix approved checklist
27.5.20 Confirm all vendor Cx level 2B checks/tests are complete and all documentation has been uploaded to Equinix document control platform by the vendor and approved by the CxA.

### 27.6 PDU & RPP L2B Documents Required:

(All documents **MUST** be available prior to commencing yellow tag)

27.6.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 27.7 PDU & RPP L2B Sign Off:

27.7.1 All required documentation is uploaded to the Equinix document control platform by GC or Vendor.
27.7.2 All required documentation is uploaded to commissioning management platform by CxA.
27.7.3 CxA to sign off checklist as Approved on commissioning management platform.
27.7.4 Yellow tag applied to the equipment and signed by CxA.

**PDU & RPP Level 3 Green Tag**

The following tests and checks to be undertaken and verified by contractor prior to continuing to L4, with appropriate documentation provided

### 27.8 PDU & RPP L3 Pre-requisites:

(All below prerequisites **MUST** be available prior to commencing green tag)

27.8.1 Verify yellow tag has been applied to the equipment and signed by the CxA.
27.8.2 Verify switching schedule and energisation plan is implemented by the GC's approved SAP/AP.
27.8.3 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
27.8.4 GC to compile a test pack in line with Equinix document matrix.

### 27.9 PDU & RPP L3 Physical Checks:

27.9.1 Confirm LOTO procedures are implemented correctly by the GC's approved SAP/AP.
27.9.2 Confirm power cables have been live tested (refer to cable section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
27.9.3 Verify metering (if applicable)
27.9.4 Confirm DCOS/BMS point to graphic testing is complete, signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA
27.9.5 Verify vendor Cx level 3 start-up/pre-functional testing has been carried out as per the vendors Cx level 3 start-up/pre functional method statement approved by the CxA.
27.9.6 Verify Cx level 3 start-up/pre-functional testing has been carried out as per the Equinix approved checklist
27.9.7 Confirm all vendor Cx level 3 checks/tests are complete and all documentation has been uploaded to Equinix document control platform by the vendor and approved by the CxA.

### 27.10 PDU & RPP L3 Documents Required:

(All documents **MUST** be available prior to commencing yellow tag)

27.10.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### PDU & RPP L3 Sign off:

27.10.2 All required documentation is uploaded to commissioning management platform by CxA. (refer to section XX documentation matrix)
27.10.3 CxA to sign off checklist as Approved on commissioning management platform.
27.10.4 Green tag applied to the equipment and signed by CxA.

## 28 Stand-alone Automatic Transfer Switch- ATS

**Automatic Transfer Switch L2A Red Tag**

The following tests and checks to be undertaken by Equipment Vendor / contractor and verified by CxA prior to continuing to Yellow Tag, with appropriate documentation provided

### 28.1 ATS L2A Pre-requisites:

(All below documentation **MUST** be available prior to commencing red tag)

28.1.1 Verify the technical submittals and as built drawings have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
28.1.2 Verify the shop drawings have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
28.1.3 Verify the cable schedules/cable interface schedules have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
28.1.4 Verify the DCOS/BMS points list have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
28.1.5 Verify the FAT/FWT documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA. Any issues raised in FAT/FWT have been addressed. (Routine FAT QAQC documentation acceptable where FWT testing has not been procured).
28.1.6 Verify the Cx level 2B static testing method statement and risk assessment (RAMS) have been uploaded to Equinix document control platform by the GC/vendor and approved by the CxA.
28.1.7 Verify the material delivery receipt has been uploaded to Equinix document control platform by the GC, GC to identify upon kerbside delivery any defects/damages during transit.
28.1.8 GC to compile a test pack in line with Equinix document matrix (refer to section XXX).

### 28.2 ATS L2A Physical checks:

28.2.1 Confirm all deficiencies/comments from FWT/FAT have been closed.
28.2.2 Confirm room/area condition is acceptable as per the Equinix room readiness checklist (refer to section XX).
28.2.3 Confirm equipment has been installed/positioned as per approved design drawings, manufactures specifications and approved technical submittals
28.2.4 Confirm the unit is correct dimensionally, handed correctly and accessible for operation and maintenance as per local code.
28.2.5 Confirm the equipment has the correct ratings, components, protective devices, interlocks (if applicable) as per approved design drawings, manufactures specifications and approved technical submittals
28.2.6 Confirm all gland plates are correct as per the approved technical submittals
28.2.7 Confirm all busbar flanges are correct as per the approved technical submittals and approved shop drawings
28.2.8 Confirm appropriate warning/safety labels are in place.
28.2.9 Confirm all device labelling is correct as per approved Equinix naming convention.
28.2.10 Confirm no damage has occurred in transit and all transit bolts, wedges etc. have been removed.
28.2.11 Carry out all external and internal quality checks of the equipment.
28.2.12 Confirm equipment IPXX ratings are correct as per the approved technical submittals
28.2.13 Confirm network interface card has been supplied as per the approved technical submittals
28.2.14 Confirm system and equipment grounding installation is as per the approved design drawings and the approved technical submittals
28.2.15 Record all equipment details as per the Equinix provided template on the equipment parameter list within commissioning management platform.
28.2.16 Confirm suitable protection is in position after L2A visual inspection.
28.2.17 Verify Cx level 2A Installation and QAQC inspection has been carried out as per the Equinix approved checklist.

### 28.3 ATS L2A Documents Required:

(All documents **MUST** be available prior to sign off red tag)
28.3.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 28.4 ATS L2A Sign Off:

28.4.1 All required documentation is uploaded to the Equinix document control platform by GC or Vendor.
28.4.2 All required documentation is uploaded to commissioning management platform by CxA.
28.4.3 CxA to sign off checklist as Approved on commissioning management platform.
28.4.4 Red tag applied to the equipment and signed by CxA.

## Automatic Transfer Switch L2B Yellow Tag

The following tests and checks to be undertaken by Equipment Vendor / contractor and verified by CxA prior prior to continuing to L3, with appropriate paperwork provided

### 28.5 ATS L2B Pre-requisites:

(All below documentation **MUST** be available prior to commencing yellow tag)
28.5.1 Verify red tag has been applied to the equipment and signed off by the CxA.
28.5.2 Verify yellow tag has been applied to the earthing system and signed off by the CxA.
28.5.3 Verify the Cx level 3 start-up/pre functional testing method statement and risk assessment (RAMS) have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
28.5.4 Verify electrical protection study is approved and uploaded to Equinix document control platform by the EOR and approved by the Equinix Design Manager.
28.5.5 Verify the ARC flash study is approved and uploaded to Equinix document control platform by the EOR and approved by the Equinix Design Manager
28.5.6 Confirm As-Built documentation (if applicable) have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
28.5.7 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
28.5.8 GC to compile a test pack in line with Equinix document matrix.

### 28.6 ATS L2B Physical checks:

28.6.1 Confirm earthing systems comply with Equinix Global Design Standards and/or design drawings.
28.6.2 Confirm busbar have been dead tested (refer to section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
28.6.3 Confirm AC power cables have been dead tested (refer to section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
28.6.4 Confirm control/monitoring cables have been dead tested (refer to section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
28.6.5 Confirm control/monitoring cables have been point to point tested, signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA
28.6.6 Confirm all power cables and control/monitoring cabling identification are present as per approved cable schedule and cable interfacing schedule.

28.6.7 Confirm ALL cables are identified with permanent labels, soundly fixed (glands/cable ties/cleats) identifying source, load, size & type as per the project specification provided by the EOR.
28.6.8 Verify all cable connections pull test is found satisfactory
28.6.9 Verify all connections are torqued correctly (if applicable) and double marked.
28.6.10 Confirm all trunking covers and equipment terminal/protection covers are in place and secured.
28.6.11 Confirm supply breaker/fuse has an equal or greater current capacity than the incoming breaker/fuse of the distribution board.
28.6.12 Confirm all protection settings are set for the equipment as per approved protection study.
28.6.13 Confirm secondary injection protection testing of all breakers/relays (if applicable) and security seal along with protection settings label applied by CxA.
28.6.14 Confirm PTW/LOTO procedures are implemented correctly by the GC's approved SAP/AP.
28.6.15 ATS vendor to conduct a deep clean of ATS and provide report.
28.6.16 Conduct a White Glove Inspection to ensure equipment is clean and free of debris or foreign materials and the appropriate protection is in place prior to energisation.
28.6.17 Verify vendor Cx level 2B static testing has been carried out as per the vendors Cx level 2B static testing method statement approved by the CxA.
28.6.18 Verify Cx level 2B static testing has been carried out as per the Equinix approved checklist
28.6.19 Confirm all vendor Cx level 2B checks/tests are complete and all documentation has been uploaded to Equinix document control platform by the vendor and approved by the CxA.

### 28.7 ATS L2B Documents Required:

(All documents **MUST** be available prior to sign off yellow tag)
28.7.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 28.8 ATS L2B Sign Off:

28.8.1 All required documentation is uploaded to the Equinix document control platform by GC or Vendor.
28.8.2 All required documentation is uploaded to commissioning management platform by CxA.
28.8.3 CxA to sign off checklist as Approved on commissioning management platform.
28.8.4 Yellow tag applied to the equipment and signed by CxA.

## Automatic Transfer Switch L3 – Green Tag

The following tests and checks to be undertaken and verified by contractor prior to continuing to L4, with appropriate documentation provided

### 28.9 ATS L3 Pre-requisites:

(All below documentation **MUST** be available prior to commencing green tag)
28.9.1 Verify yellow tag has been applied to the ATS and signed by the CxA.
28.9.2 Verify yellow tag has been applied to the associated switchboard and signed by the CxA.
28.9.3 Verify DCOS is operational (refer to DCOS section XX)
28.9.4 Verify the Cx level 4 functional & performance test script have been uploaded to Equinix commissioning management platform by CxA.
28.9.5 Confirm CxA load bank & thermal imaging strategy is approved by Equinix CxM and incorporated into the Cx plan.
28.9.6 Verify switching schedule and energisation plan is implemented by the GC's approved SAP/AP.
28.9.7 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
28.9.8 GC to compile a test pack in line with Equinix document matrix.

### 28.10 ATS L3 Physical Checks:

28.10.1 Confirm LOTO procedures are implemented correctly by the GC's approved SAP/AP.
28.10.2 Confirm AC supply cables have been live tested (refer to section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
28.10.3 Confirm busbars have been live tested (refer to section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
28.10.4 Confirm DCOS/BMS point to graphic testing is complete, signed off and documentation has been uploaded to Equinix document control platform by the vendor and approved by the CxA.
28.10.5 Verify ATS settings/timers comply with latest approved Equinix global design standards
28.10.6 Verify firmware versions for ATS comply with approved Equinix global design standards (if applicable).
28.10.7 Record firmware versions for ATS on checklist within commissioning management platform.
28.10.8 Verify source transfers in automatic and manual.
28.10.9 Verify HMI and power meters are operational and reading correctly.
28.10.10 Confirm ATS output voltage is as per approved GDS and recorded.
28.10.11 Verify vendor Cx level 3 start-up/pre-functional testing has been carried out as per the vendors Cx level 3 start-up/pre functional method statement approved by the CxA.
28.10.12 Verify Cx level 3 start-up/pre-functional testing has been carried out as per the Equinix approved checklist
28.10.13 Confirm all vendor Cx level 3 checks/tests are complete and all documentation has been uploaded to Equinix document control platform by the vendor and approved by the CxA.

### 28.11 ATS L3 Documents Required:

(All documents **MUST** be available prior to sign off green tag)
28.11.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 28.12 ATS L3 Sign off:

28.12.1 All required documentation is uploaded to commissioning management platform by CxA. (refer to section XX documentation matrix)
28.12.2 CxA to sign off checklist as Approved on commissioning management platform.
28.12.3 Green tag applied to the equipment and signed by CxA

**Automatic Transfer Switch L4 – Blue Tag**

The following tests and checks to be undertaken contractor and verified by CxA prior to continuing to L5, with appropriate documentation provided. All testing carried out with max available load (load banks connected plus building load)

### 28.13 ATS L4 Pre-requisites:

(All below documentation **MUST** be available prior to commencing blue tag)
28.13.1 Verify green tag has been applied to the ATS and signed off by the CxA.
28.13.2 Verify green tag has been applied to the relevant switchboards and signed off by the CxA.
28.13.3 Verify all related P1 Cx issues are closed on the IRL
28.13.4 Confirm DCOS/BMS verifications are complete and alarm free

### 28.14 ATS L4 Physical checks:

28.14.1 Perform a one hour 100% full design load test of the ATS through each power path with thermal imaging of ATS to be conducted. (refer to thermal imaging section XX).
28.14.2 1-hour S1 Main
28.14.3 1-hour S2 Main
28.14.4 1-hour External Bypass (if applicable)
28.14.5 Confirm trending is captured throughout the above load tests.
28.14.6 Verify source transfers via manual operation
28.14.7 Verify source transfers via automatic operation
28.14.8 S1 mains failure and return
28.14.9 S2 mains failure and return
28.14.10 Verify source seeking functionality between S1 and S2
28.14.11 Perform blip test on S1 and S2.
28.14.12 Confirm DCOS/BMS point to graphic testing is complete and screenshots captured for all of the above tests.

### 28.15 ATS L4 Documents Required:

(All documents **MUST** be available prior to sign off blue tag)
28.15.1 Verify all related test reports including raw data files are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 28.16 ATS L4 Sign off:

28.16.1 All required documentation is uploaded to commissioning management platform by CxA. (refer to section XX documentation matrix)
28.16.2 CxA to sign off checklist as Approved on commissioning management platform.
28.16.3 Blue tag applied to the equipment and signed by CxA.

## 29 Static Transfer Switches (STS)

**Static Transfer Switch L2A Red Tag**

The following tests and checks to be undertaken by Equipment Vendor / contractor and verified by CxA prior to continuing to Yellow Tag, with appropriate documentation provided

### 29.1 STS L2A Pre-requisites:

(All below documentation **MUST** be available prior to commencing red tag)
29.1.1 Verify the technical submittals and as built drawings have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
29.1.2 Verify the shop drawings have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
29.1.3 Verify the cable schedules/cable interface schedules have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
29.1.4 Verify the DCOS/BMS points list have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
29.1.5 Verify the FAT/FWT documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA. Any issues raised in FAT/FWT have been addressed. (Routine FAT QAQC documentation acceptable where FWT testing has not been procured).
29.1.6 Verify the Cx level 2B static testing method statement and risk assessment (RAMS) have been uploaded to Equinix document control platform by the GC/vendor and approved by the CxA.
29.1.7 Verify the material delivery receipt has been uploaded to Equinix document control platform by the GC, GC to identify upon kerbside delivery any defects/damages during transit.
29.1.8 GC to compile a test pack in line with Equinix document matrix (refer to section XXX).

### 29.2 STS L2A Physical checks:

29.2.1 Confirm all deficiencies/comments from FWT/FAT have been closed.
29.2.2 Confirm room/area condition is acceptable as per the Equinix room readiness checklist (refer to section XXX).
29.2.3 Confirm equipment has been installed/positioned as per approved design drawings, manufactures specifications and approved technical submittals
29.2.4 Confirm the unit is correct dimensionally, handed correctly and accessible for operation and maintenance as per local code.
29.2.5 Confirm the equipment has the correct ratings, components, protective devices, interlocks (if applicable) as per approved design drawings, manufactures specifications and approved technical submittals
29.2.6 Confirm all gland plates are correct as per the approved technical submittals
29.2.7 Confirm all busbar flanges are correct as per the approved technical submittals and approved shop drawings
29.2.8 Confirm appropriate warning/safety labels are in place.
29.2.9 Confirm all device labelling is correct as per approved Equinix naming convention.
29.2.10 Confirm no damage has occurred in transit and all transit bolts, wedges etc. have been removed.
29.2.11 Carry out all external and internal quality checks of the equipment.
29.2.12 Confirm equipment IPXX ratings are correct as per the approved technical submittals
29.2.13 Confirm network interface card has been supplied as per the approved technical submittals
29.2.14 Confirm system and equipment grounding installation is as per the approved design drawings and the approved technical submittals
29.2.15 Record all equipment details as per the Equinix provided template on the equipment parameter list within commissioning management platform.
29.2.16 Confirm suitable protection is in position after L2A visual inspection.
29.2.17 Verify Cx level 2A Installation and QAQC inspection has been carried out as per the Equinix approved checklist.

### 29.3 STS L2A Documents Required:

(All documents **MUST** be available prior to commencing yellow tag)
29.3.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 29.4 STS L2A Sign Off:

29.4.1 All required documentation is uploaded to the Equinix document control platform by GC or Vendor.
29.4.2 All required documentation is uploaded to commissioning management platform by CxA.
29.4.3 CxA to sign off checklist as Approved on commissioning management platform.
29.4.4 Red tag applied to the equipment and signed by CxA.

## Static Transfer Switch L2B Yellow Tag

The following tests and checks to be undertaken by Equipment Vendor / contractor and verified by CxA prior prior to continuing to L3, with appropriate paperwork provided

**STS L2B Pre-requisites:**

(All below documentation **MUST** be available prior to commencing yellow tag)
29.4.5 Verify red tag has been applied to the equipment and signed off by the CxA.
29.4.6 Verify yellow tag has been applied to the earthing system and signed off by the CxA.
29.4.7 Verify the Cx level 3 start-up/pre functional testing method statement and risk assessment (RAMS) have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
29.4.8 Verify electrical protection study is approved and uploaded to Equinix document control platform by the EOR and approved by the Equinix Design Manager.
29.4.9 Verify the ARC flash study is approved and uploaded to Equinix document control platform by the EOR and approved by the Equinix Design Manager
29.4.10 Verify key interlocking scheme is uploaded to Equinix document control platform by the vendor and approved by the EOR.
29.4.11 Confirm As-Built documentation (if applicable) have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
29.4.12 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
29.4.13 GC to compile a test pack in line with Equinix document matrix.

### 29.5 STS L2B Physical checks:

29.5.1 Confirm earthing systems comply with Equinix Global Design Standards and/or design drawings.
29.5.2 Confirm busbar have been dead tested (refer to section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
29.5.3 Confirm AC power cables have been dead tested (refer to section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
29.5.4 Confirm control/monitoring cables have been dead tested (refer to section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
29.5.5 Confirm control/monitoring cables have been point to point tested, signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA
29.5.6 Confirm all power cables and control/monitoring cabling identification are present as per approved cable schedule and cable interfacing schedule.
29.5.7 Confirm ALL cables are identified with permanent labels, soundly fixed (glands/cable ties/cleats) identifying source, load, size & type as per the project specification provided by the EOR.
29.5.8 Verify all cable connections pull test is found satisfactory

29.5.9 Verify all connections are torqued correctly (if applicable) and double marked.
29.5.10 Confirm all trunking covers and equipment terminal/protection covers are in place and secured.
29.5.11 Confirm supply breaker/fuse has an equal or greater current capacity than the incoming breaker/fuse of the distribution board.
29.5.12 Confirm all protection settings are set for the equipment as per approved protection study.
29.5.13 Confirm secondary injection protection testing of all breakers/relays (if applicable) and security seal along with protection settings label applied by CxA.
29.5.14 Confirm PTW/LOTO procedures are implemented correctly by the GC's approved SAP/AP.
29.5.15 STS vendor to conduct a deep clean of STS and provide report.
29.5.16 Conduct a White Glove Inspection to ensure equipment is clean and free of debris or foreign materials and the appropriate protection is in place prior to energisation.
29.5.17 Verify vendor Cx level 2B static testing has been carried out as per the vendors Cx level 2B static testing method statement approved by the CxA.
29.5.18 Verify Cx level 2B static testing has been carried out as per the Equinix approved checklist
29.5.19 Confirm all vendor Cx level 2B checks/tests are complete and all documentation has been uploaded to Equinix document control platform by the vendor and approved by the CxA.

### 29.6 STS L2B Documents Required:

(All documents **MUST** be available prior to commencing yellow tag)
Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 29.7 STS L2B Sign Off:

29.7.1 All required documentation is uploaded to the Equinix document control platform by GC or Vendor.
29.7.2 All required documentation is uploaded to commissioning management platform by CxA.
29.7.3 CxA to sign off checklist as Approved on commissioning management platform.
29.7.4 Yellow tag applied to the equipment and signed by CxA.

## Static Transfer Switch L3 Green Tag

The following tests and checks to be undertaken and verified by contractor prior to continuing to L4, with appropriate documentation provided

### 29.8 STS Pre-requisites:

(All below documentation **MUST** be available prior to commencing green tag)
29.8.1 Verify yellow tag has been applied to the STS and signed by the CxA.
29.8.2 Verify yellow tag has been applied to the associated switchboard and signed by the CxA.
29.8.3 Verify yellow tag has been applied to the cooling system, signed by the CxA and operational.
29.8.4 Verify DCOS is operational (refer to DCOS section XX)
29.8.5 Verify the Cx level 4 functional & performance test script have been uploaded to Equinix commissioning management platform by CxA.
29.8.6 Confirm CxA load bank & thermal imaging strategy is approved by Equinix CxM and incorporated into the Cx plan.
29.8.7 Verify switching schedule and energisation plan is implemented by the GC's approved SAP/AP.
29.8.8 Verify approved SOO have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
29.8.9 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
29.8.10 GC to compile a test pack in line with Equinix document matrix.

### 29.9 STS Physical Checks:

29.9.1 Confirm LOTO procedures are implemented correctly by the GC's approved SAP/AP.
29.9.2 Confirm AC supply cables have been live tested (refer to section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
29.9.3 Confirm busbars have been live tested (refer to section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
29.9.4 Confirm DCOS/BMS point to graphic testing is complete, signed off and documentation has been uploaded to Equinix document control platform by the vendor and approved by the CxA.
29.9.5 Verify STS settings comply with latest approved Equinix global design standards
29.9.6 Verify firmware versions for STS comply with approved Equinix global design standards (if applicable).
29.9.7 Record firmware versions for STS on checklist within commissioning management platform.
29.9.8 Verify castell key / interlocking functionality
29.9.9 Verify source transfers in automatic and manual.
29.9.10 Verify HMI and power meters are operational and reading correctly.
29.9.11 Confirm STS output voltage is as per approved GDS and recorded.
29.9.12 Verify vendor Cx level 3 start-up/pre-functional testing has been carried out as per the vendors Cx level 3 start-up/pre functional method statement approved by the CxA.
29.9.13 Verify Cx level 3 start-up/pre-functional testing has been carried out as per the Equinix approved checklist
29.9.14 Confirm all vendor Cx level 3 checks/tests are complete and all documentation has been uploaded to Equinix document control platform by the vendor and approved by the CxA.

### 29.10 STS Documents Required:

(All documents **MUST** be available prior to commencing green tag)

29.10.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 29.11 STS L4 Sign off:

29.11.1 All required documentation is uploaded to commissioning management platform by CxA. (refer to section XX documentation matrix)
29.11.2 CxA to sign off checklist as Approved on commissioning management platform.
29.11.3 Green tag applied to the equipment and signed by CxA

## Static Transfer Switch L4 Blue Tag

The following tests and checks to be undertaken contractor and verified by CxA prior to continuing to L5, with appropriate documentation provided All testing carried out with max available load (load banks connected plus building load)

### 29.12 STS L4 Pre-requisites:

(All below documentation **MUST** be available prior to commencing blue tag)

29.12.1 Verify green tag has been applied to the STS and signed off by the CxA.
29.12.2 Verify green tag has been applied to the relevant switchboards and signed off by the CxA.
29.12.3 Verify green tag has been applied to the relevant Generators and signed off by the CxA.
29.12.4 Verify green tag has been applied to the cooling system and signed off by the CxA.
29.12.5 Verify all related P1 Cx issues are closed on the IRL
29.12.6 Confirm DCOS/BMS verifications are complete and alarm free

### 29.13 STS L4 Physical checks:

29.13.1 Confirm a calibrated PQM is installed on the STS output throughout all L4 Cx.
29.13.2 Confirm an additional calibrated PQM is installed between STS input sources for out of phase test.
29.13.3 PQM's are to be provided by the STS vendor and set up correctly (refer to PQM section XX).
29.13.4 Perform a one hour 100% full design load test of the STS through each power path with thermal imaging of STS to be conducted. (refer to thermal imaging section XX).

- 1-hour S1 Main
- 1-hour S1 Bypass
- 1-hour S2 Main
- 1-hour S2 Bypass
- 1-hour External Bypass (if applicable) Verify source transfers via manual operation

29.13.5 Verify source transfers via automatic operation
29.13.6 S1 mains failure and return
29.13.7 S2 mains failure and return
29.13.8 Verify out of phase transfers (one source on utility and one source on generator).
Confirm DCOS/BMS point to graphic testing is complete and screenshots captured for all of the above tests.
**Note**: refer to CRAH Cx level 4 section XXXX for room cooling redundancy testing

### 29.14 STS L4 Documents Required:

(All documents **MUST** be available prior to commencing blue tag)

29.14.1 Verify all related test reports including raw data files are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 29.15 STS L4 Sign off:

29.15.1 All required documentation is uploaded to commissioning management platform by CxA. (refer to section XX documentation matrix)
29.15.2 CxA to sign off checklist as Approved on commissioning management platform.
29.15.3 Blue tag applied to the equipment and signed by CxA.

## 30 Battery Tripping Unit (BTU) MV/LV

## Battery Tripping Unit (BTU) L2A Red Tag

The following tests and checks to be undertaken by Equipment Vendor / contractor and verified by CxA prior to continuing to Yellow Tag, with appropriate documentation provided

### 30.1 BTU L2A Pre-requisites:

(All below documentation **MUST** be available prior to commencing red tag)

30.1.1 Verify the technical submittals and as built drawings have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
30.1.2 Verify the shop drawings have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
30.1.3 Verify the cable schedules/cable interface schedules have been uploaded to Equinix document control platform by the vendor and approved by the EOR.

30.1.4 Verify the DCOS/BMS points list have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
30.1.5 Verify the FAT/FWT documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA. Any issues raised in FAT/FWT have been addressed. (Routine FAT QAQC documentation acceptable where FWT testing has not been procured).
30.1.6 Verify the Cx level 2B static testing method statement and risk assessment (RAMS) have been uploaded to Equinix document control platform by the GC/vendor and approved by the CxA.
30.1.7 Verify the material delivery receipt has been uploaded to Equinix document control platform by the GC, GC to identify upon kerbside delivery any defects/damages during transit.
30.1.8 GC to compile a test pack in line with Equinix document matrix (refer to section XXX).

### 30.2 BTU L2A Physical checks:

30.2.1 Confirm all deficiencies/comments from FWT/FAT have been closed.
30.2.2 Confirm room/area condition is acceptable as per the Equinix room readiness checklist (refer to section XX).
30.2.3 Confirm equipment has been installed/positioned as per approved design drawings, manufactures specifications and approved technical submittals
30.2.4 Confirm the unit is correct dimensionally, handed correctly and accessible for operation and maintenance as per local code.
30.2.5 Confirm the equipment has the correct ratings, components, protective devices, interlocks (if applicable) as per approved design drawings, manufactures specifications and approved technical submittals
30.2.6 Confirm all gland plates are correct as per the approved technical submittals
30.2.7 Confirm appropriate warning/safety labels are in place.
30.2.8 Confirm all device labelling is correct as per approved Equinix naming convention.
30.2.9 Confirm no damage has occurred in transit and all transit bolts, wedges etc. have been removed.
30.2.10 Carry out all external and internal quality checks of the equipment.
30.2.11 Confirm equipment IPXX ratings are correct as per the approved technical submittals
30.2.12 Confirm network interface card (if applicable) has been supplied as per the approved technical submittals
30.2.13 Confirm system and equipment grounding installation is as per the approved design drawings and the approved technical submittals
30.2.14 Record all equipment details as per the Equinix provided template on the equipment parameter list within commissioning management platform.
30.2.15 Confirm suitable protection is in position after L2A visual inspection.
30.2.16 Verify Cx level 2A Installation and QAQC inspection has been carried out as per the Equinix approved checklist.

### 30.3 BTU L2A Documents Required:

(All documents **MUST** be available prior to sign off red tag)
30.3.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 30.4 BTU L2A Sign Off:

30.4.1 All required documentation is uploaded to the Equinix document control platform by GC or Vendor.
30.4.2 All required documentation is uploaded to commissioning management platform by CxA.
30.4.3 CxA to sign off checklist as Approved on commissioning management platform.
30.4.4 Red tag applied to the equipment and signed by CxA.

**Battery Tripping Unit (BTU) L2BYellow Tag**

The following tests and checks to be undertaken by Equipment Vendor / contractor and verified by CxA prior prior to continuing to L3, with appropriate paperwork provided

### 30.5 BTU L2A Prerequisites:

(All below documentation **MUST** be available prior to commencing yellow tag)
30.5.1 Verify red tag has been applied to the equipment and signed off by the CxA.
30.5.2 Verify yellow tag has been applied to the earthing system and signed off by the CxA.
30.5.3 Verify the Cx level 3 start-up/pre functional testing method statement and risk assessment (RAMS) have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
30.5.4 Confirm As-Built documentation (if applicable) have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
30.5.5 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
30.5.6 GC to compile a test pack in line with Equinix document matrix.

### 30.6 BTU L2A Physical checks:

30.6.1 Confirm earthing systems comply with Equinix Global Design Standards and/or design drawings.
30.6.2 Confirm AC/DC power cables have been dead tested (refer to section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
30.6.3 Confirm control/monitoring cables have been dead tested (refer to section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
30.6.4 Confirm control/monitoring cables have been point to point tested, signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA
30.6.5 Confirm all power cables and control/monitoring cabling identification are present as per approved cable schedule and cable interfacing schedule.
30.6.6 Confirm ALL cables are identified with permanent labels, soundly fixed (glands/cable ties/cleats) identifying source, load, size & type as per the project specification provided by the EOR.
30.6.7 Verify all cable connections pull test is found satisfactory
30.6.8 Verify all connections are torqued correctly (if applicable) and double marked.
30.6.9 Confirm all trunking covers and equipment terminal/protection covers are in place and secured.
30.6.10 Confirm supply breaker/fuse has an equal or greater current capacity than the incoming breaker/fuse of the distribution board.
30.6.11 Confirm all protection settings are set for the equipment as per approved protection study.
30.6.12 Confirm PTW/LOTO procedures are implemented correctly by the GC's approved SAP/AP.
30.6.13 Conduct a White Glove Inspection to ensure equipment is clean and free of debris or foreign materials and the appropriate protection is in place prior to energisation.
30.6.14 Verify vendor Cx level 2B static testing has been carried out as per the vendors Cx level 2B static testing method statement approved by the CxA.
30.6.15 Verify Cx level 2B static testing has been carried out as per the Equinix approved checklist
30.6.16 Confirm all vendor Cx level 2B checks/tests are complete and all documentation has been uploaded to Equinix document control platform by the vendor and approved by the CxA.

### 30.7 BTU L2A Documents Required:

(All documents **MUST** be available prior to sign off yellow tag)
30.7.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 30.8 BTU L2A Sign Off:

30.8.1 All required documentation is uploaded to the Equinix document control platform by GC or Vendor.
30.8.2 All required documentation is uploaded to commissioning management platform by CxA.
30.8.3 CxA to sign off checklist as Approved on commissioning management platform.
30.8.4 Yellow tag applied to the equipment and signed by CxA.

## Battery Tripping Unit (BTU) L3 Green Tag

The following tests and checks to be undertaken and verified by contractor prior to continuing to L4, with appropriate documentation provided

### 30.9 BTU L3 Prerequisites:

(All below documentation **MUST** be available prior to commencing green tag)
30.9.1 Verify yellow tag has been applied to the BTU and signed by the CxA.
30.9.2 Verify AC power supply is available to the BTU and associated circuit has been dead tested and signed off by the CxA.
30.9.3 Verify DCOS is operational (refer to DCOS section XX)
30.9.4 Verify the Cx level 4 functional & performance test script have been uploaded to Equinix commissioning management platform by CxA.
30.9.5 Verify switching schedule and energisation plan is implemented by the GC's approved SAP/AP.
30.9.6 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
30.9.7 GC to compile a test pack in line with Equinix document matrix.

### 30.10 BTU L3 Physical Checks:

30.10.1 Confirm LOTO procedures are implemented correctly by the GC's approved SAP/AP.
30.10.2 Confirm AC supply cables have been live tested (refer to section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.

Confirm DCOS/BMS point to graphic testing is complete, signed off and documentation has been uploaded to Equinix document control platform by the vendor and approved by the CxA.
30.10.3 Verify BTU settings comply with latest approved Equinix global design standards
30.10.4 Verify firmware versions for BTU comply with approved Equinix global design standards (if applicable).
30.10.5 Record firmware versions for BTU on checklist within commissioning management platform.
30.10.6 Confirm DC voltages and float voltages are as per approved design drawings, manufactures specifications and approved technical submittals
30.10.7 Verify metering, alarms and indicators are operational.
30.10.8 Verify vendor Cx level 3 start-up/pre-functional testing has been carried out as per the vendors Cx level 3 start-up/pre functional method statement approved by the CxA.
30.10.9 Verify Cx level 3 start-up/pre-functional testing has been carried out as per the Equinix approved checklist
30.10.10 Confirm all vendor Cx level 3 checks/tests are complete and all documentation has been uploaded to Equinix document control platform by the vendor and approved by the CxA.

### 30.11 BTU L3 Documents Required:

(All documents **MUST** be available prior to sign off green tag)

30.11.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 30.12 BTU L3 Sign off:

30.12.1 All required documentation is uploaded to commissioning management platform by CxA. (refer to section XX documentation matrix)
30.12.2 CxA to sign off checklist as Approved on commissioning management platform.
30.12.3 Green tag applied to the equipment and signed by CxA

## 31 Permanent Load Bank

**Permanent Load Bank L2A Red Tag**

The following tests and checks to be undertaken by Equipment Vendor / contractor and verified by CxA prior to continuing to Yellow Tag, with appropriate documentation provided

### 31.1 Permanent Load Bank L2A Pre-requisites:

(All below prerequisites **MUST** be available prior to commencing red tag)

31.1.1 Verify the technical submittals and as built drawings have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
31.1.2 Verify the shop drawings have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
31.1.3 Verify the cable schedules/cable interface schedules have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
31.1.4 Verify the FAT/FWT documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA. Any issues raised in FAT/FWT have been addressed. (Routine FAT QAQC documentation acceptable where FWT testing has not been procured).
31.1.5 Verify the electrical protection study is approved and have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
31.1.6 Verify the Cx level 2B static testing method statement and risk assessment (RAMS) have been uploaded to Equinix document control platform by the GC/vendor and approved by the CxA.
31.1.7 Verify the material delivery receipt has been uploaded to Equinix document control platform by the GC, GC to identify upon kerbside delivery any defects/damages during transit.
31.1.8 GC to compile a test pack in line with Equinix document matrix (refer to document matrix section XX).

### Permanent Load Bank L2A Physical checks:

31.1.9 Confirm all deficiencies/comments from FWT/FAT have been closed.
31.1.10 Confirm room/area condition is acceptable as per the Equinix room readiness checklist.
31.1.11 Confirm equipment has been installed/positioned as per approved design drawings, manufactures specifications and approved technical submittals
31.1.12 Confirm the unit is correct dimensionally, handed correctly and accessible for operation and maintenance as per local code.
31.1.13 Confirm the equipment has the correct ratings, components, protective devices, interlocks (if applicable) as per approved design drawings, manufactures specifications and approved technical submittals
31.1.14 Confirm all gland plates are correct as per the approved technical submittals
31.1.15 Confirm appropriate warning/safety labels are in place.
31.1.16 Confirm all device labelling is correct as per approved Equinix naming convention.
31.1.17 Confirm no damage has occurred in transit and all transit bolts, wedges etc. have been removed.
31.1.18 Carry out all external and internal quality checks of the equipment.
31.1.19 Confirm equipment IPXX ratings are correct as per the approved technical submittals
31.1.20 Confirm network interface card has been supplied as per the approved technical submittals
31.1.21 Confirm system and equipment grounding installation is as per the approved design drawings and the approved technical submittals
31.1.22 Record all equipment details as per the Equinix provided template on the equipment parameter list within commissioning management platform.
31.1.23 Verify Cx level 2A Installation and QAQC inspection checklist has been carried out as per the Equinix approved checklist.

### Permanent Load Bank L2A Documents Required:

(All documents **MUST** be available prior to sign off red tag)

Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### Permanent Load Bank L2A Sign Off:

31.1.24 All required documentation is uploaded to the Equinix document control platform by GC or Vendor.
31.1.25 All required documentation is uploaded to commissioning management platform by CxA.
31.1.26 CxA to sign off checklist as Approved on commissioning management platform.
31.1.27 Red tag applied to the equipment and signed by CxA.

## Permanent Load Bank L2B Yellow Tag

The following tests and checks to be undertaken contractor and verified by CxA prior to continuing to Level 3, with appropriate documentation provided

### Permanent Load Bank L2B Prerequisites:

(All below prerequisites **MUST** be available prior to commencing yellow tag)

31.1.28 Verify red tag has been applied to the equipment and signed off by the CxA.
31.1.29 Verify the Cx level 3 start-up/pre functional testing method statement and risk assessment (RAMS) have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
31.1.30 Verify electrical protection study is approved and uploaded to Equinix document control platform by the EOR and approved by the Equinix Design Manager.
31.1.31 Verify the ARC flash study is approved and uploaded to Equinix document control platform by the EOR and approved by the Equinix Design Manager (if applicable).
31.1.32 Verify key interlocking scheme is uploaded to Equinix document control platform by the vendor and approved by the EOR.
31.1.33 Confirm As-Built documentation (if applicable) have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
31.1.34 GC to compile a test pack in line with Equinix document matrix (refer to document matrix section XX).

### 31.2 Permanent Load Bank L2B Physical checks:

31.2.1 Confirm earthing systems comply with Equinix Global Design Standards and/or design drawings.
31.2.2 Confirm power cables have been dead tested (refer to cable section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
31.2.3 Confirm busduct have been dead tested (refer to busduct section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
31.2.4 Confirm control/monitoring cables have been dead tested (refer to cable section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
31.2.5 Confirm control/monitoring cables have been point to point tested, signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA
31.2.6 Confirm all power cables and control/monitoring cabling identification are present as per approved cable schedule and cable interfacing schedule.
31.2.7 Confirm all cables are identified with permanent labels, soundly fixed (glands/cable ties/cleats) identifying source, load, size & type as per the project specification provided by the EOR.
31.2.8 Verify all cable connections pull test & tightness test is found satisfactory
31.2.9 Verify all connections are torqued correctly (if applicable) and double marked.
31.2.10 Confirm all trunking covers and equipment terminal/protection covers are in place and secured.
31.2.11 Confirm supply breaker/fuse has an equal or greater current capacity than the incoming breaker/fuse of the distribution board.
31.2.12 Confirm all protection settings are set for the equipment as per approved protection study.
31.2.13 Confirm cable entry box (if applicable) is installed as per approved design drawings, manufactures specifications and approved technical submittals
31.2.14 Confirm PTW/LOTO procedures are implemented correctly by the GC's approved SAP/AP.
31.2.15 Confirm all equipment labelling and circuit identification is present and correct
31.2.16 Confirm primary & secondary injection protection scheme testing of all breakers/relays (if applicable) and security seal along with protection settings label applied by CxA.
31.2.17 Conduct a White Glove Inspection to ensure equipment is clean and free of debris or foreign materials and the appropriate protection is in place prior to energisation.
31.2.18 Verify vendor Cx level 2B static testing has been carried out as per the vendors Cx level 2B static testing method statement approved by the CxA.
31.2.19 Verify Cx level 2B static testing has been carried out as per the Equinix approved checklist
31.2.20 Confirm all vendor Cx level 2B checks/tests are complete and all documentation has been uploaded to Equinix document control platform by the vendor and approved by the CxA.
31.2.21

### 31.3 Permanent Load Bank L2B Documents Required:

(All documents **MUST** be available prior to sign off yellow tag)

31.3.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX)

### 31.4 Permanent Load Bank L2B Sign Off:

31.4.1 All required documentation is uploaded to the Equinix document control platform by GC or Vendor.
31.4.2 All required documentation is uploaded to commissioning management platform by CxA.
31.4.3 CxA to sign off checklist as Approved on commissioning management platform.
31.4.4 Yellow tag applied to the equipment and signed by CxA.

## Permanent Load Bank L3 Green Tag

The following tests and checks to be undertaken and verified by contractor prior to continuing to L4, with appropriate documentation provided

### Permanent Load Bank L3 Prerequisites:

(All below prerequisites **MUST** be available prior to commencing green tag)

31.4.5 Verify yellow tag has been applied to the equipment and signed by the CxA.
31.4.6 Verify yellow tag has been applied to the associated switchboard and signed by the CxA.
31.4.7 Verify switching schedule and energisation plan is implemented by the GC's approved SAP/AP.
31.4.8 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
31.4.9 GC to compile a test pack in line with Equinix document matrix.

### 31.5 Permanent Load Bank L3 Physical Checks:

31.5.1 Confirm LOTO procedures are implemented correctly by the GC's approved SAP/AP.
31.5.2 Confirm power cables have been live tested (refer to cable section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
31.5.3 Confirm busduct have been live tested (refer to busduct section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
31.5.4 Verify load bank controller operation and record firmware version
31.5.5 Perform load steps 25%, 50%, 75% & 100% and record power output.
31.5.6 Verify vendor Cx level 3 start-up/pre-functional testing has been carried out as per the vendors Cx level 3 start-up/pre functional method statement approved by the CxA.
31.5.7 Verify Cx level 3 start-up/pre-functional testing has been carried out as per the Equinix approved checklist
31.5.8 Confirm all vendor Cx level 3 checks/tests are complete and all documentation has been uploaded to Equinix document control platform by the vendor and approved by the CxA.

### 31.6 Permanent Load Bank L3 Documents Required:

(All documents **MUST** be available prior to sign off green tag)

31.6.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 31.7 Permanent Load Bank L3 Sign off:

All required documentation is uploaded to commissioning management platform by CxA. (refer to section XX documentation matrix)

31.7.1 CxA to sign off checklist as Approved on commissioning management platform.
31.7.2 Green tag applied to the equipment and signed by CxA.

## Permanent Load Bank L4 Blue Tag

Not Applicable

# 32 Busbar System

For the full requirements for Busducts please refer to The Quality Control appendix

## Busbar System L2A Red Tag

The following tests and checks to be undertaken by Equipment Vendor / contractor and verified by CxA prior to continuing to Yellow Tag, with appropriate documentation provided

### 32.1 Busbar System L2A Prerequisites:

(All below prerequisites **MUST** be available prior to commencing red tag)

32.1.1 Verify the technical submittals and as built drawings have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
32.1.2 Verify the shop drawings have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
32.1.3 Verify the busbar isometric drawings have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
32.1.4 Verify the busbar isometric drawings include joint numbering.
32.1.5 Verify the cable/busbar schedules have been uploaded to Equinix document control platform by the vendor and approved by the EOR.

32.1.6 Verify the FAT/FWT documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA. Any issues raised in FAT/FWT have been addressed. (Routine FAT QAQC documentation acceptable where FWT testing has not been procured). (If applicable for tap off boxes)
32.1.7 Verify the electrical protection study is approved and have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
32.1.8 Verify the DCOS/BMS points list have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
32.1.9 Verify the Cx level 2B static testing method statement and risk assessment (RAMS) have been uploaded to Equinix document control platform by the GC/vendor and approved by the CxA.
32.1.10 GC to compile a test pack in line with Equinix document matrix (refer to document matrix section XX).

### 32.2 Busbar System L2A Physical checks:

32.2.1 Confirm all deficiencies/comments from FWT/FAT have been closed.
32.2.2 Confirm room/area condition is acceptable as per the Equinix room readiness checklist.
32.2.3 Perform a visual inspection of the full length of busbar to check for alignment, damages and adequate fixing arrangement.
32.2.4 Verify all busbar has been installed/positioned as per approved design drawings, manufactures specifications and approved technical submittals
32.2.5 Verify all busbar and flanges are correct dimensionally, handed correctly and accessible for operation and maintenance as per local code.
32.2.6 Verify the busbar has the correct ratings, components, protective devices, interlocks (if applicable) as per approved design drawings, manufactures specifications and approved technical submittals
32.2.7 Confirm earthing systems comply with Equinix Global Design Standards and/or design drawings.
32.2.8 Confirm appropriate warning/safety labels are in place.
32.2.9 Confirm all busbar labelling is correct as per approved Equinix naming convention.
32.2.10 Confirm busbar IPXX ratings are correct as per the approved technical submittals
32.2.11 Confirm busbar system and equipment grounding installation is as per the approved design drawings and the approved technical submittals.
32.2.12 Verify all busbar joints are torqued to the correct value as per manufacturers guidance.
32.2.13 Verify busbar expansion joints are installed as per design (if applicable).
32.2.14 Verify cast resin busbar joints are installed as per design, manufacturers guidance and approved technical submittals. (if applicable)
32.2.15 Verify galvanic separation of dissimilar metals (if applicable).
32.2.16 Record all busbar details as per the Equinix provided template on the equipment parameter list within commissioning management platform.
32.2.17 Verify Cx level 2A Installation and QAQC inspection checklist has been carried out as per the Equinix approved checklist.

### 32.3 Busbar System L2A Documents Required:

(All documents **MUST** be available prior to sign off red tag)
32.3.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX)

### 32.4 Busbar System L2A Sign Off:

32.4.1 All required documentation is uploaded to the Equinix document control platform by GC or Vendor.
32.4.2 All required documentation is uploaded to commissioning management platform by CxA.
32.4.3 CxA to sign off checklist as Approved on commissioning management platform.
32.4.4 Red tag applied to the equipment and signed by CxA.

## Busbar System L2B Yellow Tag

The following tests and checks to be undertaken contractor and verified by CxA prior to continuing to Level 3, with appropriate documentation provided

### 32.5 Busbar System L2B Prerequisites:

(All below prerequisites **MUST** be available prior to commencing yellow tag)
32.5.1 Verify red tag has been applied to the equipment and signed off by the CxA.
32.5.2 Verify the Cx level 3 start-up/pre functional testing method statement and risk assessment (RAMS) have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
32.5.3 Confirm As-Built documentation (if applicable) have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
32.5.4 Verify approved DCOS/BMS & automation points lists have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
32.5.5 GC to compile a test pack in line with Equinix document matrix (refer to document matrix section XX).

### 32.6 Busbar System L2B Physical checks:

32.6.1 Verify all busbar flange connections are torqued correctly and double marked as per manufacturers guidance.
32.6.2 Verification of mechanical operation of tap off boxes.
32.6.3 Confirm all protection settings are set for the tap off boxes as per approved protection study.
32.6.4 Perform secondary injection testing of all tap off breakers (if applicable) and security seal along with protection settings label applied by CxA.
32.6.5 Confirm PTW/LOTO procedures are implemented correctly by the GC's approved SAP/AP.
32.6.6 On completion of static testing ensure all busbar joint covers and end caps are replaced.
32.6.7 Verify vendor Cx level 2B static testing has been carried out as per the vendors Cx level 2B static testing method statement approved by the CxA.
32.6.8 Verify Cx level 2B static testing has been carried out as per the Equinix approved checklist
32.6.9 Confirm all vendor Cx level 2B checks/tests are complete and all documentation has been uploaded to Equinix document control platform by the vendor and approved by the CxA.
32.6.10 **Busbar System L2B Testing Required:** (below tests are the minimum requirement)

- Perform low OHM resistance test of full busbar installation, test current to be minimum 100A and record the Ohm value (R1+R2).
- For cast resin busbar perform low OHM resistance test on each joint prior to resin pour.
- Perform polarity test, can be verified in above test.
- Perform insulation resistance test.

### 32.7 Busbar System L2B Documents Required:

(All documents **MUST** be available prior to commencing yellow tag)

32.7.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 32.8 Busbar System L2B Sign Off:

32.8.1 All required documentation is uploaded to the Equinix document control platform by GC or Vendor.
32.8.2 All required documentation is uploaded to commissioning management platform by CxA.
32.8.3 CxA to sign off checklist as Approved on commissioning management platform.
32.8.4 Yellow tag applied to the equipment and signed by CxA.

## Busbar System L3 Green Tag

The following tests and checks to be undertaken and verified by contractor prior to continuing to L4, with appropriate documentation provided

### 32.9 Busbar System L3 Prerequisites:

(All below prerequisites **MUST** be available prior to commencing green tag)

32.9.1 Verify yellow tag has been applied to the busbar and signed by the CxA.
32.9.2 Verify switching schedule and energisation plan is implemented by the GC's approved SAP/AP.
32.9.3 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
32.9.4 GC to compile a test pack in line with Equinix document matrix.

### 32.10 Busbar System L3 Physical Checks:

32.10.1 Confirm LOTO procedures are implemented correctly by the GC's approved SAP/AP.
32.10.2 Confirm DCOS/BMS point to graphic testing is complete, signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA for tap off boxes (if applicable).
32.10.3 Verify vendor Cx level 3 start-up/pre-functional testing has been carried out as per the vendors Cx level 3 start-up/pre functional method statement approved by the CxA.
32.10.4 Verify Cx level 3 start-up/pre-functional testing has been carried out as per the Equinix approved checklist
32.10.5 Confirm all vendor Cx level 3 checks/tests are complete and all documentation has been uploaded to Equinix document control platform by the vendor and approved by the CxA.

### 32.11 Busbar System L3 Testing Required:

32.11.1 Verify voltage.
32.11.2 Perform phase rotation test.
32.11.3 Perform earth loop impedance test (Ze/Zs). For main distribution boards use a high current earth loop impedance test instrument with resolution of 0.1m Ohm and up to 50kA required for this test.
32.11.4 Perform prospective short circuit current test (PSCC)
32.11.5 Perform prospective earth fault current test (PFC)
32.11.6 Perform 4-hour full design load test, thermal imaging to be conducted every 1-hour intervals.

### 32.12 Busbar System L3 Documents Required:

(All documents **MUST** be available prior to sign off green tag)

32.12.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 32.13 Busbar System L3 Sign off:

32.13.1 All required documentation is uploaded to commissioning management platform by CxA. (refer to section XX documentation matrix)
32.13.2 CxA to sign off checklist as Approved on commissioning management platform.
32.13.3 Green tag applied to the equipment and signed by CxA.

## Busbar System L4 Blue Tag

### 32.14 Main Busbar on Electrical strings L4

MVTX-MSB, MSB-UPS, UPS-Output Board, UPS Bypass

32.14.1 Load testing busbar located within the electrical strings is undertaken in conjunction with the 4 hour load testing of the UPS/MSB
32.14.2 A full thermal image scan must be undertaken of all joints every 60 minutes and a report issued

- **Data Hall Busbars**
- Including: UPS output board- STS/STSSB/PDU, Cable End Box, Data Hall Busbar
- Load testing of Data Hall busbar is undertaken with full load in conjunction with the STS/STSSB 4 hour load test via load banks attached to the data hall busbar
- A full thermal image scan must be undertaken of all joints every 60 minutes and a report issued

### 32.15 Busduct Systems Blue Tag Sign Off

32.15.1 Verify all related test reports including Thermal image scan report are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
32.15.2 All required documentation is uploaded to commissioning management platform by CxA
32.15.3 CxA to sign off checklist as Approved on commissioning management platform

## 33 Busbar Temperature Monitoring System

### Busbar Monitoring System L2A Red Tag

The following tests and checks to be undertaken by Equipment Vendor / contractor and verified by CxA prior to continuing to Yellow Tag, with appropriate documentation provided

### 33.1 Busbar Monitoring System L2A Pre-requisites:

(All below prerequisites **MUST** be available prior to commencing red tag)

33.1.1 Verify the technical submittals and as built drawings have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
33.1.2 Verify the shop drawings have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
33.1.3 Verify the busbar isometric drawings have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
33.1.4 Verify the busbar isometric drawings include joint numbering.
33.1.5 Verify the cable/busbar schedules have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
33.1.6 Verify the DCOS/BMS points list have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
33.1.7 Verify the Cx level 2B static testing method statement and risk assessment (RAMS) have been uploaded to Equinix document control platform by the GC/vendor and approved by the CxA.
33.1.8 GC to compile a test pack in line with Equinix document matrix (refer to document matrix section XX).

### 33.2 Busbar Monitoring System L2A Physical checks:

33.2.1 Confirm room/area condition is acceptable as per the Equinix room readiness checklist.
33.2.2 Confirm equipment has been installed/positioned as per approved design drawings, manufactures specifications and approved technical submittals
33.2.3 Confirm the unit is correct dimensionally, handed correctly and accessible for operation and maintenance as per local code.
33.2.4 Confirm no damage has occurred in transit and all transit bolts, wedges etc. have been removed.
33.2.5 Confirm all glands and cables entries are correct as per the approved technical submittals
33.2.6 Confirm appropriate warning/safety labels are in place.
33.2.7 Confirm all device labelling is correct as per approved Equinix naming convention.
33.2.8 Confirm equipment IPXX ratings are correct as per the approved technical submittals
33.2.9 Confirm network interface card has been supplied as per the approved technical submittals
33.2.10 Record all equipment details as per the Equinix provided template on the equipment parameter list within commissioning management platform.
33.2.11 Verify Cx level 2A Installation and QAQC inspection checklist has been carried out as per the Equinix approved checklist.

### 33.3 Busbar Monitoring System L2A Documents Required:

(All documents **MUST** be available prior to sign off red tag)

33.3.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX)

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### 33.4 Busbar Monitoring System L2A Sign Off:

33.4.1 All required documentation is uploaded to the Equinix document control platform by GC or Vendor.
33.4.2 All required documentation is uploaded to commissioning management platform by CxA.
33.4.3 CxA to sign off checklist as Approved on commissioning management platform.
33.4.4 Red tag applied to the equipment and signed by CxA.
33.4.5

### Busbar Monitoring System L2B Yellow Tag

The following tests and checks to be undertaken contractor and verified by CxA prior to continuing to Level 3, with appropriate documentation provided

### 33.5 Busbar Monitoring System L2B Pre-requisites:

(All below prerequisites MUST be available prior to commencing yellow tag) Verify red tag has been applied to the equipment and signed off by the CxA.

33.5.1 Verify yellow tag has been applied to the busbar and signed off by the CxA.
33.5.2 Verify the Cx level 3 start-up/pre functional testing method statement and risk assessment (RAMS) have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
33.5.3 Confirm As-Built busbar isometric drawings have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
33.5.4 Verify approved DCOS/BMS & automation points lists have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
33.5.5 GC to compile a test pack in line with Equinix document matrix (refer to document matrix section XX).

### 33.6 Busbar Monitoring System L2B Physical checks:

33.6.1 Perform a visual inspection of the full length of busbar temperature monitoring cable:
33.6.2 Verify busbar is clean from any foreign debris such as metal swarf that could damage the temperature monitoring cable.
33.6.3 Perform visual check of the cable for cuts, abrasions and any other damages.
33.6.4 Verify fibre optic cables have the correct bend radius as per manufacture guidance.
33.6.5 Verify temperature monitoring cables are not jointed throughout entire run.
33.6.6 Verify temperature monitoring cables are installed with correct fixing method as per manufacturers guidance.
33.6.7 Verify maintenance access of the temperature monitoring cable is sufficient.
33.6.8 Perform fibre optic cable test (see section XX)
33.6.9 Perform a visual inspection of the busbar temperature monitoring panel:
33.6.10 Confirm earthing systems comply with Equinix Global Design Standards and/or design drawings.
33.6.11 Confirm power cables have been dead tested (refer to cable section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
33.6.12 Confirm control/monitoring cables have been dead tested (refer to cable section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
33.6.13 Confirm control/monitoring cables have been point to point tested, signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA
33.6.14 Confirm all power cables and control/monitoring cabling identification are present as per approved cable schedule and cable interfacing schedule.
33.6.15 Confirm all cables are identified with permanent labels, soundly fixed (glands/cable ties/cleats) identifying source, load, size & type as per the project specification provided by the EOR.
33.6.16 Verify all cable connections pull test & tightness test is found satisfactory
33.6.17 Verify all connections are torqued correctly (if applicable) and double marked.
33.6.18 Confirm all trunking covers and equipment terminal/protection covers are in place and secured.
33.6.19 Confirm supply breaker/fuse has an equal or greater current capacity than the incoming breaker/fuse of the distribution board.
33.6.20 Confirm all equipment labelling and circuit identification is present and correct
33.6.21 Confirm PTW/LOTO procedures are implemented correctly by the GC's approved SAP/AP.
33.6.22 Construction clean of room and of equipment
33.6.23 Conduct a White Glove Inspection to ensure equipment is clean and free of debris or foreign materials and the appropriate protection is in place prior to energisation.
33.6.24 Verify vendor Cx level 2B static testing has been carried out as per the vendors Cx level 2B static testing method statement approved by the CxA.
33.6.25 Verify Cx level 2B static testing has been carried out as per the Equinix approved checklist
33.6.26 Confirm all vendor Cx level 2B checks/tests are complete and all documentation has been uploaded to Equinix document control platform by the vendor and approved by the CxA.

### 33.7 Busbar Monitoring System L2B Documents Required:

(All documents **MUST** be available prior to sign off yellow tag)
33.7.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 33.8 Busbar Monitoring System L2B Sign Off:

33.8.1 All required documentation is uploaded to the Equinix document control platform by GC or Vendor.
33.8.2 All required documentation is uploaded to commissioning management platform by CxA.
33.8.3 CxA to sign off checklist as Approved on commissioning management platform.
33.8.4 Yellow tag applied to the equipment and signed by CxA.

## Busbar Monitoring System L3 Green Tag

The following tests and checks to be undertaken and verified by contractor prior to continuing to L4, with appropriate documentation provided

### 33.9 Busbar Monitoring System L3 Prerequisites:

(All below prerequisites **MUST** be available prior to commencing green tag)
33.9.1 Verify yellow tag has been applied to the busbar temperature monitoring panel and signed by the CxA.
33.9.2 Verify the virtual machine is online and configured. (DCOS TEAM)
33.9.3 Verify the busbar temperature monitoring graphics are correct are available.
33.9.4 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
33.9.5 GC to compile a test pack in line with Equinix document matrix.

### 33.10 Busbar Monitoring System L3 Physical Checks:

33.10.1 Verify busbar temperature monitoring system functionality, configuration, zoning and alarming is as per manufacturers guidance.
33.10.2 Confirm DCOS/BMS point to graphic testing is complete, signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
33.10.3 Confirm DCOS / equipment permanent Software License is active before RFS. (DCOS TEAM).
33.10.4 Verify vendor Cx level 3 start-up/pre-functional testing has been carried out as per the vendors Cx level 3 start-up/pre functional method statement approved by the CxA.
33.10.5 Verify Cx level 3 start-up/pre-functional testing has been carried out as per the Equinix approved checklist
33.10.6 Confirm all vendor Cx level 3 checks/tests are complete and all documentation has been uploaded to Equinix document control platform by the vendor and approved by the CxA.

### 33.11 Busbar Monitoring System L3 Documents Required:

(All documents **MUST** be available prior to sign off green tag)
33.11.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 33.12 Busbar Monitoring System L3 Sign off:

33.12.1 All required documentation is uploaded to commissioning management platform by CxA. (refer to section XX documentation matrix)
33.12.2 CxA to sign off checklist as Approved on commissioning management platform.
33.12.3 Green tag applied to the equipment and signed by CxA.

## Busbar Monitoring System L4 Blue Tag

Not required

## *34* Battery Monitoring System

## Battery Monitoring System L2A Red Tag

The following tests and checks to be undertaken and verified by contractor prior to continuing to Yellow Tag L2B, with appropriate paperwork provided

### *34.1* Battery Monitoring System L2A Red Tag

34.1.1 As Built drawings issued from the Vendor
34.1.2 Visual inspection of Equipment is undertaken, no defects present
34.1.3 Verify equipment has been Installed/ positioned as per approved design drawings
34.1.4 Vendor Dead testing method statement is submitted and approved
34.1.5 Cable Schedule has been submitted and approved
34.1.6 Calibration certificates used to carry out the tests are uploaded to Equinix document control
34.1.7 Confirm all device labelling is correct as per site labelling schedule
34.1.8 Confirm the correct equipment as per design specification has been delivered and record nameplate information. Check serial numbers and other identification and appropriate warning labels are in place.
34.1.9 Confirm no damage has occurred in transit and all transit bolts, wedges etc. have been removed
34.1.10 Confirm the unit is correct dimensionally
34.1.11 Confirm the unit is handed correctly
34.1.12 Confirm installation location is available and correctly prepared – Level floor, no ongoing works, etc
34.1.13 Confirm equipment has been installed / positioned as per approved shop drawings
34.1.14 Check no debris or foreign materials have entered the equipment
34.1.15 Confirm all necessary cabling is correctly glanded to ensure the characteristics of the enclosure (e.g. IP56) which the cable enters can be maintained adequately.
34.1.16 Confirm all cabling has appropriate strain relief in place.
34.1.17 Confirm the correct BMS interface card has been supplied
34.1.18 Confirm system and equipment grounding installation is per approved Equinix grounding installation drawing
34.1.19 Red tag applied to the equipment and signed, recorded accordingly

### 34.2 Busbar Monitoring System L3 Documents Required:

(All documents **MUST** be available prior to sign off green tag)
34.2.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 34.3 Battery Monitoring System L2A Sign off

34.3.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA
34.3.2 All required documentation is uploaded to commissioning management platform by CxA
34.3.3 CxA to sign off checklist as Approved on commissioning management platform

**Battery Monitoring System L2B Yellow Tag**

The following tests and checks to be undertaken and verified by contractor prior to continuing to L3, with appropriate paperwork provided

### 34.4 Battery Monitoring System L2B Yellow Tag

34.4.1 Equipment is clean and free of debris (white glove test)
34.4.2 Vendor checks/dead tests are completed, documents are uploaded to Equinix document control.
34.4.3 Verify inputs and outputs to terminals.
34.4.4 All Equipment Identification (labels/ warning signs etc) are present
34.4.5 Earth connections comply with global standards (Ref EES-5) and/ or design.
34.4.6 AC Supply cables have been initially verified, signed off and preliminary documentation is submitted
34.4.7 DC load cables have been initially verified, signed off and final documentation is uploaded to Equinix document control.
34.4.8 Signal cables have been point-to-point & IR tested, signed off and documentation is uploaded to Equinix document control.
34.4.9 As-Built documentation is submitted and approved
34.4.10 All cables (as above) are identified with permanent labels, soundly fixed (cable ties). identifying source, load, size & type.
34.4.11 Torque test. Ensure all bolts and nuts are properly marked using Torque marker pen.
34.4.12 Torque reports for battery connections are submitted and uploaded to Equinix document control
34.4.13 Verify system configurations and settings are as per Equinix approved settings.
34.4.14 Vendor start-up/ live testing method statements are submitted and approved
34.4.15 All trunking covers and terminal covers are in place and secured
34.4.16 Calibration certificates used to carry out the tests are uploaded to Equinix document control
34.4.17 Yellow tag applied to the equipment and signed, recorded accordingly

### 34.5 Battery Monitoring System L2B Sign off

34.5.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA
34.5.2 All required documentation is uploaded to commissioning management platform by CxA
34.5.3 CxA to sign off checklist as Approved on commissioning management platform
34.5.4 Yellow Tag applied to the equipment and signed by CxA

**Battery Monitoring System L3 Green Tag**

The following tests and checks to be undertaken and verified by contractor prior to continuing to L3, with appropriate paperwork provided

### 34.6 Battery Monitoring System L3 Green Tag

34.6.1 Confirm LOTO procedures are implemented correctly by the GC's approved SAP/AP.
34.6.2 Confirm DCOS/BMS point to graphic testing is complete, signed off and documentation has been uploaded to Equinix document control platform by the vendor and approved by the CxA.
34.6.3 Verify firmware versions for batteries comply with approved Equinix global design standards (if applicable).
34.6.4 Record firmware versions for batteries on checklist within commissioning management platform.
34.6.5 Verify BCB inter-trips.
34.6.6 Confirm battery monitoring system is operational
34.6.7 Verify batteries are charging.
34.6.8 Verify vendor Cx level 3 start-up/pre-functional testing has been carried out as per the vendors Cx level 3 start-up/pre functional method statement approved by the CxA.

Battery Monitoring System Level 4 Commissioning – Blue Tag

Not Applicable

## *35* Branch Circuit Monitoring System (BCM)

**Branch Circuit Monitoring System L2A Red Tag**

The following tests and checks to be undertaken by Equipment Vendor / contractor and verified by CxA prior to continuing to Yellow Tag, with appropriate documentation provided

### 35.1 Branch Circuit Monitoring L2A Red Tag

35.1.1 As Built drawings issued from the Vendor
35.1.2 Visual inspection of Equipment is undertaken, no defects present
35.1.3 Verify equipment has been Installed/ positioned as per approved design drawings
35.1.4 Vendor Dead testing method statement is submitted and approved
35.1.5 Cable Schedule has been submitted and approved

### 35.2 Branch Circuit Monitoring System L2A Sign off

35.2.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA
35.2.2 All required documentation is uploaded to commissioning management platform by CxA

## Branch Circuit Monitoring System L2B Yellow Tag

The following tests and checks to be undertaken by Equipment Vendor / contractor and verified by CxA prior to continuing to Green Tag, with appropriate documentation provided

### 35.3 Branch Circuit Monitoring L2B Yellow Tag

35.3.1 Equipment is clean and free of debris (white glove test)
35.3.2 Vendor checks/dead tests are completed, documents are uploaded to Equinix document control.
35.3.3 Verify inputs and outputs to terminals.
35.3.4 All Equipment Identification (labels/ warning signs etc) are present
35.3.5 Earth connections comply with global standards (Ref EES-5) and/ or design.
35.3.6 AC Supply cables have been initially verified, signed off and preliminary documentation is submitted
35.3.7 Signal cables have been point to point & IR tested, signed off and documentation is uploaded to Equinix document control.
35.3.8 As-Built documentation is submitted and approved
35.3.9 All cables (as above) are identified with permanent labels, soundly fixed (cable ties). identifying source, load, size & type.
35.3.10 Torque test. Ensure all bolts and nuts are properly marked using Torque marker pen.
35.3.11 Verify system configurations and settings are as per Equinix approved settings.
35.3.12 Vendor start-up/ live testing method statements are submitted and approved
35.3.13 All trunking covers and terminal covers are in place and secured
35.3.14 Calibration certificates used to carry out the tests are uploaded to Equinix document control
35.3.15 All required documentation is uploaded to commissioning management platform by CxA

### 35.4 Branch Circuit Monitoring System L2B Sign off

35.4.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA
35.4.2 All required documentation is uploaded to commissioning management platform by CxA

## Branch Circuit Monitoring System L3 Green Tag

The following tests and checks to be undertaken by Equipment Vendor / contractor and verified by CxA prior to continuing to Blue Tag, with appropriate documentation provided

### 35.5 Branch Circuit Monitoring System L3 Green Tag

35.5.1 AC Supply & Load cables have been verified, signed off and final documentation is submitted
35.5.2 Verify monitoring system function, configuration, communications and alarms
35.5.3 Verify amperage values are mapped correctly and accurate by applying a known load on circuit and confirming value on BCM graphic
35.5.4 Vendor Live tests have been carried out as per method statement
35.5.5 BCM point to graphic testing is complete, documented and uploaded to Equinix document control
35.5.6 Calibration certificates used to carry out the tests are uploaded to Equinix document control
35.5.7 BCM mapping complete prior to heat load runs

### 35.6 Branch Circuit Monitoring System L3 Sign off

35.6.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA
35.6.2 All required documentation is uploaded to commissioning management platform by CxA

## Branch Circuit Monitoring System L4 Blue Tag

### 35.7 Branch Circuit Monitoring System L4 Blue Tag

35.7.1 Verify functionality and trending of system during heat load test. Trends to be obtain via Branch Circuit Monitoring System and uploaded to Equinix document Portal
35.7.2 Testing document is signed off by CxA
35.7.3 System is left fault/ snag free

### 35.8 Branch Circuit Monitoring System L4 Sign off

35.8.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA
35.8.2 All required documentation is uploaded to commissioning management platform by CxA

# 36 Lightning Protection System

## Lightning Protection System L2A Red Tag

The following tests and checks to be undertaken by Equipment Vendor / contractor and verified by CxA prior to continuing to Yellow Tag, with appropriate documentation provided

### 36.1 Lightning Protection L2A Prerequisites:

(All below prerequisites **MUST** be available prior to commencing red tag)

36.1.1 Verify the technical submittals and as built drawings have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
36.1.2 Verify the shop drawings have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
36.1.3 Verify the cable schedules have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
36.1.4 Verify the Cx level 2B static testing method statement and risk assessment (RAMS) have been uploaded to Equinix document control platform by the GC/vendor and approved by the CxA.
36.1.5 GC to compile a test pack in line with Equinix document matrix (refer to document matrix section XX).

### 36.2 Lightning Protection L2A Physical checks:

36.2.1 Confirm room/area condition is acceptable as per the Equinix room readiness checklist.
36.2.2 Confirm lightning protection system has been installed/positioned as per approved design drawings, manufactures specifications and approved technical submittals
36.2.3 Confirm lightning protection system is correct dimensionally, handed correctly and accessible for operation and maintenance as per local code.
36.2.4 Confirm appropriate warning/safety labels are in place.
36.2.5 Confirm lightning protection system fixed correctly and no damage is visible.
36.2.6 Confirm lightning protection system and equipment grounding installation is as per the approved design drawings and the approved technical submittals
36.2.7 Confirm all earth cables/tape have been installed as per approved design drawings.
36.2.8 Confirm all earth cables/tape have been installed with adequate fixing arrangement.
36.2.9 Verify all earth cables bending radiuses are as per manufacturers guidance.
36.2.10 Verify all earth cables/tape are installed with appropriate terminations and accessories as per design, manufacturers guidance and approved technical submittals.
36.2.11 Verify earth matts/electrodes and earth pits (if applicable) are installed as per as per approved design drawings, manufactures specifications and approved technical submittals.
36.2.12 Record all earthing system details as per the Equinix provided template on the equipment parameter list within commissioning management platform.
36.2.13 Verify Cx level 2A Installation and QAQC inspection checklist has been carried out as per the Equinix approved checklist.

### 36.3 Lightning Protection L2A Documents Required:

(All documents **MUST** be available prior to sign off red tag)
36.3.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 36.4 Lightning Protection L2A Sign Off:

36.4.1 All required documentation is uploaded to the Equinix document control platform by GC or Vendor.
36.4.2 All required documentation is uploaded to commissioning management platform by CxA.
36.4.3 CxA to sign off checklist as Approved on commissioning management platform.
36.4.4 Red tag applied to the equipment and signed by CxA.

## Lightning Protection System L2B Yellow Tag

The following tests and checks to be undertaken contractor and verified by CxA prior to continuing to Level 3, with appropriate documentation provided

### 36.5 Lightning Protection L2B Prerequisites:

(All below prerequisites **MUST** be available prior to commencing yellow tag)
36.5.1 Verify red tag has been applied to the equipment and signed off by the CxA.
36.5.2 Confirm As-Built documentation (if applicable) have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
36.5.3 GC to compile a test pack in line with Equinix document matrix (refer to document matrix section XX).

### 36.6 Lightning Protection L2B Physical checks:

36.6.1 Confirm earthing systems comply with Equinix Global Design Standards and approved design drawings.
36.6.2 Verify all earth cable/tape connections pull test & tightness test is found satisfactory
36.6.3 Verify all connections are torqued to the correct value as per manufacturers guidance and double marked.
36.6.4 Verify vendor Cx level 2B static testing has been carried out as per the vendors Cx level 2B static testing method statement approved by the CxA.
36.6.5 Verify Cx level 2B static testing has been carried out as per the Equinix approved checklist
36.6.6 Confirm all vendor Cx level 2B checks/tests are complete and all documentation has been uploaded to Equinix document control platform by the vendor and approved by the CxA.
36.6.7 Lightning Protection L2B Testing Required
36.6.8 All earthing cable inspection & testing is to comply with local code and documented in agreed format.
(**below tests are the minimum requirement):**
36.6.9 Dead Tests:
36.6.10 Perform continuity test by means of measuring the earthing cable/tape resistance.
36.6.11 Perform earth electrode resistance testing (if applicable) and record the Ohm value.

### 36.7 Lightning Protection L2B Documents Required:

(All documents **MUST** be available prior to sign off yellow tag)
36.7.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 36.8 Lightning Protection L2B Sign Off:

36.8.1 All required documentation is uploaded to the Equinix document control platform by GC or Vendor.
36.8.2 All required documentation is uploaded to commissioning management platform by CxA.
36.8.3 CxA to sign off checklist as Approved on commissioning management platform.
36.8.4 Yellow tag applied to the equipment and signed by CxA.

**Lightning Protection System L3 Green Tag**

Not Applicable

## 37 Harmonic Filter

**Harmonic Filter L2A Red Tag**

The following tests and checks to be undertaken by Equipment Vendor / contractor and verified by CxA prior to continuing to Yellow Tag, with appropriate documentation provided

### Harmonic Filter L2A Pre-requisites:

(All below prerequisites **MUST** be available prior to commencing red tag)

37.1.1 Verify the technical submittals and as built drawings have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
37.1.2 Verify the shop drawings have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
37.1.3 Verify the cable schedules/cable interface schedules have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
37.1.4 Verify the DCOS/BMS points list have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
37.1.5 Verify the FAT/FWT documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA. Any issues raised in FAT/FWT have been addressed. (Routine FAT QAQC documentation acceptable where FWT testing has not been procured).
37.1.6 Verify the electrical protection study is approved and have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
37.1.7 Verify the Cx level 2B static testing method statement and risk assessment (RAMS) have been uploaded to Equinix document control platform by the GC/vendor and approved by the CxA.
37.1.8 Verify the material delivery receipt has been uploaded to Equinix document control platform by the GC, GC to identify upon kerbside delivery any defects/damages during transit.
37.1.9 GC to compile a test pack in line with Equinix document matrix (refer to document matrix section XX).

### 37.2 Harmonic Filter L2A Physical checks:

37.2.1 Confirm all deficiencies/comments from FWT/FAT have been closed.
37.2.2 Confirm room/area condition is acceptable as per the Equinix room readiness checklist.
37.2.3 Confirm equipment has been installed/positioned as per approved design drawings, manufactures specifications and approved technical submittals
37.2.4 Confirm the unit is correct dimensionally, handed correctly and accessible for operation and maintenance as per local code.
37.2.5 Confirm the equipment has the correct ratings, components, protective devices, interlocks (if applicable) as per approved design drawings, manufactures specifications and approved technical submittals
37.2.6 Confirm all gland plates are correct as per the approved technical submittals
37.2.7 Confirm appropriate warning/safety labels are in place.
37.2.8 Confirm all device labelling is correct as per approved Equinix naming convention.
37.2.9 Confirm no damage has occurred in transit and all transit bolts, wedges etc. have been removed.
37.2.10 Carry out all external and internal quality checks of the equipment.
37.2.11 Confirm equipment IPXX ratings are correct as per the approved technical submittals
37.2.12 Confirm network interface card has been supplied as per the approved technical submittals
37.2.13 Confirm system and equipment grounding installation is as per the approved design drawings and the approved technical submittals
37.2.14 Record all equipment details as per the Equinix provided template on the equipment parameter list within commissioning management platform.
37.2.15 Verify Cx level 2A Installation and QAQC inspection checklist has been carried out as per the Equinix approved checklist.

### 37.3 Harmonic Filter L2A Documents Required:

(All documents **MUST** be available prior to commencing yellow tag)

37.3.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 37.4 Harmonic Filter L2A Sign Off:

37.4.1 All required documentation is uploaded to the Equinix document control platform by GC or Vendor.
37.4.2 All required documentation is uploaded to commissioning management platform by CxA.
37.4.3 CxA to sign off checklist as Approved on commissioning management platform.
37.4.4 Red tag applied to the equipment and signed by CxA.

**Harmonic Filter L2B Yellow Tag**

The following tests and checks to be undertaken contractor and verified by CxA prior to continuing to Level 3, with appropriate documentation provided

### 37.5 Harmonic Filter L2B Prerequisites:

(All below prerequisites **MUST** be available prior to commencing yellow tag)

37.5.1 Verify red tag has been applied to the equipment and signed off by the CxA.
37.5.2 Verify green tag has been applied to the associated equipment and signed off by the CxA.

37.5.3 Verify the Cx level 3 start-up/pre functional testing method statement and risk assessment (RAMS) have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
37.5.4 Verify electrical protection study is approved and uploaded to Equinix document control platform by the EOR and approved by the Equinix Design Manager.
37.5.5 Verify the ARC flash study is approved and uploaded to Equinix document control platform by the EOR and approved by the Equinix Design Manager
37.5.6 Confirm As-Built documentation (if applicable) have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
37.5.7 Verify approved DCOS/BMS points lists have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
37.5.8 GC to compile a test pack in line with Equinix document matrix (refer to document matrix section XX).

### 37.6 Harmonic Filter L2B Physical checks:

37.6.1 Confirm earthing systems comply with Equinix Global Design Standards and/or design drawings.
37.6.2 Confirm power cables have been dead tested (refer to cable section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
37.6.3 Confirm control/monitoring cables have been dead tested (refer to cable section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
37.6.4 Confirm control/monitoring cables have been point to point tested, signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA
37.6.5 Confirm all power cables and control/monitoring cabling identification are present as per approved cable schedule and cable interfacing schedule.
37.6.6 Confirm all cables are identified with permanent labels, soundly fixed (glands/cable ties/cleats) identifying source, load, size & type as per the project specification provided by the EOR.
37.6.7 Verify all cable connections pull test & tightness test is found satisfactory
37.6.8 Verify all connections are torqued correctly (if applicable) and double marked.
37.6.9 Confirm all trunking covers and equipment terminal/protection covers are in place and secured.
37.6.10 Confirm supply breaker/fuse has an equal or greater current capacity than the incoming breaker/fuse of the distribution board.
37.6.11 Confirm all protection settings are set for the equipment as per approved protection study.
37.6.12 Confirm cable entry box (if applicable) is installed as per approved design drawings, manufactures specifications and approved technical submittals
37.6.13 Confirm PTW/LOTO procedures are implemented correctly by the GC's approved SAP/AP.
37.6.14 Confirm all equipment labelling and circuit identification is present and correct
37.6.15 Construction clean of room and of equipment
37.6.16 Verification of mechanical operation.
37.6.17 Confirm primary & secondary injection protection scheme testing of all breakers/relays (if applicable) and security seal along with protection settings label applied by CxA.
37.6.18 Verify firmware/software revisions meet Equinix global design standards
37.6.19 Conduct a White Glove Inspection to ensure equipment is clean and free of debris or foreign materials and the appropriate protection is in place prior to energisation.
37.6.20 Verify vendor Cx level 2B static testing has been carried out as per the vendors Cx level 2B static testing method statement approved by the CxA.
37.6.21 Verify Cx level 2B static testing has been carried out as per the Equinix approved checklist
37.6.22 Confirm all vendor Cx level 2B checks/tests are complete and all documentation has been uploaded to Equinix document control platform by the vendor and approved by the CxA.

### 37.7 Harmonic Filter L2B Documents Required:

(All documents **MUST** be available prior to commencing yellow tag)
37.7.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 37.8 Harmonic Filter L2B Sign Off:

37.8.1 All required documentation is uploaded to the Equinix document control platform by GC or Vendor.
37.8.2 All required documentation is uploaded to commissioning management platform by CxA.
37.8.3 CxA to sign off checklist as Approved on commissioning management platform.
37.8.4 Yellow tag applied to the equipment and signed by CxA
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## Harmonic Filter L3 Green Tag

The following tests and checks to be undertaken and verified by contractor prior to continuing to L4, with appropriate documentation provided

### 37.9 Harmonic Filter L3 Pre-requisites:

(All below prerequisites **MUST** be available prior to commencing green tag)
37.9.1 Verify yellow tag has been applied to the equipment and signed by the CxA.
37.9.2 Verify switching schedule and energisation plan is implemented by the GC's approved SAP/AP.
37.9.3 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
37.9.4 GC to compile a test pack in line with Equinix document matrix.

### 37.10 Harmonic Filter L3 Physical Checks:

37.10.1 Confirm LOTO procedures are implemented correctly by the GC's approved SAP/AP.
37.10.2 Confirm power cables have been live tested (refer to cable section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
37.10.3 Confirm PQM is installed and set up correctly.
37.10.4 Verify HMI and power meters are operational and reading correctly.
37.10.5 Verify meter readings on upstream switchgear.
37.10.6 Verify alarms on equipment
37.10.7 Confirm settings are to design specification.
37.10.8 As a minimum perform the following test:
37.10.9 Perform step load test 25%, 50%, 75% and 100% on the equipment on utility source and verify the harmonic filter maintains harmonic percentage as per specification.
37.10.10 Perform a full load test on equipment on both utility and generator sources and verify the harmonic filter maintains harmonic percentage as per specification.
37.10.11 Verify and record harmonic values throughout the above mentioned tests.
37.10.12 Confirm DCOS/BMS point to graphic testing is complete, signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA
37.10.13 Verify vendor Cx level 3 start-up/pre-functional testing has been carried out as per the vendors Cx level 3 start-up/pre functional method statement approved by the CxA.
37.10.14 Verify Cx level 3 start-up/pre-functional testing has been carried out as per the Equinix approved checklist
37.10.15 Confirm all vendor Cx level 3 checks/tests are complete and all documentation has been uploaded to Equinix document control platform by the vendor and approved by the CxA.

### 37.11 Harmonic Filter L3 Documents Required:

(All documents **MUST** be available prior to commencing yellow tag)
37.11.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 37.12 Harmonic Filter L3 Sign off:

37.12.1 All required documentation is uploaded to commissioning management platform by CxA. (refer to section XX documentation matrix)
37.12.2 CxA to sign off checklist as Approved on commissioning management platform.
37.12.3 Green tag applied to the equipment and signed by CxA.

## 38 Lighting & Lighting Control Systems

**Lighting & Lighting Control L2A Red Tag**

The following tests and checks to be undertaken by Equipment Vendor / contractor and verified by CxA prior to continuing to Yellow Tag, with appropriate documentation provided

### 38.1 Lighting & Lighting Control L2A Prerequisites:

(All below prerequisites **MUST** be available prior to commencing red tag)
38.1.1 Verify the technical submittals and as built drawings have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
38.1.2 Verify the shop drawings are uploaded to Equinix document control platform by the vendor and approved by the EOR.
38.1.3 Verify the cable schedules/cable interface schedules have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
38.1.4 Verify the DCOS/BMS points list have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
38.1.5 Verify the FAT/FWT documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA. Any issues raised in FAT/FWT have been addressed. (Routine FAT QAQC documentation acceptable where FWT testing has not been procured).
38.1.6 Verify the electrical protection study is approved and have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
38.1.7 Verify the Cx level 2B static testing method statement and risk assessment (RAMS) have been uploaded to Equinix document control platform by the GC/vendor and approved by the CxA.
38.1.8 Verify the material delivery receipt has been uploaded to Equinix document control platform by the GC, GC to identify upon kerbside delivery any defects/damages during transit.
38.1.9 GC to compile a test pack in line with Equinix document matrix (refer to document matrix section XX).

### 38.2 Lighting & Lighting Control L2A Physical checks:

38.2.1 Confirm all deficiencies/comments from FWT/FAT have been closed.
Confirm room/area condition is acceptable as per the Equinix room readiness checklist.
38.2.2 Confirm equipment has been installed/positioned as per approved design drawings, manufactures specifications and approved technical submittals
38.2.3 Confirm the unit is correct dimensionally, handed correctly and accessible for operation and maintenance as local code.
Confirm the equipment has the correct ratings, components, protective devices as per approved design drawings, manufactures specifications and approved technical submittals
38.2.4 Confirm all gland plates are correct as per the approved technical submittals
38.2.5 Confirm appropriate warning/safety labels are in place.

38.2.6 Confirm all device labelling is correct as per approved Equinix naming convention.
38.2.7 Confirm no damage has occurred in transit and all transit bolts, wedges etc. have been removed.
38.2.8 Carry out all external and internal quality checks of the equipment.
38.2.9 Confirm equipment IPXX ratings are correct as per the approved technical submittals
38.2.10 Confirm network interface card has been supplied as per the approved technical submittals
38.2.11 Confirm system and equipment grounding installation is as per the approved design drawings and the approved technical submittals
38.2.12 Record all equipment details as per the Equinix provided template on the equipment parameter list within commissioning management platform.
38.2.13 Verify Cx level 2A Installation and QAQC inspection checklist has been carried out as per the Equinix approved checklist. \

### 38.3 Lighting & Lighting Control L2A Documents Required:

(All documents **MUST** be available prior to sign off red tag)
38.3.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 38.4 Lighting & Lighting Control L2A Sign Off:

38.4.1 All required documentation is uploaded to the Equinix document control platform by GC or Vendor.
38.4.2 All required documentation is uploaded to commissioning management platform by CxA.
38.4.3 CxA to sign off checklist as Approved on commissioning management platform.
38.4.4 Red tag applied to the equipment and signed by CxA.

## Lighting & Lighting Control L2B Yellow Tag

The following tests and checks to be undertaken contractor and verified by CxA prior to continuing to Level 3, with appropriate documentation provided

### 38.5 Lighting & Lighting Control L2B Prerequisites:

38.5.1 (All below prerequisites **MUST** be available prior to commencing yellow tag)
38.5.2 Verify red tag has been applied to the equipment and signed off by the CxA.
38.5.3 Verify the Cx level 3 start-up/pre functional testing method statement and risk assessment (RAMS) have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
38.5.4 Verify electrical protection study is approved and uploaded to Equinix document control platform by the EOR and approved by the Equinix Design Manager.
38.5.5 Verify the ARC flash study is approved and uploaded to Equinix document control platform by the EOR and approved by the Equinix Design Manager.
38.5.6 Confirm As-Built documentation (if applicable) have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
38.5.7 Verify approved DCOS/BMS & automation points lists have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
38.5.8 GC to compile a test pack in line with Equinix document matrix (refer to document matrix section XX).

### 38.6 Lighting & Lighting Control L2B Physical checks:

38.6.1 Confirm earthing systems comply with Equinix Global Design Standards and/or design drawings.
38.6.2 Confirm AC cables have been dead tested (refer to cable section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
38.6.3 Confirm control/monitoring cables have been dead tested (refer to cable section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
38.6.4 Confirm control/monitoring cables have been point to point tested, signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA
38.6.5 Confirm all AC cables and control/monitoring cabling identification are present as per approved cable schedule and cable interfacing schedule.
38.6.6 Confirm all cables are identified with permanent labels, soundly fixed (glands/cable ties/cleats) identifying source, load, size & type as per the project specification provided by the EOR.
38.6.7 Verify all cable connections pull test & tightness test is found satisfactory
38.6.8 Verify all connections are torqued correctly (if applicable) and double marked.
38.6.9 Confirm all trunking covers and equipment terminal/protection covers are in place and secured.
38.6.10 Confirm supply breaker/fuse has an equal or greater current capacity than the incoming breaker/fuse of the distribution board.
38.6.11 Confirm all protection settings are set for the equipment as per approved protection study.
38.6.12 Confirm cable entry box (if applicable) is installed as per approved design drawings, manufactures specifications and approved technical submittals
38.6.13 Confirm PTW/LOTO procedures are implemented correctly by the GC's approved SAP/AP.
38.6.14 Confirm all equipment labelling and circuit identification is present and correct
38.6.15 Construction clean of room and of equipment.
38.6.16 Cx level 2B equipment static testing **MUST** consist of as a minimum:

- Continuity & polarity test
- Insulation resistance test

38.6.17 Verification of mechanical operation.
38.6.18 Verify control devices are correctly installed and terminated in the field as per approved shop drawings.
38.6.19 Confirm primary & secondary injection protection scheme testing of all breakers/relays (if applicable) and security seal along with protection settings label applied by CxA.
38.6.20 Conduct a White Glove Inspection to ensure equipment is clean and free of debris or foreign materials and the appropriate protection is in place prior to energisation.
38.6.21 Verify vendor Cx level 2B static testing has been carried out as per the vendors Cx level 2B static testing method statement approved by the CxA.
38.6.22 Verify Cx level 2B static testing has been carried out as per the Equinix approved checklist
38.6.23 Confirm all vendor Cx level 2B checks/tests are complete and all documentation has been uploaded to Equinix document control platform by the vendor and approved by the CxA.

### 38.7 Lighting & Lighting Control L2B Documents Required:

(All documents **MUST** be available prior to sign off yellow tag)
38.7.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 38.8 Lighting & Lighting Control L2B Sign Off:

38.8.1 All required documentation is uploaded to the Equinix document control platform by GC or Vendor.
38.8.2 All required documentation is uploaded to commissioning management platform by CxA.
38.8.3 CxA to sign off checklist as Approved on commissioning management platform.
38.8.4 Yellow tag applied to the equipment and signed by CxA.

## Lighting & Lighting Control L3 Green Tag

The following tests and checks to be undertaken and verified by contractor prior to continuing to L4, with appropriate documentation provided

### 38.9 Lighting & Lighting Control L3 Pre-requisites:

(All below prerequisites **MUST** be available prior to commencing green tag)
38.9.1 Verify yellow tag has been applied to the equipment and signed by the CxA.
38.9.2 Verify switching schedule and energisation plan is implemented by the GC's approved SAP/AP.
38.9.3 Verify approved SOO have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
38.9.4 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
38.9.5 GC to compile a test pack in line with Equinix document matrix.

### 38.10 Lighting & Lighting Control L3 Physical Checks:

38.10.1 Confirm LOTO procedures are implemented correctly by the GC's approved SAP/AP.
38.10.2 Confirm AC cables have been live tested (refer to cable section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
38.10.3 Verify metering (if applicable).
38.10.4 Verify the lighting control system program is in line with approved project lighting controls strategy.
38.10.5 Verify all lighting control devices are operating correctly as per lighting controls strategy.
38.10.6 Verify functional test of all lighting control devices.
38.10.7 Verify Lux levels comply as per approved design drawings, manufactures specifications and approved technical submittals.
38.10.8 Confirm DCOS/BMS point to graphic testing is complete, signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA
38.10.9 Verify vendor Cx level 3 start-up/pre-functional testing has been carried out as per the vendors Cx level 3 start-up/pre functional method statement approved by the CxA.
38.10.10 Verify Cx level 3 start-up/pre-functional testing has been carried out as per the Equinix approved checklist
38.10.11 Confirm all vendor Cx level 3 checks/tests are complete and all documentation has been uploaded to Equinix document control platform by the vendor and approved by the CxA.

### 38.11 Lighting & Lighting Control L3 Documents Required:

(All documents **MUST** be available prior to sign off green tag)
38.11.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 38.12 Lighting & Lighting Control L3 Sign off:

All required documentation is uploaded to commissioning management platform by CxA.
(refer to section XX documentation matrix)
38.12.1 CxA to sign off checklist as Approved on commissioning management platform.
38.12.2 Green tag applied to the equipment and signed by CxA.

## Lighting & Lighting Control L4 Blue Tag

Not Applicable

# 39 Variable Frequency Drive (VFD)

## Variable Frequency Drive (VFD) 2A Red Tag

The following tests and checks to be undertaken by Equipment Vendor / contractor and verified by CxA prior to continuing to Yellow Tag, with appropriate documentation provided

### 39.1 VFD L2A Pre-requisites:

*(All below documentation **MUST** be available prior to commencing red tag)*

39.1.1 Verify the technical submittals and as built drawings have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
39.1.2 Verify the shop drawings have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
39.1.3 Verify the cable schedules/cable interface schedules have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
39.1.4 Verify the DCOS/BMS points list has been uploaded to Equinix document control platform by the vendor and approved by the EOR.
39.1.5 Verify the FAT/FWT documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA. Any issues raised in FAT/FWT have been addressed. (Routine FAT QAQC documentation acceptable where FWT testing has not been procured).
39.1.6 Verify the Cx level 2B static testing method statement and risk assessment (RAMS) have been uploaded to Equinix document control platform by the GC/vendor and approved by the CxA.
39.1.7 Verify the material delivery receipt has been uploaded to Equinix document control platform by the GC, GC to identify upon kerbside delivery any defects/damages during transit.
39.1.8 GC to compile a test pack in line with Equinix document matrix.

### 39.2 VFD L2A Physical checks:

39.2.1 Confirm installation location is available and correctly prepared – Level floor, no ongoing works, etc. if VFD is not integrated with associated plant
39.2.2 Confirm the correct VFD has been delivered as per design specification and record nameplate information (check serial numbers, other identification, appropriate warning labels are in place)
39.2.3 Confirm no damage occurred between delivery and installation
39.2.4 Check equipment is properly mounted as per manufacturer's recommendations, for example, anti-vibration mounts where required
39.2.5 Check no debris or foreign materials have entered the equipment
39.2.6 Confirm all external accessories supplied are securely mounted in appropriate containment as per design drawings
39.2.7 Confirm all lifting eyes have been removed (if applicable) and any transit materials
39.2.8 Confirm all necessary cabling is correctly glanded to ensure the characteristics of the enclosure (e.g. IP56) which the cable enters can be maintained adequately.
39.2.9 Confirm all cabling has appropriate strain relief in place.
39.2.10 Confirm all device labelling is correct as per site labelling schedule.
39.2.11 Confirm piping materials / components are fully in accordance with the relevant project piping specification for the piping specification
39.2.12 Confirm all deficiencies/comments from FWT/FAT have been closed.
39.2.13 Confirm room/area condition is acceptable as per the Equinix room readiness checklist.
39.2.14 Confirm equipment has been installed/positioned as per approved design drawings, manufactures specifications and approved technical submittals
39.2.15 Confirm the unit is correct dimensionally, handed correctly and accessible for operation and maintenance as per local code.
39.2.16 Confirm the equipment has the correct ratings, components, protective devices, interlocks (if applicable) as per approved design drawings, manufactures specifications and approved technical submittals
39.2.17 Confirm appropriate warning/safety labels are in place.
39.2.18 Confirm all device labelling is correct as per approved Equinix naming convention.
39.2.19 Confirm no damage has occurred in transit and all transit bolts, wedges etc. have been removed.
39.2.20 Carry out all external and internal quality checks of the equipment.
39.2.21 Confirm equipment IPXX ratings are correct as per the approved technical submittals
39.2.22 Confirm network interface(s) have been supplied as per the approved technical submittals
39.2.23 Confirm system and equipment grounding installation is as per the approved design drawings and the approved technical submittals
39.2.24 Record all equipment details as per the Equinix provided template on the equipment parameter list within commissioning management platform.
39.2.25 Verify Cx level 2A Installation and QAQC inspection has been carried out as per the Equinix approved checklist.

### 39.3 VFD L2A Documents Required:

(All documents **MUST** be available prior to commencing yellow tag)

39.3.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 39.4 VFD L2A Sign Off:

39.4.1 All required documentation is uploaded to the Equinix document control platform by GC or Vendor.
39.4.2 All required documentation is uploaded to commissioning management platform by CxA.
39.4.3 CxA to sign off checklist as Approved on commissioning management platform.
39.4.4 Red tag applied to the equipment and signed by CxA.

## Variable Frequency Drive (VFD) L2B Yellow Tag

The following tests and checks to be undertaken by Equipment Vendor / contractor and verified by CxA prior to continuing to L3, with appropriate paperwork provided

### 39.5 VFD L2B Prerequisites:

(All below documentation **MUST** be available prior to commencing yellow tag)

39.5.1 Verify red tag has been applied to the equipment and signed off by the CxA.
39.5.2 Verify yellow tag has been applied to the earthing system and signed off by the CxA.
39.5.3 Verify Level 2B checks have been carried out on integrated pump/fan, to be yellow tagged as single asset.
39.5.4 Verify the Cx level 3 start-up/pre functional testing method statement and risk assessment (RAMS) have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
39.5.5 Confirm As-Built documentation (if applicable) have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
39.5.6 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
39.5.7 GC to compile a test pack in line with Equinix document matrix.

### 39.6 VFC L2B Physical checks:

39.6.1 Confirm earthing systems comply with Equinix Global Design Standards and/or design drawings.
39.6.2 Confirm power cables have been dead tested (refer to section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
39.6.3 Confirm control/monitoring cables have been dead tested (refer to section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
39.6.4 Confirm control/monitoring cables have been point to point tested, signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA
39.6.5 Confirm ALL cables are identified with permanent labels, soundly fixed (glands/cable ties/cleats) identifying source, load, size & type as per the project specification provided by the EOR.
39.6.6 Verify all cable connections pull test is found satisfactory
39.6.7 Verify all connections are torqued correctly (if applicable) and double marked.
39.6.8 Confirm all equipment terminal/protection covers are in place and secured.
39.6.9 Confirm supply breaker/fuse has an equal or greater current capacity than the incoming breaker/fuse of the distribution board.
39.6.10 Confirm all cable entry points are sealed and watertight as per approved design drawings, manufactures specifications and approved technical submittals
39.6.11 Confirm cable entry box (if applicable) is installed as per approved design drawings, manufactures specifications and approved technical submittals
39.6.12 Check levelling and alignment of units are correct and acceptable
39.6.13 Confirm that the electrical bonding joints are completed according to the project pipe specification
39.6.14 Confirm PTW/LOTO procedures are implemented correctly by the GC's approved SAP/AP.
39.6.15 Conduct a White Glove Inspection to ensure equipment is clean and free of debris or foreign materials and the appropriate protection is in place prior to energisation.
39.6.16 Verify vendor Cx level 2B static testing has been carried out as per the vendors Cx level 2B static testing method statement approved by the CxA.
39.6.17 Verify Cx level 2B static testing has been carried out as per the Equinix approved checklist
39.6.18 Confirm all vendor Cx level 2B checks/tests are complete and all documentation has been uploaded to Equinix document control platform by the vendor and approved by the CxA.

### 39.7 VFD L2B Documents Required:

(All documents **MUST** be available prior to commencing yellow tag)

39.7.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 39.8 VFD L2B Sign Off:

39.8.1 All required documentation is uploaded to the Equinix document control platform by GC or Vendor.
39.8.2 All required documentation is uploaded to commissioning management platform by CxA.
39.8.3 CxA to sign off checklist as Approved on commissioning management platform.
39.8.4 Yellow tag applied to the equipment and signed by CxA.

## Variable Frequency Drive (VFD) L3 Green Tag

The following tests and checks to be undertaken and verified by contractor prior to continuing to L4, with appropriate documentation provided

### 39.9 VFD L3 Pre-requisites:

*(All below documentation **MUST** be available prior to commencing green tag)*

39.9.1 Verify yellow tag has been applied to associated pipework systems (if applicable) equipment and signed by the CxA.
39.9.2 Refer to section XX for DCOS/BMS requirements
39.9.3 Verify switching schedule and energisation plan is implemented by the GC's approved SAP/AP.
39.9.4 Verify approved SOO have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
39.9.5 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
39.9.6 GC to compile a test pack in line with Equinix document matrix.

### 39.10 VFD L3 Physical Checks:

39.10.1 Confirm LOTO procedures are implemented correctly by the GC's approved SAP/AP.
39.10.2 Confirm supply cables have been live tested (refer to section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
39.10.3 Confirm DCOS/BMS and point to graphic testing is complete, signed off and documentation has been uploaded to Equinix document control platform by the vendor and approved by the CxA (if applicable)
39.10.4 Confirm system and pump casing is vented of air
39.10.5 Confirm no excessive vibration
39.10.6 Verify pump rotation / direction is correct
39.10.7 Verify pump head and flow meets pump curve
39.10.8 Verify pump is able to deliver design flow
39.10.9 Measure motor running current on all phases at design flow
39.10.10 Verify vendor Cx level 3 start-up/pre-functional testing has been carried out as per the vendors Cx level 3 start-up/pre functional method statement approved by the CxA.
39.10.11 Verify Cx level 3 start-up/pre-functional testing has been carried out as per the Equinix approved checklist
39.10.12 Confirm all vendor Cx level 3 checks/tests are complete and all documentation has been uploaded to Equinix document control platform by the vendor and approved by the CxA.

### 39.11 VFD L3 Documents Required:

(All documents **MUST** be available prior to commencing yellow tag)
39.11.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 39.12 VFD L3 Sign off:

39.12.1 All required documentation is uploaded to commissioning management platform by CxA. (refer to section XX documentation matrix)
39.12.2 CxA to sign off checklist as Approved on commissioning management platform.
39.12.3 Green tag applied to the equipment and signed by CxA.

**Variable Frequency Drive (VFD) L4 Blue Tag**

Blue tag not required for individual pumps – refer to L4 requirements for associated system.

## 40 Thermal Imaging Requirements

40.1.1 The GC or electrical contractor shall be responsible for carrying out the thermal imaging of their installation. e.g. Electrical equipment, cables/busbars and LV terminations.

40.1.2 The MCE shall be responsible for carrying out the thermal imaging of their equipment. e.g. Electrical equipment including interconnecting cables/busbar and terminations.

40.1.3 Thermal imaging plan is to be developed by the CxA and approved by the Equinix CxM.
40.1.4 Thermal imaging durations to be defined in the approved thermal imaging plan.
40.1.5 Thermal imaging surveys should be performed during periods of maximum rated load testing of the equipment.
40.1.6 Thermal imaging equipment should have a minimum sensitivity of 0.2 degrees C.
40.1.7 Technicians operating thermal imaging equipment must have their Level I infrared thermography certification, or equivalent.
40.1.8 All inaccessible and/or unobservable locations are to be identified prior to carrying out the thermal imaging surveys. These are to be agreed by Equinix Cx Manager.
40.1.9 All necessary equipment covers will be removed or thermal windows to be installed before performing the thermal imaging surveys. Refer to ANSI/NFPA 70B latest edition for details.
40.1.10 PPE to be worn in compliance to the approved arc flash study.
40.1.11 Thermal imaging equipment must be within calibration period.
40.1.12 Digital images must be captured for each equipment thermal imaging point scanned as defined in the approved thermal imaging plan.
40.1.13 All thermal imaging reports must include the load on the equipment and the digital images must be properly tagged with equipment ID, date & time, delta T, ambient temperature.
40.1.14 All digital images must be assembled in a report per equipment/system in a legible format and include thermal image, plus a normal image at each thermal imaging point showing the location.

**Note:** UPS battery thermal imaging required as part of the discharge test immediately after discharge.

## 40.2 Electrical Integrated Systems Test (IST)

**Level 5 Commissioning – White Tag (Electrical Systems Test)**

The CxA is to develop an Integrated System Test Load Bank Strategy including but not limited to, data hall heat loads for IST, heat load bank quantities & locations, permanent or temporary Hot Aisle Containment (HAC) / Cold Aisle Containment (CAC) locations, PQA quantities and locations and identify what BMS/DCOS screenshots and trends are to be captured throughout the IST.

The GC shall be responsible for providing heat load banks, permanent or temporary Hot Aisle Containment (HAC) / Cold Aisle Containment (CAC) installed in the data halls if applicable/as per the CxA's approved Integrated System Test Load Bank Strategy, provide a temporary power plan to identify the electrical supplies to heat load banks and means of communication i.e. radios (coverage to be proven prior to IST)

Note:
When sourcing heat load banks the GC is to ensure an extra 20% spare capacity is allowed for. This is to take into account for any heat load banks failures and volt drop.
Heat load banks should be a maximum rating of 20kW or below, unless a higher rating heat load banks are agreed by Equinix Commissioning Manager.

The following Integrated System Test scenarios are to be carried out as a minimum with all electrical and mechanical plant in auto operation and BMS/DCOS systems alarms free and trending:

Note: A Pre-Integrated System Test (Pre-IST) must be carried out prior to the Integrated System Test (IST) both to be in accordance with the below scenarios.

1. Step up heat load in data hall from 0%-25%-50%-75%-100% for at each step until data hall is stabilised.
2. Fail the utility supply to MV panel 1 and return (auto/manual).
3. Fail the utility supply to MV panel 2 and return (auto/manual).
4. Fail both utility supplies to MV panel 1 and MV panel 2 simultaneously and return (auto/manual).
5. Perform Dead Bus Test and source seeking on MV / LV switchboard on one power string:
6. Fail Utility 1
7. Fail Utility 2 (if applicable)
8. Transfer to generator
9. Fail generator
10. Prove MV / LV Switchboard has no supply on either Generator or Utility – Dead Bus State.
11. Reinstate generator to prove auto restoration on generator.
12. Repeat steps 1 to 5.
13. Reinstate utility to prove auto restoration on utility.
14. Perform dual mains failure followed by cascade generator failure - avoid generator overload scenario (if applicable)
15. Perform utility BLIP Test within timer threshold as per Equinix approved Global Design Standards.
16. Before transfer to generators - System to remain on utility
17. After transfer to generators (utility failed) - System to remain on generator.
18. During generator engine cool down with system supplied by utility - System to remain on utility. (blip test performed within timer threshold).
19. During generator engine cool down with system supplied by utility - System to transfer to generator. (blip test performed outside of timer threshold).
    **Note: before starting the blip tests ensure all systems are in normal operation with timers and settings confirmed.**
20. Swing generator failure scenarios – if applicable
21. NER failure scenarios – if applicable
22. Ensure that all cooling equipment auto restarts as per SOO and cooling is fully restored.
23. Step down heat load in data hall from 100%-75%-50%-25%-0% at each step or until data hall is stabilised.
24. Capture all relevant equipment data locally and via DCOS/BMS including trends.

    Capture and record PUE values and related data at each load step
    **Maintenance scenarios (to be demonstrated to Ops)**
    Perform a generator isolation.
    Demonstrate load banking of a generator.
    Demonstrate UPS shut down and operation of maintenance bypass.
    Demonstrate STS shut down and operation of maintenance bypass.
    Perform a complete power isolation of an mechanical string.
    Perform a complete power isolation of an electrical string (performed during dead bus test).

- Note:
- Install load banks / heaters on the Colo floor to closely simulate actual server heat loads
- Additional data loggers, PQA and thermo hydro-graphs will be required
- Capture and record PUE values and related data at each load step
- Ensure all related trending are enable prior to the commencement of the test
- Perform print screens on the required monitoring system before and after each test

## 41 Power Quality Analyser (PQA) Requirements

The General Contractor (GC) or Main Capital Equipment (MCE) supplier is required to supply, install, set up, and operate the Power Quality Analyser (PQA) equipment according to the following specifications.

### PQA is applicable to but not exclusively limited to the following types of equipment:

- UPS
- 1 no. PQA installed on UPS input
- 1 no. PQA installed on UPS output
- STS / ATS
- 1 no. PQA installed on STS input (set up across one phase of each input supply)
- 1 no. PQA installed on STS output
- Generators
- 1 no. PQA installed on load side of Generator
- MV / LV synchronising switchboards (when required)

### Specification

- Power quality Analyser/Meter (must be capable of recording 256 samples per cycle)
- Acceptable models are Fluke 1750 / Chauvin Arnoux CA8336 or equivalent.
- The meter is capable of logging power quality in accordance with EN50160 standards.
- The meter is capable of logging power quality in accordance with ITIC/CBEMA standards.
- Adequate memory capacity in the PQA is necessary to support the entire duration of the test.

### General recommended trigger parameter & thresholds

- Voltage = +10% of nominal voltage/ -6% of nominal voltage aligning with the harmonized standards
- Total Harmonic distortion Voltage (THDV) = >5%
- Total Harmonic distortion Current (THDI) = 3-5% (on load)
- Frequency (Hz) = +/- 1% of nominal Frequency (Hz)
- Note: In critical output applications like double conversion UPS, the output power quality must meet the ITIC/CBEMA standards

### Requirements

- PQA quantities and locations will be identified in the load bank strategy plan that is developed by the CxA and approved by the Equinix CxM. PQA's to be provided for IST as detailed in IST load strategy plan that is developed by the CxA and approved by the Equinix CxM.
- PQA will be provided, installed, set-up and operated by GC/MCE vendors
- PQA set-up and operation shall be carried out by a trained engineer
- Correct PQA installation and recording should be checked prior to conducting any commissioning activity
- AUX power supply will be available for PQA.
- All required covers on the equipment must be removed to facilitate the installation of the PQA. (The party responsible for this task will be determined and agreed prior test and detailed in load bank strategy plan)
- PPE to be worn in compliance to the approved arc flash study provided by the EOR and/or Equinix approved standards.
- PQA equipment must be within calibration period.
- PQA equipment should be fully operational and safe for use, with all test leads complying with local standards and regulations.
- The data must be reviewed and approved by the CxA during the testing before proceeding to the next tests.
- All PQA data must be assembled in a report per equipment/system including waveform captures in a legible format and RAW data files must be provided.
- RAW data files must be provided at the end of each day of testing for review by CxA
  Final Vendor reports to be submitted to CxA for review no later than 7 days after the test is completed.

# Mechanical Systems

## 42 Chemical Cleaning & Flushing of Pipework (Chilled Water & Condenser Water)

**Chemical Cleaning & Flushing Pre-requisites before asset energisation**

42.1.1 Water flushing Method statement issued and approved by the CxA
42.1.2 Assets isolated before static Flush
42.1.3 Static flushing to be Undertaken
42.1.4 Passivation to be undertaken and checked before Dynamic Flush
42.1.5 Dynamic flushing could be used on low volume systems, but preferred method on closed loop systems is Side Stream Filtration filled with pre-treated water.
42.1.6 Verify all flushing velocities are met on all pipework
42.1.7 Verify water Quality onsite before chemical dosing
42.1.8 Water Quality report template Reviewed
42.1.9 Chemical dosing to be undertaken in line with Manufacturer's Safety Data Sheets (MSDS)
42.1.10 Backflushing of Asset to be undertaken with Dosed Water
42.1.11 Verify all Strainers have been removed and cleaned on the completion of flushing

### 42.2 Conditions for samples to be collected for Laboratory

**Laboratory Analysis collection Requirements**

42.2.1 Adequate sampling points to be determined by the CxA
42.2.2 Each sample must be collected in a sterile container.
42.2.3 Samples must be stored at a temperature between 6-8˚C and must be tested within 24 hours of being removed from the system.
42.2.4 Tests must be performed by an accredited laboratory.
42.2.5 Any variation in results from samples taken at different points around the system should be investigated and, if necessary, further samples taken.
42.2.6 Where connection to existing "Live" system is concerned, samples are to be collected from both live & system to be integrated for laboratory analysis

**Laboratory Analysis Report Requirements**

### 42.3 Laboratory analysis test requirements:

42.3.1 Hardness
42.3.2 Total alkalinity (ppm CaCO3)
42.3.3 Molybdate (ppm MoO4)
42.3.4 Nitrite (ppm NaNO2)
42.3.5 Conductivity (µS/cm)
42.3.6 Total dissolved solids (TDS) (ppm or mg/l)
42.3.7 Suspended solids (mg/l)
42.3.8 pH
42.3.9 Soluble Iron (mg/l) & Total Iron (mg/l)
42.3.10 Soluble Copper (mg/l) & Total Copper (mg/l)
42.3.11 Silica, Sulphate and Chloride (ppm or mg/l)
42.3.12 Glycol (%) – Where Applicable
42.3.13 Bacteriological Analysis (to include test for pseudomonas)
42.3.14 Biological growth (algae and bacteria, visual & counts per ml)
42.3.15 Treatment chemical residual (ppm or mg/l)
42.3.16 Sediment

**CHW Pipework Pressure Testing before Balancing**

42.3.17 Verify that all sectional testing of pipework has been completed
42.3.18 Verify that all section test reports are reviewed, Approved and uploaded to Commissioning Portal
42.3.19 Undertake a pressure test of complete pipework system after sectional testing complete
42.3.20 Confirm external pipework has pressure tested to 1.5x working pressure or 150Psi whichever is higher and documentation has been issued

## 43 Water Balancing

**Water Balancing Pre-Requisites**

43.1.1 Verify the water balancing method statement and risk assessment (RAMS) has been approved and uploaded to Commit Compliance Task on Commissioning Portal
43.1.2 Verify that pressure testing has been completed as per section in Pressure testing
43.1.3 Verify that system flushing has been completed as per section in Chemical Cleaning
43.1.4 Verify that all equipment has been back flushed
43.1.5 Verify that all flushing loops are closed
43.1.6 Ensure pre-commissioning is carried out on the system
43.1.7 Verify that equipment valves positions are as per factory pre-set values
43.1.8 Verify that the mains flow is equal to a minimum of 100% of design
43.1.9 Verify that system equipment is on full flow to match 100% of design at N equipment operating

**Water Balancing Physical Checks**

43.1.10 Ensure pre-commissioning is carried out on the system
43.1.11 Verify that equipment valves positions are as per factory pre-set values
43.1.12 Verify that the mains flow is equal to 100% of design
43.1.13 Verify that system equipment is on full flow to match 100% of design at N equipment operating
43.1.14 Check all of metering stations to prove design flow (Where Applicable)
43.1.15 Check & record all PICVs are receiving required minimum design pressure
43.1.16 Carry out riser failover test to ensure that respective equipment maintains 100% design flow
43.1.17 Check and record system differential pressure for pump speed control.
43.1.18 This is to be carried out in conjunction with the Chiller Plant controls with N equipment in service and at design flow rates
43.1.19 Carry out mains / riser failover test to ensure that respective equipment receive 100% design flow
43.1.20 Carry out redundancy failover test to ensure that respective operating equipment receive 100% design flow
43.1.21 Review Balancing report results
43.1.22 Check & record all equipment is receiving minimum design pressure
43.1.23 Check and record system differential pressure for pump control
43.1.24 Check all of metering stations to prove design flow
43.1.25 Check & record all DRV / Balancing Valves / PICVs are receiving required design pressure
43.1.26 Check and record system differential pressure for pump speed control. This is to be carried out in conjunction with the Chiller Plant controls with N equipment in service and at design flow rates
43.1.27 Carry out mains / riser failover test to ensure that respective equipment receive 100% design flow
43.1.28 Carry out redundancy failover test to ensure that respective operating equipment receive 100% design flow
43.1.29 Test results of all balancing activities carried out.
43.1.30 Verify that system equipment is on full flow to match 100% of design
43.1.31 Verify that the main flow is equal to 100% of design
43.1.32 Check a selection of metering stations to prove design flow
43.1.33 Check & record all equipment is receiving minimum design pressure
43.1.34 Check and record system differential pressure for pump control

## 44 Air Handling Unit

**Air Handling Unit (AHU) 2A Red Tag**

The following tests and checks to be undertaken by Equipment Vendor / contractor and verified by CxA prior to continuing to Yellow Tag, with appropriate documentation provided

### 44.1 Air Handling Unit L2A Prerequisites:

(All below documentation **MUST** be available prior to commencing red tag)

44.1.1 Verify the technical submittals and as built drawings have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
44.1.2 Verify the shop drawings have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
44.1.3 Verify the cable schedules/cable interface schedules have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
44.1.4 Verify the DCOS/BMS points list has been uploaded to Equinix document control platform by the vendor and approved by the EOR.
44.1.5 Verify the FAT/FWT documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA. Any issues raised in FAT/FWT have been addressed. (Routine FAT QAQC documentation acceptable where FWT testing has not been procured).
44.1.6 Verify the Cx level 2B static testing method statement and risk assessment (RAMS) have been uploaded to Equinix document control platform by the GC/vendor and approved by the CxA.
44.1.7 Verify the material delivery receipt has been uploaded to Equinix document control platform by the GC, GC to identify upon kerbside delivery any defects/damages during transit.
44.1.8 GC to compile a test pack in line with Equinix document matrix.

### 44.2 Air Handling Unit L2A Physical checks:

44.2.1 Confirm the correct AHU has been delivered per design specification and record nameplate information (check serial numbers, other identification, appropriate warning labels are in place, fan modules, any loose items)
44.2.2 Confirm no damage occurred between delivery and installation
44.2.3 Check equipment is properly mounted as per manufacturer's recommendations, for example, anti-vibration mounts where required
44.2.4 Confirm sufficient maintenance access.
44.2.5 Check no debris or foreign materials have entered the equipment
44.2.6 Confirm all external accessories supplied, are securely mounted in appropriate containment as per design drawings or securely stored for DH items.
44.2.7 Confirm all lifting eyes/transit bolts have been removed and any other transit materials.
44.2.8 Confirm all necessary cabling is correctly glanded to ensure the characteristics of the enclosure (e.g. IP56) which the cable enters can be maintained adequately.
44.2.9 Confirm all internal cabling has appropriate strain relief in place.
44.2.10 Confirm all device labelling is correct as per site labelling schedule.
44.2.11 Confirm piping materials / components are fully in accordance with the relevant project piping specification.

44.2.12 Confirm all deficiencies/comments from FWT/FAT have been closed.
44.2.13 Confirm room/area condition is acceptable as per the Equinix room readiness checklist.
44.2.14 Confirm equipment has been installed/positioned as per approved design drawings, manufactures specifications and approved technical submittals
44.2.15 Confirm the unit is correct dimensionally, handed correctly and accessible for operation and maintenance as per local code.
44.2.16 Confirm the equipment has the correct ratings, components, protective devices, interlocks (if applicable) as per approved design drawings, manufactures specifications and approved technical submittals
44.2.17 Confirm appropriate warning/safety labels are in place.
44.2.18 Carry out all external and internal quality checks of the equipment.
44.2.19 Confirm equipment IPXX ratings are correct as per the approved technical submittals
44.2.20 Confirm network interface(s) have been supplied as per the approved technical submittals
44.2.21 Record all equipment details as per the Equinix provided template on the equipment parameter list within commissioning management platform.
44.2.22 Verify Cx level 2A Installation and QAQC inspection has been carried out as per the Equinix approved checklist.

### 44.3 Air Handling Unit L2A Documents Required:

(All documents **MUST** be available prior to commencing yellow tag)

44.3.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 44.4 Air Handling Unit Sign Off:

44.4.1 All required documentation is uploaded to the Equinix document control platform by GC or Vendor.
44.4.2 All required documentation is uploaded to commissioning management platform by CxA.
44.4.3 CxA to sign off checklist as Approved on commissioning management platform.
44.4.4 Red tag applied to the equipment and signed by CxA.

## Air Handling Unit (AHU) L2A Yellow Tag

The following tests and checks to be undertaken by Equipment Vendor / contractor and verified by CxA prior prior to continuing to L3, with appropriate paperwork provided

### 44.5 Air Handling Unit L2B Pre-requisites:

(All below documentation **MUST** be available prior to commencing yellow tag)

44.5.1 Verify red tag has been applied to the equipment and signed off by the CxA.
44.5.2 Verify the Cx level 3 start-up/pre functional testing method statement and risk assessment (RAMS) have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
44.5.3 Confirm As-Built documentation (if applicable) have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
44.5.4 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
44.5.5 GC to compile a test pack in line with Equinix document matrix.

### 44.6 Air Handling Unit L2B Physical checks:

44.6.1 Confirm power cables have been dead tested signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
44.6.2 Confirm control/monitoring cables have been dead tested signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
44.6.3 Confirm control/monitoring cables have been point to point tested, signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA
44.6.4 Confirm all power cables and control/monitoring cabling identification are present as per approved cable schedule and cable interfacing schedule.
44.6.5 Confirm ALL cables are identified with permanent labels, soundly fixed (glands/cable ties/cleats) identifying source, load, size & type as per the project specification provided by the EOR.
44.6.6 Verify all connections are torqued correctly (if applicable) and double marked.
44.6.7 Confirm supply breaker/fuse has an equal or greater current capacity than the incoming breaker/fuse of the distribution board.
44.6.8 Confirm all cable entry points are sealed and watertight as per approved design drawings, manufactures specifications and approved technical submittals
44.6.9 Confirm cable entry box (if applicable) is installed as per approved design drawings, manufactures specifications and approved technical submittals
44.6.10 Confirm that the necessary binder points, temperature pockets, filters (if applicable), flush bypass leg, drain points have been installed as per design specification. If Applicable)
44.6.11 Confirm piping support are in accordance with the piping specification
44.6.12 Confirm that the in-line piping components are mounted in the correct orientation and with regard to flow direction.
44.6.13 Confirm all insulated pipework lagging integrity, completed and vapour sealed.
44.6.14 Confirm ALL pipework flange bolts, are in place, show three (3) threads beyond the nut, and have been torqued correctly and documented accordingly. (If Applicable)
44.6.15 Confirm external pipework and has appropriate pressure test documentation uploaded and approved by the CxA
44.6.16 Confirm the correct pipework orifice plate has been installed according to the project pipe specification
44.6.17 Confirm control valve and damper actuators can operated freely under hand control.
44.6.18 Confirm that the electrical bonding joints are completed according to the project pipe specification
44.6.19 Verify yellow tag has been applied to the earthing system and signed off by the CxA
44.6.20 Confirm any associated ductwork and components (such as dampers, actuators, pressure sensors etc match design drawings and specifications if applicable.

44.6.21 Confirm internal pipework has appropriate leak pressure test documentation.
44.6.22 Confirm pipework flushing has been cleaned and flushing documentation has been issued by the vendor and approved by the CxA
44.6.23 Local AHU isolators are labelled accordingly.
44.6.24 Bag & panel/paper filters are installed and clean
44.6.25 Drains and piping connections. Condensate drain pans can fully drain of water when filled and that there are no stagnant areas.
44.6.26 Drain trap has enough depth for fan suction with dirty filters when running at full speed, and that it is filled with water.
44.6.27 Duct connected, clean and leakage tested (Leakage test applicable to medium and high-pressure ducts only)
44.6.28 Confirm heating and cooling coils are undamaged
44.6.29 Confirm humidifier location and installation.
44.6.30 Confirm humidifier process water feed is present.
44.6.31 Confirm DX Installation (If Applicable)
44.6.32 Confirm LOTO procedures are implemented correctly by the GC's approved SAP/AP.
44.6.33 Conduct a White Glove Inspection to ensure equipment is clean and free of debris or foreign materials and the appropriate protection is in place prior to energisation
44.6.34 Confirm all vendor Cx level 2B checks/tests are complete and all documentation has been uploaded to Equinix document control platform by the vendor and approved by the CxA.

### 44.7 Air Handling Unit L2B Documents Required:

(All documents **MUST** be available prior to commencing yellow tag)
44.7.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 44.8 Air Handling Unit L2B Sign Off:

44.8.1 All required documentation is uploaded to the Equinix document control platform by GC or Vendor.
44.8.2 All required documentation is uploaded to commissioning management platform by CxA.
44.8.3 CxA to sign off checklist as Approved on commissioning management platform.
44.8.4 Yellow tag applied to the equipment and signed by CxA.

## Air Handling Unit (AHU) L3 Green Tag

The following tests and checks to be undertaken and verified by contractor prior to continuing to L4, with appropriate documentation provided

### 44.9 Air Handling Unit L3 Pre-requisites:

(All below documentation **MUST** be available prior to commencing green tag)
44.9.1 Verify yellow tag has been applied to the associated chilled water system and signed by the CxA.
44.9.2 Verify water balancing has been completed and signed by the CxA. (If Required)
44.9.3 Verify the Cx level 4 functional & performance test script have been uploaded to Equinix commissioning management platform by CxA.
44.9.4 Verify switching schedule and energisation plan is implemented by the GC's approved SAP/AP.
44.9.5 Verify approved SOO have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
44.9.6 Verify all related L2B test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
44.9.7 GC to compile a test pack in line with Equinix document matrix.
44.9.8 Confirm ALL pipework has been flushed and results are to BISRIA standards and recorded accordingly. Back flushing of coils has been performed and the strainers have been removed and cleaned. (If Applicable)

### 44.10 Air Handling Unit L3 Physical Checks:

44.10.1 Confirm supply cables have been live tested signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
44.10.2 Confirm DCOS/BMS point to graphic testing is complete, signed off and documentation has been uploaded to Equinix document control platform by the vendor and approved by the CxA.
44.10.3 Verify AHU settings comply with approved design
44.10.4 Verify firmware versions for all AHU controllers comply with approved Equinix global design standards
44.10.5 Record firmware versions for all AHU controllers on checklist within commissioning management platform.
44.10.6 Confirm all level 3 vendor commissioning is completed.
44.10.7 Confirm all sensors have been calibrated in their final position with the relevant calibration certificates.
44.10.8 Confirm all AHU components are operational
44.10.9 Confirm AHU vendor commissioning records include a **full** parameter list.
44.10.10 Verify AHU operation and alarms in accordance with approved SOO and approved Equinix global design standards.
44.10.11 Confirm ATS settings have Equinix conform to standards and confirm operation on each supply.
44.10.12 Confirm ATS source seek function
44.10.13 Verify and record ATS changeover
44.10.14 Verify CHW design flowrate (where Applicable)
44.10.15 Verify air flow volume design flowrate
44.10.16 Confirm that the relevant DCOS communication has been installed as per site specification.
44.10.17 Verify and record air On/Off Temperatures across coil
44.10.18 Check the function of the component parts, including (If Applicable) but not limited to the following examples
44.10.19 Fan rotation is correct and any VFD functions
44.10.20 Frost protection heater operating correctly
44.10.21 Recirculating damper operating correctly
44.10.22 Inlet / outlet damper operating correctly
44.10.23 Main fan volume & pressure
44.10.24 Check VFD is as per Equinix approved settings
44.10.25 Verify and record ATS switch, if available, under-voltage and phase monitor relay settings per approved relay settings

44.10.26 Cooling coil is not damage and has been vented of all air
44.10.27 VFD Hz setting at 100% design volume
44.10.28 Confirm the AHU air flow meets design requirement
44.10.29 Measurement of CHW at 100% design flowrate
44.10.30 Pressure profile across:
- Paper Filters
- Bag filters
- Cooling / Heating Coils
- Fan inlet / Unit discharge

44.10.31 Verify Vibration Testing has been undertaken
44.10.32 Verify point to point graphics and all alarms to the DCOS
44.10.33 Verify Cx level 3 start-up/pre-functional testing has been carried out as per approved TMS.
44.10.34 Confirm all vendor Cx level 3 checks/tests are complete and all documentation has been uploaded to Equinix document control platform by the vendor and approved by the CxA.

### 44.11 Air Handling Unit L3 Documents Required:

(All documents **MUST** be available prior to commencing yellow tag)
44.11.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 44.12 Air Handling Unit L3 Sign off:

All required documentation is uploaded to commissioning management platform by CxA. (refer to section XX documentation matrix)
44.12.1 CxA to sign off checklist as Approved on commissioning management platform.
44.12.2 Green tag applied to the equipment and signed by CxA.

## Air Handling Unit (AHU) L4 Blue Tag

The following tests and checks to be undertaken contractor and verified by CxA prior to continuing to L5, with appropriate documentation provided

### 44.13 Air Handling Unit L4 Prerequisites:

(All below documentation **MUST** be available prior to commencing blue tag)
44.13.1 Verify green tag has been applied to Chilled Water System and signed off by the CxA.
44.13.2 Verify all related all Cx issues are closed on the IRL
44.13.3 Confirm DCOS/BMS verifications are complete and alarm free

### 44.14 Air Handling Unit L4 Physical checks:

44.14.1 Confirm that the chilled water system is operating before applying any load
44.14.2 Verify the heat load is applied to associated while during L4 AHU testing
44.14.3 Verify AHU operates in accordance with the approved sequence of operations including, but not limited to;
44.14.4 Sequencing of AHU sections for load as per
44.14.5 Failure changeover of AHU sections
44.14.6 Fan modulation control based on their respective sensors
44.14.7 Supply air temperature control (valve modulation) from relevant sensor(s)
44.14.8 Component failure scenarios (fans / flow / valves switch etc.)
44.14.9 Unit response to alarms (high/low temperature / water leak detection, etc.)
44.14.10 CHW valve position during power failure and upon power restored. Record valve opening timing
44.14.11 Unit response to smoke/fire detection interface
44.14.12 Verify dehumidification, humification and heater function
44.14.13 Raise set point and verify that heater energises and maintain air temperature
44.14.14 Lower setpoint and verify that cooling coil (DX or CHW) operates and maintains setpoint
44.14.15 Raise the humidity setpoint and verify that the humidifier operates and maintains setpoint
44.14.16 Lower the humidity setpoint and verify that both the cooling coil and reheat operates correctly and maintains setpoint
44.14.17 Fail one unit and verify that redundant unit starts and maintains air flow
44.14.18 Remove airflow sensor and verify that unit alarms and shuts down
44.14.19 Verify proper response to sensor failures (return air temp, supply air temp, humidity sensor, damper end switch, etc)
44.14.20 Low airflow simulation (blockage) AHU detects low air flow and raises alarm to DCOS
44.14.21 Smoke detector interface with unit
44.14.22 Verify that the air volume meets 100% of design
44.14.23 Check & record outlets are delivering design air flows
44.14.24 Short and long cycle power failure testing to confirm auto restart of VFD
44.14.25 Confirm vendor's calibration of sensors with a 10% spot check. If any issues are identified, then a further 10% to be checked.
44.14.26 Verify network and network controller failure alarm.
44.14.27 Confirm AHU vendor commissioning records to include a full parameter list during the load test

### 44.15 Air Handling Unit L4 Documents Required:

(All documents **MUST** be available prior to commencing yellow tag)
44.15.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 44.16 Air Handling Unit L4 Sign off:

All required documentation is uploaded to commissioning management platform by CxA. (refer to section XX documentation matrix)
44.16.1 CxA to sign off checklist as Approved on commissioning management platform.
44.16.2 Blue tag applied to the equipment and signed by CxA.

# 45 Chiller (ACC & WCC)

## Chiller L2A Red Tag

The following tests and checks to be undertaken by Equipment Vendor / contractor and verified by CxA prior to continuing to Yellow Tag, with appropriate documentation provided

### 45.1 Chiller L2A Pre-requisites:

(All below documentation **MUST** be available prior to commencing red tag)

45.1.1 Verify the technical submittals have been uploaded to Equinix document control and approved by the EOR.
45.1.2 Verify the shop drawings have been uploaded to Equinix document control platform and approved by the EOR.
45.1.3 Verify the FAT/FWT documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA and any outstanding issues have been highlighted on the IRL
45.1.4 Verify the Cx level 2B static testing method statement and risk assessment (RAMS) have been uploaded to Equinix document control platform by the GC/vendor and approved by the CxA.
45.1.5 GC to compile a test pack in line with Equinix document matrix.

### 45.2 Chiller L2A Physical checks:

45.2.1 Confirm the correct chiller has been delivered per design specification
45.2.2 Confirm no damage occurred between transit and installation
45.2.3 Check equipment is properly mounted as per manufacturer's recommendations
45.2.4 Check no debris or foreign materials have entered the equipment
45.2.5 Confirm all external accessories supplied, such as baffle plates / sensors / tubing, are securely mounted in appropriate containment as per design drawings
45.2.6 Confirm all lifting eyes/transit bolts have been removed and any transit materials removed
45.2.7 Confirm all internal cabling has appropriate strain relief in place.
45.2.8 Confirm all device labelling is correct as per site labelling schedule.
45.2.9 Confirm piping materials / components are fully in accordance with the relevant project piping specification.
45.2.10 Confirm equipment has been installed/positioned as per approved design drawings, manufactures specifications and approved technical submittals
45.2.11 Confirm the unit is correct dimensionally, handed correctly and accessible for operation and maintenance as per local code.
45.2.12 Confirm the equipment has the correct ratings, components, protective devices, interlocks etc as per approved design drawings, and approved technical submittals
45.2.13 Confirm appropriate warning/safety labels are in place.
45.2.14 Carry out all external and internal quality checks of the equipment.
45.2.15 Confirm equipment IPXX ratings are correct as per the approved technical submittals
45.2.16 Confirm network interface(s) have been supplied as per the approved technical submittals
45.2.17 Record all equipment details as per the Equinix provided template on the equipment parameter list within commissioning management platform.
45.2.18 Verify Cx level 2A Installation and QAQC inspection has been carried out as per the Equinix approved checklist.

### 45.3 Chiller L2A Documents Required:

(All documents **MUST** be available prior to commencing yellow tag)

45.3.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 45.4 Chiller L2A Sign Off:

45.4.1 All required documentation is uploaded to the Equinix document control platform by GC or Vendor.
45.4.2 All required documentation is uploaded to commissioning management platform by CxA.
45.4.3 CxA to sign off checklist as Approved on commissioning management platform.
45.4.4 Red tag applied to the equipment and signed by CxA

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## Chiller L2B Yellow Tag

The following tests and checks to be undertaken by Equipment Vendor / contractor and verified by CxA prior prior to continuing to L3, with appropriate paperwork provided

### 45.5 Chiller L2B Prerequisites:

(All below documentation **MUST** be available prior to commencing yellow tag)

45.5.1 Verify red tag has been applied to the equipment and signed off by the CxA.
45.5.2 Verify yellow tag has been applied to the earthing system and signed off by the CxA.
45.5.3 Verify the Cx level 3 start-up/pre functional testing method statement and risk assessment (RAMS) have been uploaded to Equinix document control platform and approved by the CxA.
45.5.4 Confirm As-Built documentation have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
45.5.5 Confirm local authority environmental permits are secured.
45.5.6 Verify all related test L2A reports are complete, signed and have been uploaded to Equinix document control platform and approved by the CxA.
45.5.7 GC to compile a test pack in line with Equinix document matrix.

### 45.6 Chiller L2B Physical checks:

45.6.1 Verify approved SOO have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
45.6.2 Confirm power cables have been dead tested signed off and documentation have been uploaded to Equinix document control platform and approved by the CxA.
45.6.3 Confirm control/monitoring cables have been dead tested signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
45.6.4 Confirm control/monitoring cables have been point to point tested, signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA
45.6.5 Confirm all cable connections pull test is found satisfactory
45.6.6 Confirm all connections are torqued correctly (if applicable) and double marked.
45.6.7 Confirm all trunking covers and equipment terminal/protection covers are in place and secured.
45.6.8 Confirm all cable entry points are sealed and watertight as per approved design drawings, manufactures specifications and approved technical submittals
45.6.9 Confirm that the necessary binder points, temperature pockets, filters (if applicable), flush bypass leg, drain points have been installed as per design specification.
45.6.10 Confirm piping support are in accordance with the piping specification
45.6.11 Confirm that the in-line piping components are mounted in the correct orientation and flow direction.
45.6.12 Confirm that all uninsulated pipework is painted in accordance with the piping specification.
45.6.13 Confirm all insulated pipework lagging integrity, completed and vapour sealed.
45.6.14 Confirm ALL pipework flange bolts, are in place, show three (3) threads beyond the nut, and have been torqued correctly and documented accordingly
45.6.15 Confirm refrigerant type used and charged are as per manufacturer / design specification
45.6.16 Confirm external pipework and has appropriate leak pressure test documentation
45.6.17 Confirm that refrigerant pipework pressure, vacuum and leakage tests have been successfully completed and that there is no evidence of leakage from joints and valves
45.6.18 Confirm that all chilled water pipework trace heating has been installed.
45.6.19 Confirm /LOTO procedures are implemented correctly by the GC's approved SAP/AP.
45.6.20 Conduct a White Glove Inspection to ensure equipment is clean and free of debris or foreign materials and the appropriate protection is in place prior to energisation.
45.6.21 Verify vendor Cx level 2B static testing has been carried out as per the vendors Cx level 2B static testing method statement approved by the CxA.
45.6.22 Confirm all vendor Cx level 2B checks/tests are complete and all documentation has been uploaded to Equinix document control platform by the vendor and approved by the CxA.

### 45.7 Chiller L2B Documents Required:

(All documents **MUST** be available prior to commencing yellow tag)
45.7.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 45.8 Chiller L2B Sign Off:

45.8.1 All required documentation is uploaded to the Equinix document control platform by GC or Vendor.
45.8.2 All required documentation is uploaded to commissioning management platform by CxA.
45.8.3 CxA to sign off checklist as Approved on commissioning management platform.
45.8.4 Yellow tag applied to the equipment and signed by CxA.

## Chiller L3 Green Tag

The following tests and checks to be undertaken and verified by contractor prior to continuing to L4, with appropriate documentation provided

### 45.9 Chiller L3 Pre-requisites:

(All below documentation **MUST** be available prior to commencing green tag)
45.9.1 Verify yellow tag has been applied to any associated pumps and signed by the CxA.
45.9.2 Verify yellow tag has been applied to any associated external heat rejection (if applicable) equipment and signed by the CxA.
45.9.3 Verify the Cx level 4 functional & performance test script have been uploaded to Equinix commissioning management platform by CxA.
45.9.4 Verify switching schedule and energisation plan is implemented by the GC's approved SAP/AP.
45.9.5 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
45.9.6 GC to compile a test pack in line with Equinix document matrix.

### 45.10 Chiller L3 Physical Checks:

45.10.1 Confirm LOTO procedures are implemented correctly by the GC's approved SAP/AP.
45.10.2 Confirm supply cables have been live tested signed off and documentation have been uploaded to Equinix document control platform and approved by the CxA.
45.10.3 Confirm DCOS/BMS and automation point to graphic testing is complete, signed off and documentation has been uploaded to Equinix document control platform approved by the CxA.
45.10.4 Verify Chiller settings comply with approved design
45.10.5 Verify firmware versions for all chiller controllers comply with approved Equinix global design standards
45.10.6 Record firmware versions for all chiller controllers on checklist within commissioning management platform.
45.10.7 Confirm refrigerant type used and charged are as per manufacturer / design specification
45.10.8 Confirm that refrigerant pipework pressure, vacuum and leakage tests have been successfully completed and that there is no evidence of leakage from joints and valves

45.10.9 Verify and record ATS switch, testing is complete
45.10.10 Confirm that the ambient sensor location is adequate (free-cooling chiller)
45.10.11 Confirm all level 3 vendor commissioning is completed at 100% load conditions (per circuit) to ensure stable pressures and accurate refrigerant charges.
45.10.12 Confirm glycol concentrations have been added according to design specification (if applicable)
45.10.13 Confirm all sensors have been calibrated in their final position with the relevant calibration certificates.
45.10.14 Confirm all chiller components are operational
45.10.15 Confirm chiller vendor commissioning records include a full parameter list, including but not limited to:

- Alarm thresholds
- Setpoints
- Control Loop Parameters
- Staging parameters
- Auto/stop commands
- Demand limit setpoint
- Cooling modulation commands
- Evaporator water temp cut offs
- Min & max compressor speeds
- Control staging times
- High / low pressure settings
- Head pressure control setpoint and differential
- Free-cooling circuit operation and capacity
- Evaporator Entering / Leaving Fluid Temperature & Pressure
- Saturated Condenser Temperature (all circuits)
- Saturated Suction Temperature (all circuits)
- Discharge Superheat Temperature, Gas Temperature and Pressure (all circuits)
- Suction Pressure (all circuits)
- Oil Pressure and Oil Filter Differential Pressure (all circuit)
- Compressor Running Current
- Condenser Entering / Leaving Air Temperature (For air cool chiller)
- Condenser Entering / Leaving Water Temperature (For water cool chiller)
- Evaporator and condenser water flow rate

45.10.16 Verify chiller operation and alarms in accordance with approved SOO and approved Equinix global design standards.
45.10.17 Confirm all refrigerant pipework is labelled accordingly
45.10.18 Verify Cx level 3 start-up/pre-functional testing has been carried out as per the Equinix approved checklist
45.10.19 Confirm all vendor Cx level 3 checks/tests are complete and all documentation has been uploaded to Equinix document control platform by the vendor and approved by the CxA.

### 45.11 Chiller L3 Documents Required:

(All documents **MUST** be available prior to commencing yellow tag)
45.11.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 45.12 Chiller L3 Sign off:

45.12.1 All required documentation is uploaded to commissioning management platform by CxA. (refer to section XX documentation matrix)
45.12.2 CxA to sign off checklist as Approved on commissioning management platform.
45.12.3 Green tag applied to the equipment and signed by CxA.

## Chiller L4 Blue Tag

### 45.13 Level 4 Commissioning – Blue Tag

The following tests and checks to be undertaken contractor and verified by CxA prior to continuing to L5, with appropriate documentation provided
All testing carried out with max available load (load banks connected plus building load)

### 45.14 Chiller L4 Pre-requisites:

(All below documentation **MUST** be available prior to commencing blue tag)
45.14.1 Verify green tag has been applied to any associated pumps and signed off by the CxA.
45.14.2 Verify green tag has been applied to any associated external heat rejection (if applicable) and signed off by the CxA.
45.14.3 Verify green tag has been applied to any associated DCOS/BMS panel(s)
45.14.4 Verify green tag has been applied to Data Hall cooling and signed off by the CxA.
45.14.5 Verify green tag has been applied to refrigerant leak detection ventilation (if applicable) and signed off by the CxA
45.14.6 Verify green tag has been applied to the automation system and signed off by the CxA.
45.14.7 Verify all related P1 Cx issues are closed on the IRL
45.14.8 Confirm DCOS/BMS verifications are complete and alarm free

### 45.15 Chiller L4 Physical checks:

45.15.1 Confirm that external heat rejection enabled before proceeding with testing (if applicable)
45.15.2 Apply 100% headload to chilled water and record supply & return temperatures, individual refrigerant pressures & temperatures, refrigerant & oil site glass observations.
45.15.3 Carry out load tests to verify chiller capacity (25%, 50%, 75% load/1 hour and 100% for a minimum of 4 hours (region specific 8 Hours APAC 4 Hours EMEA and EMER)
45.15.4 Verify stability of chiller when operating under low load condition (25%)
45.15.5 Carry out sound and vibration measurement under no load and full load condition
45.15.6 Verify chiller operates in accordance with the approved sequence of operations
45.15.7 Verify any component (compressor/fans/pumps/flow switch etc.) failure scenarios meets expected sequence of operations
45.15.8 Verify transition to/from free-cooling and confirm cooling capacity maintained throughout (if applicable)
45.15.9 Confirm tuning of all control loops (e.g. circuit staging, condenser fand operation, etc.) is localised for site requirements
45.15.10 Confirm vendor's calibration sensors with a 10% spot check. If any issues are identified then a further 10% to be checked.
45.15.11 Refrigerant leak detection to be tested and any associated systems (if applicable)
45.15.12 Verify short cycle power failure testing to confirm rapid restart operation
45.15.13 Record and confirm time taken reach full load after rapid restart conforms with Equinix GDS and RLA is achieved within specified timeframe
45.15.14 Verify network and network controller failure alarm.
45.15.15 Confirm all chiller components are operational and chiller vendor commissioning records to include a full parameter list during the load test, including but not limited to:

- Chiller Sensible Cooling Capacity (kW)
- Chiller Total Cooling Capacity (kW)
- Evaporator and Condenser flow Rate inlet/outlet (L/S)
- Evaporator and Condenser Temp Inlet/Outlet (°C)
- Evaporator and Condenser circuit pressure drop and pressure differential (kPA)
- Oil pressure (kPa)
- Compressor Discharge / Suction Pressure (kPa)
- Compressor running current (Amps)

Chiller plant efficiency
45.15.16 Simulate power failure and verify phase failure function at DCOS/BMS.

### 45.16 Chiller L4 Documents Required:

(All documents **MUST** be available prior to commencing yellow tag)
45.16.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 45.17 Chiller L4 Sign off:

45.17.1 All required documentation is uploaded to commissioning management platform by CxA. (refer to section XX documentation matrix)
45.17.2 CxA to sign off checklist as Approved on commissioning management platform.
45.17.3 Blue tag applied to the equipment and signed by CxA.

## 46 Chiller Controls System

**Chiller Controls L2A Red Tag**

Not Applicable

**Chiller Controls L2A Yellow Tag**

Not Applicable

**Chiller Controls L3 Green Tag**

The following tests and checks to be undertaken and verified by contractor prior to continuing to L4, with appropriate documentation provided

### 46.1 Chiller Controls L3 Prerequisites:

(All below documentation **MUST** be available prior to commencing green tag)
46.1.1 Verify yellow tag has been applied to all connected mechanical plant and signed by the CxA.
46.1.2 Verify the Cx level 4 functional & performance test script have been uploaded to Equinix commissioning management platform by CxA.
46.1.3 Verify approved SOO have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
46.1.4 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA.

### 46.2 Chiller Controls L3 Physical Checks:

46.2.1 Confirm LOTO procedures are implemented correctly by the GC's approved SAP/AP.
46.2.2 Confirm DCOS/BMS point to graphic testing for all associated DCOS panels is complete, signed off and documentation has been uploaded to Equinix document control platform and approved by the CxA.
46.2.3 Record firmware versions for all associated DCOS/BMS controllers, gateways, etc
46.2.4 Verify that any DCOS controllers in a primary/backup configuration have compatible firmware versions

46.2.5 Confirm DCOS vendor commissioning records include a full parameter list for all CHW controllers, including but not limited to:

- Alarm thresholds
- Setpoints
- Control Loop Parameters
- Verify CHW system alarms operate in accordance with approved SOO and approved Equinix global design standards including, but not limited to;
- High/low Alarm Limit
- Invalid Input Alarm
- Redundant Array Sensor Deviation Alarm
- Mismatch Alarm
- Status Alarm
- Redundant Array Sensor Alarm Exclusion
- Correct alarm configuration at alarm management console

46.2.6 Verify communications between CHW DCOS/BMS controllers, RIO and associated devices
46.2.7 Verify communications between CHW DCOS/BMS controllers and DCOS/BMS server (VM)
46.2.8 Verify CHW DCOS/BMS device level network redundancy e.g. IO and PLC rings
46.2.9 Verify CHW DCOS/BMS controller hot/standby changeover (if applicable)
46.2.10 Verify trending and logging are configured and available on the server (VM) as per Equinix Global Standards
46.2.11 100% of CHW DCOS/BMS field instrumentation (e.g. flow transmitter, temperature sensor, etc.) to be point to graphic tested. Where controllers are in primary/backup configuration, any instrumentation connected to these controllers need to be tested with each as the primary.
46.2.12 Verify correct operation of any associated DCOS/BMS control panel HMI (if applicable)
46.2.13 Confirm accuracy of graphics of any associated DCOS/BMS control panel HMI (if applicable)
46.2.14 Remove power and re-instate to verify that unit re-starts correctly and record unit restart / controller reboot time
46.2.15 Verify vendor Cx level 3 start-up/pre-functional testing has been carried out as per the vendors Cx level 3 start-up/pre functional method statement approved by the CxA

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### 46.3 Chiller Controls L3 Documents Required:

(All documents **MUST** be available prior to commencing yellow tag)

46.3.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 46.4 Chiller Controls L3 Sign off:

46.4.1 All required documentation is uploaded to commissioning management platform by CxA. (refer to section XX documentation matrix)
46.4.2 CxA to sign off checklist as Approved on commissioning management platform.
46.4.3 Green tag applied to the equipment and signed by CxA.

## Chiller Controls L4 Blue Tag

The following tests and checks to be undertaken contractor and verified by CxA prior to continuing to L5, with appropriate documentation provided

### 46.5 Chiller Controls L4 Prerequisites:

(All below documentation **MUST** be available prior to commencing blue tag)

46.5.1 Verify blue tag has been applied to all connected chilled water plant and signed off by the CxA.
46.5.2 Confirm layout of temporary aisle containment and heaters has been agreed
46.5.3 Verify all related Cx issues are closed on the IRL
46.5.4 Confirm DCOS/BMS verifications are complete and free from any issues associated with the chilled water plant.
46.5.5 Ensure any DCOS/BMS nuisance alarms are noted and managed.

### 46.6 Chiller Controls L4 Physical checks:

46.6.1 Verify control test sequence is in accordance with Equinix approved sequence of operations at 25% load, including but not limited to:

- Staging up and down operations
- Sequencing / rotation operations
- Fail over modes
- System low flow bypass (if applicable)
- Dynamic flow balancing.
- Setpoint reset (if applicable)
- Verify system operations under low load condition
- Frost protection

46.6.2 Verify control test sequence is in accordance with Equinix approved sequence of operations up to 100% load, including but not limited to:

- Staging up and down operations
- Sequencing / rotation operations
- Fail over modes
- Dynamic flow balancing.
- Setpoint reset (if applicable)
- Frost protection

46.6.3 Verify system response to setpoint adjustment, including but not limited to:
- CHW pump control
- Condenser pump control (If applicable)
- Chiller control (if applicable)
- Cooling Tower control (If applicable)
- Dry air cooler control (If applicable)
- Valve control (If applicable)
- Full cooling block failure scenarios
- Sensor failure scenarios
- Verify RAS functions
- Buffer tank operations during various mode (if applicable)

46.6.4 Verify CHW DCOS/BMS device level network redundancy e.g. IO and PLC rings and confirm no system impact.
46.6.5 Verify CHW DCOS/BMS controller hot/standby changeover (if applicable) and confirm no system impact.
46.6.6 Fail communications between CHW DCOS/BMS controllers and DCOS/BMS server (VM), confirm redundancy and no system operational impact.
46.6.7 Verify mains failure scenarios.
46.6.8 Verify Chiller and Cooling tower optimization functions (if applicable)
46.6.9 Verify all critical equipment failure scenarios
46.6.10 Calibration of all sensors – spot check 10%, then if issues further 10%
46.6.11 Ensure DCOS/BMS trends are operational and capturing L4 data.
46.6.12 Confirm tuning of all control loops (e.g. chiller sequencing, pump speed control, valve modulation etc) and record all parameters and confirm same are used by the DCOS/BMS as default values in case of power down.
46.6.13 Confirm all DCOS/BMS records include a full and final parameter list at the end of testing, including but not limited to:
- Alarm thresholds
- Setpoints
- Control Loop Parameters

### 46.7 Chiller Controls L4 Documents Required:

(All documents **MUST** be available prior to commencing yellow tag)
46.7.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 46.8 Chiller Controls L4 Sign off:

46.8.1 All required documentation is uploaded to commissioning management platform by CxA. (refer to section XX documentation matrix)
46.8.2 CxA to sign off checklist as Approved on commissioning management platform.
46.8.3 Blue tag applied to the equipment and signed by CxA.

## 47 Cooling Tower

**Cooling Towers L2A Red Tag**

The following tests and checks to be undertaken by Equipment Vendor / contractor and verified by CxA prior to continuing to Yellow Tag, with appropriate documentation provided

### 47.1 Cooling Tower L2A Pre-requisites:

(All below documentation **MUST** be available prior to commencing red tag)
47.1.1 Verify the technical submittals and as built drawings have been uploaded to Equinix document control platform and approved by the EOR.
47.1.2 Verify the shop drawings have been uploaded to Equinix document control platform and approved by the EOR.
47.1.3 Verify the cable schedules/cable interface schedules have been uploaded to Equinix document control platform and approved by the EOR.
47.1.4 Verify the DCOS/BMS points list has been uploaded to Equinix document control platform and approved by the EOR.
47.1.5 Verify the FAT/FWT documentation have been uploaded to Equinix document control platform and approved by the CxA. Any issues raised in FAT/FWT have been included on the IRL
47.1.6 Verify the Cx level 2B static testing method statement and risk assessment (RAMS) have been uploaded to Equinix document control platform by the GC/vendor and approved by the CxA.
47.1.7 GC to compile a test pack in line with Equinix document matrix.

### 47.2 Cooling Tower L2A Physical checks:

47.2.1 Confirm the correct Cooling Tower has been delivered per design specification and record nameplate information (check serial numbers, other identification, appropriate warning labels are in place, integral pump packages, any loose items)
47.2.2 Confirm no damage occurred between Transit and installation
47.2.3 Check equipment is properly mounted as per manufacturer's recommendations
47.2.4 Check no debris or foreign materials have entered the equipment
47.2.5 Confirm all external accessories supplied, such as baffle plates / sensors / tubing, are securely mounted in appropriate containment as per design drawings
47.2.6 Confirm all lifting eyes and transit materials have been removed
47.2.7 Confirm all necessary cabling is correctly glanded to ensure the characteristics of the enclosure which the cable enters can be maintained adequately.

47.2.8 Confirm all internal cabling has appropriate strain relief in place.
47.2.9 Confirm all device labelling is correct as per site labelling schedule.
47.2.10 Confirm area condition is acceptable as per the Equinix room readiness checklist.
47.2.11 Confirm equipment has been installed/positioned as per approved design drawings, manufactures specifications and approved technical submittals
47.2.12 Confirm the unit is correct dimensionally, handed correctly and accessible for operation and maintenance as per local code.
47.2.13 Confirm the equipment has the correct ratings, components, protective devices, interlocks (if applicable) as per approved design drawings, manufactures specifications and approved technical submittals
47.2.14 Confirm appropriate warning/safety labels are in place.
47.2.15 Confirm all device labelling is correct as per approved Equinix naming convention.
47.2.16 Confirm no damage has occurred in transit and all transit bolts, wedges etc. have been removed.
47.2.17 Carry out all external and internal quality checks of the equipment.
47.2.18 Confirm equipment IPXX ratings are correct as per the approved technical submittals
47.2.19 Confirm network interface(s) have been supplied as per the approved technical submittals
47.2.20 Record all equipment details as per the Equinix provided template on the equipment parameter list within commissioning management platform.
47.2.21 Verify Cx level 2A Installation and QAQC inspection has been carried out as per the Equinix approved checklist.

### 47.3 Cooling Tower L2A Documents Required:

(All documents **MUST** be available prior to commencing yellow tag)
47.3.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 47.4 Cooling Tower L2A Sign Off:

47.4.1 All required documentation is uploaded to the Equinix document control platform by GC or Vendor.
47.4.2 All required documentation is uploaded to commissioning management platform by CxA.
47.4.3 CxA to sign off checklist as Approved on commissioning management platform.
47.4.4 Red tag applied to the equipment and signed by CxA.

## Cooling Towers L2B Yellow Tag

The following tests and checks to be undertaken by Equipment Vendor / contractor and verified by CxA prior prior to continuing to L3, with appropriate paperwork provided

### 47.5 Cooling Tower L2B Pre-requisites:

(All below documentation **MUST** be available prior to commencing yellow tag)
47.5.1 Verify red tag has been applied to the equipment and signed off by the CxA.
47.5.2 Verify yellow tag has been applied to the earthing system and signed off by the CxA.
47.5.3 Verify the Cx level 3 start-up/pre functional testing method statement and risk assessment (RAMS) have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
47.5.4 Confirm As-Built documentation (if applicable) have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
47.5.5 Confirm local authority environmental permits are secured.
47.5.6 Verify all L2A related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
47.5.7 GC to compile a test pack in line with Equinix document matrix.

### 47.6 Cooling Tower L2B Physical checks:

47.6.1 Confirm power cables have been dead tested (refer to section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
47.6.2 Confirm control/monitoring cables have been dead tested (refer to section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
47.6.3 Confirm all device labelling is correct as per approved Equinix naming convention
47.6.4 Confirm all device labelling is correct as per site labelling schedule
47.6.5 Confirm control/monitoring cables have been point to point tested, signed off and documentation have been uploaded to Equinix document control platform and approved by the CxA
47.6.6 Confirm all trunking covers and equipment terminal/protection covers are in place and secured.
47.6.7 Confirm supply breaker/fuse has an equal or greater current capacity than the incoming breaker/fuse of the distribution board.
47.6.8 Confirm all cable entry points are sealed and watertight as per approved design and approved technical submittals
47.6.9 Confirm cable entry box (if applicable) is installed as per approved design drawings, and approved technical submittals
47.6.10 Confirm that the vibration switch is included in the fan safety/shutdown circuit.
47.6.11 Confirm that the cooling tower basin leakage test have been completed
47.6.12 Confirm pipework has been tested and is clean
47.6.13 Confirm fans are free to turn and correct rotation
47.6.14 Confirm filters are installed and undamaged
47.6.15 Confirm water treatment has been completed

47.6.16 Confirm drain/fill valves operated
47.6.17 Confirm that the necessary binder points, temperature pockets, filters (if applicable), flush bypass leg, drain points have been installed as per design specification.
47.6.18 Confirm piping support are in accordance with the piping specification
47.6.19 Confirm that the in-line piping components are mounted in the correct orientation and with regard to flow direction.
47.6.20 Confirm strainer is installed on inlet water pipe to the cooling tower and that vents are installed at the highest point of the pipework.
47.6.21 Confirm that drain has been installed at the lowest point of equipment
47.6.22 Confirm all insulated pipework lagging integrity, completed and vapour sealed.
47.6.23 Confirm ALL pipework flange bolts, are in place, show three (3) threads beyond the nut, and have been torqued correctly and documented accordingly
47.6.24 Confirm that all chilled water pipework trace heating has been installed.
47.6.25 Confirm LOTO procedures are implemented correctly by the GC's approved SAP/AP.
47.6.26 Conduct a White Glove Inspection to ensure equipment is clean and free of debris or foreign materials and the appropriate protection is in place prior to energisation.
47.6.27 Verify vendor Cx level 2B static testing has been carried out as per the vendors Cx level 2B static testing method statement approved by the CxA.
47.6.28 Confirm all vendor Cx level 2B checks/tests are complete and all documentation has been uploaded to Equinix document control platform by the vendor and approved by the CxA.
47.6.29 Confirm that drain has been installed at the lowest point of equipment

### 47.7 Cooling Tower L2B Documents Required:

(All documents **MUST** be available prior to commencing Yellow tag)
47.7.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 47.8 Cooling Tower L2B Sign Off:

47.8.1 All required documentation is uploaded to the Equinix document control platform by GC or Vendor.
47.8.2 All required documentation is uploaded to commissioning management platform by CxA.
47.8.3 CxA to sign off checklist as Approved on commissioning management platform.
47.8.4 Yellow tag applied to the equipment and signed by CxA.

## Cooling Towers L3 Green Tag

The following tests and checks to be undertaken and verified by contractor prior to continuing to L4, with appropriate documentation provided

### 47.9 Cooling Tower L3 Prerequisites:

(All below documentation **MUST** be available prior to commencing green tag)
47.9.1 Verify yellow tag has been applied to any associated pumps/VFDs and signed by the CxA.
47.9.2 Refer to section XX for DCOS/BMS requirements
47.9.3 Verify the Cx level 4 functional & performance test script have been uploaded to Equinix commissioning management platform by CxA.
47.9.4 Verify switching schedule and energisation plan is implemented by the GC's approved SAP/AP
47.9.5 Verify approved SOO have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
47.9.6 Verify all related L2B test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
47.9.7 GC to compile a test pack in line with Equinix document matrix.

### 47.10 Cooling Tower L3 Physical Checks:

47.10.1 Confirm LOTO procedures are implemented correctly by the GC's approved SAP/AP.
47.10.2 Confirm supply cables have been live tested (refer to section XX) signed off and documentation have been uploaded to Equinix document control platform and approved by the CxA.
47.10.3 Confirm DCOS/BMS and automation point to graphic testing is complete, signed off and documentation has been uploaded to Equinix document control platform and approved by the CxA.
47.10.4 Verify Cooling Tower settings comply with approved design.
47.10.5 Verify and record ATS switch, if available, under-voltage and phase monitor relay settings per Equinix approved settings
47.10.6 Confirm all level 3 vendor commissioning is completed at 100%.
47.10.7 Confirm all sensors have been calibrated in their final position with the relevant calibration certificates.
47.10.8 Confirm all Cooling Tower components are operational
47.10.9 Confirm Cooling Tower vendor/DCOS System commissioning records include a full parameter list, including but not limited to:

- Alarm Thresholds
- Set Points
- Control Lopp Parameters
- Staging Parameters

47.10.10 Verify Cooling Tower operation and alarms in accordance with approved SOO
47.10.11 Verify fan speed min / max operations
47.10.12 Verify vibration switch interlock with fans.
47.10.13 Verify freeze protection functionality and availability.
47.10.14 Verify basin heater on/Off functionality.

47.10.15 Verify pumps on/Off functionality
47.10.16 Confirm operation of auto blowdown system (if applicable)
47.10.17 Vibration signature meets specification and ensure there is no signs of undue vibrations
47.10.18 Confirm equipment air flow design vs actual.
47.10.19 Confirm air on/Off Temperatures across coil
47.10.20 Confirm condenser water is distributed evenly
47.10.21 Check make-up water supply is available to equipment
47.10.22 Verify cooling tower air flow is in accordance to manufacturers specifications
47.10.23 Verify air flow failure and fan failure function
47.10.24 Verify pump staging
47.10.25 Cooling tower valves operation / failure scenarios
47.10.26 Cooling tower staging, water and fan control
47.10.27 PID control loops achieve stability
47.10.28 Verify Setpoint and Setpoint reaction.
47.10.29 Cooling tower make-up water control functions correctly
47.10.30 Water treatment systems are functioning correctly.
47.10.31 Verify vendor Cx level 3 start-up/pre-functional testing has been carried out as per the vendors Cx level 3 start-up/pre functional method statement approved by the CxA.
47.10.32 Confirm all vendor Cx level 3 checks/tests are complete and all documentation has been uploaded to Equinix document control platform by the vendor and approved by the CxA.

### 47.11 Cooling Tower L3 Documents Required:

(All documents **MUST** be available prior to commencing yellow tag)
47.11.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 47.12 Cooling Tower L3 Sign off:

47.12.1 All required documentation is uploaded to commissioning management platform by CxA. (refer to section XX documentation matrix)
47.12.2 CxA to sign off checklist as Approved on commissioning management platform.
47.12.3 Green tag applied to the equipment and signed by CxA.

## Cooling Towers L4 Blue Tag

The following tests and checks to be undertaken contractor and verified by CxA prior to continuing to L5, with appropriate documentation provided, All testing carried out with max available load (load banks connected plus building load)

### 47.13 Cooling Tower L4 Pre-requisites:

(All below documentation **MUST** be available prior to commencing blue tag)
47.13.1 Verify green tag has been applied to any associated pumps and signed off by the CxA.
47.13.2 Verify green tag has been applied to any associated DCOS/BMS panel(s)
47.13.3 Verify all related Cx issues are closed on the IRL
47.13.4 Confirm DCOS/BMS verifications are complete and alarm free

### 47.14 Cooling Tower L4 Physical checks:

47.14.1 Apply 100% heat load to chilled water and record supply & return temperatures, (If Applicable)
47.14.2 Carry out load tests to verify Cooling Tower capacity (25%, 50%, 75% load/1 hour and 100% load/8 hours region specific 8 Hours AP 4 Hours EMEA and NA)
47.14.3 Verify stability of Cooling Tower when operating under low load condition (25%)
47.14.4 Carry out sound and vibration measurement under no load and full load condition
47.14.5 Verify any component (fans/pumps/flow switch etc.) failure scenarios meet expected sequence of operations
47.14.6 Verify transition to/from free-cooling and confirm cooling capacity maintained throughout (if applicable)
47.14.7 Confirm tuning of all control loops (e.g. circuit staging, condenser fand operation, etc.) is localised for site requirements
47.14.8 Confirm vendor's calibration sensors with a 10% spot check. If any issues are identified, then a further 10% to be checked.
47.14.9 Verify network and network controller failure alarm.
47.14.10 Confirm all Cooling Tower components are operational and Cooling Tower vendor commissioning records to include a full parameter list during the load test, including but not limited to:
47.14.11 Cooling Tower Cooling Capacity (kW)
47.14.12 Cooling Tower flow Rate inlet/outlet
47.14.13 Cooling Tower Temp Inlet/Outlet
47.14.14 Cooling Tower circuit pressure drop and pressure differential
47.14.15 Cooling Tower running current (Amps)
47.14.16 Verify that setpoints are maintained in all scenarios via setpoint manipulation.
47.14.17 Verify fan ramping via manipulation of setpoints.
47.14.18 Verify unit redundancy (If Applicable)
47.14.19 Verify PID control loops achieve stability.
47.14.20 Verify all operations during heat load test.
47.14.21 Verify anti-freeze and water dump operations (If Applicable
47.14.22 Verify makeup system control and basin level monitoring function per SOO (If Applicable)

47.14.23 Verify proper response to sensor failures (return air temp, supply air temp, humidity sensor, damper end switch, etc) (If Applicable)
47.14.24 Verify proper staging if applicable per system SOO
47.14.25 Carry out fan failures test
47.14.26 Carry out pump failures test
47.14.27 Cooling tower failure scenarios
47.14.28 Sequencer / plant manager / control plc master/slave failure
47.14.29 Staging in / out of pump with water temperature control
47.14.30 Verify cooling tower make-up water system functionality
47.14.31 Verify proper tower basin level setting and that pump doesn't pull air in at full speed

### 47.15 Cooling Tower L4 Documents Required:

(All documents **MUST** be available prior to commencing Yellow tag)

47.15.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 47.16 Cooling Tower L4 Sign off:

47.16.1 All required documentation is uploaded to commissioning management platform by CxA. (refer to section XX documentation matrix)
47.16.2 CxA to sign off checklist as Approved on commissioning management platform.
47.16.3 Blue tag applied to the equipment and signed by CxA.

## 48 Dry Air Cooler (DAC) & Hybrid Dry Air Cooler (HDAC)

**Dry Air Cooler (DAC) & Hybrid Dry Air Cooler (HDAC) L2A Red**

The following tests and checks to be undertaken by Equipment Vendor / contractor and verified by CxA prior to continuing to Yellow Tag, with appropriate documentation provided

### 48.1 DAC & HDAC L2A Pre-requisites:

(All below documentation **MUST** be available prior to commencing red tag)

48.1.1 Verify the technical submittals and as built drawings have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
48.1.2 Verify the shop drawings have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
48.1.3 Verify the cable schedules/cable interface schedules have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
48.1.4 Verify the DCOS/BMS points list has been uploaded to Equinix document control platform by the vendor and approved by the EOR.
48.1.5 Verify the FAT/FWT documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA. Any issues raised in FAT/FWT have been addressed. (Routine FAT QAQC documentation acceptable where FWT testing has not been procured).
48.1.6 Verify the Cx level 2B static testing method statement and risk assessment (RAMS) have been uploaded to Equinix document control platform by the GC/vendor and approved by the CxA.
48.1.7 Verify the material delivery receipt has been uploaded to Equinix document control platform by the GC, GC to identify upon kerbside delivery any defects/damages during transit.
48.1.8 GC to compile a test pack in line with Equinix document matrix.

### 48.2 DAC & HDAC L2A Physical checks:

48.2.1 Confirm installation location is available and correctly prepared – Level floor, no ongoing works, etc
48.2.2 Confirm the correct Dry Air Cooler (DAC) & Hybrid Dry Air Cooler (HDAC) has been delivered per design specification and record nameplate information (check serial numbers, other identification, appropriate warning labels are in place, integral pump packages, any loose items)
48.2.3 Confirm no damage occurred between delivery and installation
48.2.4 Check equipment is properly mounted as per manufacturer's recommendations, for example, anti-vibration mounts where required
48.2.5 Check no debris or foreign materials have entered the equipment
48.2.6 Confirm all external accessories supplied, such as baffle plates / sensors / tubing, are securely mounted in appropriate containment as per design drawings
48.2.7 Confirm all lifting eyes have been removed (if applicable) and any transit materials
48.2.8 Confirm all necessary cabling is correctly glanded to ensure the characteristics of the enclosure (e.g. IP56) which the cable enters can be maintained adequately.
48.2.9 Confirm all cabling has appropriate strain relief in place.
48.2.10 Confirm all device labelling is correct as per site labelling schedule.
48.2.11 Confirm piping materials / components are fully in accordance with the relevant project piping specification.
48.2.12 Confirm all deficiencies/comments from FWT/FAT have been closed.
48.2.13 Confirm room/area condition is acceptable as per the Equinix room readiness checklist.
48.2.14 Confirm equipment has been installed/positioned as per approved design drawings, manufactures specifications and approved technical submittals
48.2.15 Confirm the unit is correct dimensionally, handed correctly and accessible for operation and maintenance as per local code.
48.2.16 Confirm the equipment has the correct ratings, components, protective devices, interlocks (if applicable) as per approved design drawings, manufactures specifications and approved technical submittals

48.2.17 Confirm appropriate warning/safety labels are in place
48.2.18 Confirm all device labelling is correct as per approved Equinix naming convention.
48.2.19 Confirm no damage has occurred in transit and all transit bolts, wedges etc. have been removed.
48.2.20 Carry out all external and internal quality checks of the equipment.
48.2.21 Confirm equipment IPXX ratings are correct as per the approved technical submittals
48.2.22 Confirm network interface(s) have been supplied as per the approved technical submittals
48.2.23 Confirm system and equipment grounding installation is as per the approved design drawings and the approved technical submittals
48.2.24 Record all equipment details as per the Equinix provided template on the equipment parameter list within commissioning management platform.
48.2.25 Verify Cx level 2A Installation and QAQC inspection has been carried out as per the Equinix approved checklist.
48.2.26 Confirm all pipework connections conform with design drawings

### 48.3 DAC & HDAC L2A Documents Required:

(All documents **MUST** be available prior to commencing yellow tag)
Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 48.4 DAC & HDAC L2A Sign Off:

48.4.1 All required documentation is uploaded to the Equinix document control platform by GC or Vendor.
48.4.2 All required documentation is uploaded to commissioning management platform by CxA.
48.4.3 CxA to sign off checklist as Approved on commissioning management platform.
48.4.4 Red tag applied to the equipment and signed by CxA.

## Dry Air Cooler (DAC) & Hybrid Dry Air Cooler (HDAC) L2B Yellow

The following tests and checks to be undertaken by Equipment Vendor / contractor and verified by CxA prior prior to continuing to L3, with appropriate paperwork provided

### 48.5 DAC & HDAC L2B Pre requisites:

48.5.1 (All below documentation **MUST** be available prior to commencing yellow tag)
48.5.2 Verify red tag has been applied to the equipment and signed off by the CxA.
48.5.3 Verify yellow tag has been applied to the earthing system and signed off by the CxA.
48.5.4 Verify the Cx level 3 start-up/pre functional testing method statement and risk assessment (RAMS) have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
48.5.5 Confirm As-Built documentation (if applicable) have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
48.5.6 Confirm local authority environmental permits are secured.
48.5.7 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
48.5.8 GC to compile a test pack in line with Equinix document matrix.

### 48.6 DAC & HDAC L2B Physical checks:

48.6.1 Confirm earthing systems comply with Equinix Global Design Standards and/or design drawings.
48.6.2 Confirm power cables have been dead tested (refer to section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
48.6.3 Confirm control/monitoring cables have been dead tested (refer to section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
48.6.4 Confirm control/monitoring cables have been point to point tested, signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA
48.6.5 Confirm all power cables and control/monitoring cabling identification are present as per approved cable schedule and cable interfacing schedule.
48.6.6 Confirm ALL cables are identified with permanent labels, soundly fixed (glands/cable ties/cleats) identifying source, load, size & type as per the project specification provided by the EOR.
48.6.7 Verify all cable connections pull test is found satisfactory
48.6.8 Verify all connections are torqued correctly (if applicable) and double marked.
48.6.9 Confirm all trunking covers and equipment terminal/protection covers are in place and secured.
48.6.10 Confirm supply breaker/fuse has an equal or greater current capacity than the incoming breaker/fuse of the distribution board.
48.6.11 Confirm all cable entry points are sealed and watertight as per approved design drawings, manufactures specifications and approved technical submittals
48.6.12 Confirm cable entry box (if applicable) is installed as per approved design drawings, manufactures specifications and approved technical submittals
48.6.13 Confirm that the necessary binder points, temperature pockets, filters (if applicable), flush bypass leg, drain points have been installed as per design specification.
48.6.14 Confirm piping support are in accordance with the piping specification
48.6.15 Confirm that the in-line piping components are mounted in the correct orientation and with regard to flow direction.
48.6.16 Check levelling and alignment of units are correct and acceptable
48.6.17 Confirm that all uninsulated pipework is painted in accordance with the piping specification.
48.6.18 Confirm all insulated pipework lagging integrity, completed and vapour sealed.
48.6.19 Confirm ALL pipework flange bolts, are in place, show three (3) threads beyond the nut, and have been torqued correctly and documented accordingly

48.6.20 Confirm external pipework and has appropriate leak pressure test documentation (Pressure test duration is subjected to region specific)
48.6.21 Confirm external pipework has appropriate strength pressure test documentation to 1.5x working pressure or 150Psi whichever is higher. (Pressure test duration is subjected to region specific)
48.6.22 Confirm that all chilled water pipework trace heating has been installed.
48.6.23 Confirm PTW/LOTO procedures are implemented correctly by the GC's approved SAP/AP.
48.6.24 Conduct a White Glove Inspection to ensure equipment is clean and free of debris or foreign materials and the appropriate protection is in place prior to energisation.
48.6.25 Verify vendor Cx level 2B static testing has been carried out as per the vendors Cx level 2B static testing method statement approved by the CxA.
48.6.26 Verify Cx level 2B static testing has been carried out as per the Equinix approved checklist
48.6.27 Confirm all vendor Cx level 2B checks/tests are complete and all documentation has been uploaded to Equinix document control platform by the vendor and approved by the CxA.

### 48.7 DAC & HDAC L2B Documents Required:

(All documents **MUST** be available prior to commencing yellow tag)
48.7.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 48.8 DAC & HDAC L2B Sign Off:

48.8.1 All required documentation is uploaded to the Equinix document control platform by GC or Vendor.
48.8.2 All required documentation is uploaded to commissioning management platform by CxA.
48.8.3 CxA to sign off checklist as Approved on commissioning management platform.
48.8.4 Yellow tag applied to the equipment and signed by CxA.

## Dry Air Cooler (DAC) & Hybrid Dry Air Cooler (HDAC) L3 Green Tag

The following tests and checks to be undertaken and verified by contractor prior to continuing to L4, with appropriate documentation provided

### 48.9 DAC & HDAC L3 Pre-requisites:

(All below documentation **MUST** be available prior to commencing green tag)
48.9.1 Verify yellow tag has been applied to any associated pumps and signed by the CxA.
48.9.2 Refer to section XX for DCOS/BMS requirements
48.9.3 Verify the Cx level 4 functional & performance test script have been uploaded to Equinix commissioning management platform by CxA.
48.9.4 Verify switching schedule and energisation plan is implemented by the GC's approved SAP/AP.
48.9.5 Verify approved SOO have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
48.9.6 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
48.9.7 GC to compile a test pack in line with Equinix document matrix.

### 48.10 DAC & HDAC L3 Physical Checks:

48.10.1 Confirm LOTO procedures are implemented correctly by the GC's approved SAP/AP.
48.10.2 Confirm supply cables have been live tested (refer to section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
48.10.3 Confirm DCOS/BMS and automation point to graphic testing is complete, signed off and documentation has been uploaded to Equinix document control platform by the vendor and approved by the CxA.
48.10.4 Verify Dry Air Cooler (DAC) & Hybrid Dry Air Cooler (HDAC) settings comply with approved design
48.10.5 Verify firmware versions for all Dry Air Cooler (DAC) & Hybrid Dry Air Cooler (HDAC) controllers comply with approved Equinix global design standards
48.10.6 Record (If applicable) versions for all Dry Air Cooler (DAC) & Hybrid Dry Air Cooler (HDAC) controllers on checklist within commissioning management platform.
48.10.7 Verify and record ATS switch, if available, under-voltage and phase monitor relay settings per Equinix approved settings
48.10.8 Confirm that the ambient sensor location is adequate (free-cooling Dry Air Cooler (DAC) & Hybrid Dry Air Cooler (HDAC))
48.10.9 Confirm glycol concentrations have been added according to design specification (if applicable) (If Applicable)
48.10.10 Confirm all sensors have been calibrated in their final position with the relevant calibration certificates.
48.10.11 Confirm all Dry Air Cooler (DAC) & Hybrid Dry Air Cooler (HDAC) components are operational
48.10.12 Confirm Dry Air Cooler (DAC) & Hybrid Dry Air Cooler (HDAC) vendor commissioning records include a full parameter list, including but not limited to:
- Alarm thresholds
- Setpoints
- Control Loop Parameters
- Staging parameters

48.10.13 Verify Dry Air Cooler (DAC) & Hybrid Dry Air Cooler (HDAC) operation and alarms in accordance with approved SOO and approved Equinix global design standards.
48.10.14 Confirm phase rotation is correct (if applicable).
48.10.15 Verify Setpoint and Setpoint movement
48.10.16 Verify PID controller functionality
48.10.17 Verify Hybrid-on setpoint (If applicable)

48.10.18 Verify fan speed min / max, timer on/off and periodic fan operations
48.10.19 Confirm delay timings are in accordance to approved settings
48.10.20 Verify freeze protection on
48.10.21 Check biocide dosing functionality
48.10.22 Check for process water conductivity (If applicable)
48.10.23 Verify basin heater on/Off functionality (If applicable)
48.10.24 Verify pumps on/Off functionality
48.10.25 Operation of UV lamps (If applicable)
48.10.26 Level measuring sensor (If applicable)
48.10.27 Frost mode valve positions
48.10.28 Blow down operation
48.10.29 Confirm air on/Off Temperatures across coil
48.10.30 Verify vendor Cx level 3 start-up/pre-functional testing has been carried out as per the vendors Cx level 3 start-up/pre functional method statement approved by the CxA.
Confirm all vendor Cx level 3 checks/tests are complete and all documentation has been uploaded to Equinix document control platform by the vendor and approved by the CxA.

### 48.11 DAC & HDAC L3 Documents Required:

(All documents **MUST** be available prior to commencing yellow tag)
48.11.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 48.12 DAC & HDAC L3 Sign off:

All required documentation is uploaded to commissioning management platform by CxA. (refer to section XX documentation matrix)
48.12.1 CxA to sign off checklist as Approved on commissioning management platform.
48.12.2 Green tag applied to the equipment and signed by CxA.

## Dry Air Cooler (DAC) & Hybrid Dry Air Cooler (HDAC) L4 Blue Tag

The following tests and checks to be undertaken contractor and verified by CxA prior to continuing to L5, with appropriate documentation provided. All testing carried out with max available load (load banks connected plus building load)

### 48.13 DAC & HDAC L4 Pre-requisites:

(All below documentation **MUST** be available prior to commencing blue tag)
48.13.1 Verify green tag has been applied to any associated pumps and signed off by the CxA.
48.13.2 Verify green tag has been applied to any associated DCOS/BMS panel(s)
48.13.3 Verify green tag has been applied to the automation system and signed off by the CxA.
48.13.4 Verify all related P1 Cx issues are closed on the IRL
48.13.5 Confirm DCOS/BMS verifications are complete and alarm free

### 48.14 DAC & HDAC L4 Physical checks:

48.14.1 Apply 100% heat load to chilled water and record supply & return temperatures, (If Applicable)
48.14.2 Carry out load tests to verify Dry Air Cooler (DAC) & Hybrid Dry Air Cooler (HDAC) capacity (25%, 50%, 75% load/1 hour and 100% load/8 hours region specific 8 Hours AP 4 Hours EMEA and NA)
48.14.3 Verify stability of Dry Air Cooler (DAC) & Hybrid Dry Air Cooler (HDAC) when operating under low load condition (25%)
48.14.4 Carry out sound and vibration measurement under no load and full load condition
48.14.5 Verify Dry Air Cooler (DAC) & Hybrid Dry Air Cooler (HDAC) operates in accordance with the approved sequence of operations
48.14.6 Verify any component (fans/pumps/flow switch etc.) failure scenarios meet expected sequence of operations
48.14.7 Verify transition to/from free-cooling and confirm cooling capacity maintained throughout (if applicable)
48.14.8 Confirm tuning of all control loops (e.g. circuit staging, condenser fand operation, etc.) is localised for site requirements
48.14.9 Confirm vendor's calibration sensors with a 10% spot check. If any issues are identified, then a further 10% to be checked.
48.14.10 Verify network and network controller failure alarm.
48.14.11 Confirm all Dry Air Cooler (DAC) & Hybrid Dry Air Cooler (HDAC) components are operational and Dry Air Cooler (DAC) & Hybrid Dry Air Cooler (HDAC) vendor commissioning records to include a full parameter list during the load test, including but not limited to:
- Dry Air Cooler (DAC) & Hybrid Dry Air Cooler (HDAC) Cooling Capacity (kW)
- Dry Air Cooler (DAC) & Hybrid Dry Air Cooler (HDAC) flow Rate inlet/outlet (l/s)
- Dry Air Cooler (DAC) & Hybrid Dry Air Cooler (HDAC) Temp Inlet/Outlet (°C)
- Dry Air Cooler (DAC) & Hybrid Dry Air Cooler (HDAC) circuit pressure drop and pressure differential (kPA)
- Dry Air Cooler (DAC) & Hybrid Dry Air Cooler (HDAC) running current (Amps)
- Dry Air Cooler (DAC) & Hybrid Dry Air Cooler (HDAC) plant efficiency

48.14.12 Verify adiabatic functions and adiabatic pump failures (If Applicable)
48.14.13 Verify that setpoints are maintained in all scenarios via setpoint manipulation.
48.14.14 Verify fan ramping via manipulation of setpoints.
48.14.15 Verify unit redundancy (If Applicable)
48.14.16 Verify PID control loops achieve stability.
48.14.17 Verify all operations during heat load test.
48.14.18 Check verify transition to and from hybrid operation (If Applicable)
48.14.19 Verify anti-freeze and water dump operations (If Applicable)
48.14.20 Proper water and air flow distribution
48.14.21 Verify makeup system control and basin level monitoring function per SOO (If Applicable)
48.14.22 Verify proper response to sensor failures (return air temp, supply air temp, humidity sensor, damper end switch, etc)
48.14.23 Verify proper staging if applicable per system SOO

### 48.15 DAC & HDAC L4 Documents Required:

(All documents **MUST** be available prior to commencing yellow tag)

48.15.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 48.16 DAC & HDAC L4 Sign off:

48.16.1 All required documentation is uploaded to commissioning management platform by CxA. (refer to section XX documentation matrix)
48.16.2 CxA to sign off checklist as Approved on commissioning management platform.
48.16.3 Blue tag applied to the equipment and signed by CxA.

## 49 Cool Wall

**Cool Wall L2A Red Tag**

The following tests and checks to be undertaken by Equipment Vendor / contractor and verified by CxA prior to continuing to Yellow Tag, with appropriate documentation provided

### 49.1 Cool Wall L2A Pre-requisites:

(All below documentation **MUST** be available prior to commencing red tag)

49.1.1 Verify the technical submittals and as built drawings have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
49.1.2 Verify the shop drawings have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
49.1.3 Verify the cable schedules/cable interface schedules have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
49.1.4 Verify the DCOS/BMS points list has been uploaded to Equinix document control platform by the vendor and approved by the EOR.
49.1.5 Verify the FAT/FWT documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA. Any issues raised in FAT/FWT have been addressed. (Routine FAT QAQC documentation acceptable where FWT testing has not been procured).
49.1.6 Verify the Cx level 2B static testing method statement and risk assessment (RAMS) have been uploaded to Equinix document control platform by the GC/vendor and approved by the CxA.
49.1.7 Verify the material delivery receipt has been uploaded to Equinix document control platform by the GC, GC to identify upon kerbside delivery any defects/damages during transit.
49.1.8 GC to compile a test pack in line with Equinix document matrix.

### 49.2 Cool Wall L2A Physical checks:

49.2.1 Confirm installation location is available and correctly prepared – Level floor, no ongoing works, etc
49.2.2 Confirm the correct Cool Wall has been delivered per design specification and record nameplate information (check serial numbers, other identification, appropriate warning labels are in place, fan modules, any loose items)
49.2.3 Confirm no damage occurred between delivery and installation
49.2.4 Check equipment is properly mounted as per manufacturer's recommendations, for example, anti-vibration mounts where required
49.2.5 Check no debris or foreign materials have entered the equipment
49.2.6 Confirm all external accessories supplied, such as remote sensors, valves, actuators, differential pressure switch, are securely mounted in appropriate containment as per design drawings or securely stored for DH items.
49.2.7 Confirm all lifting eyes have been removed (if applicable) and any transit materials
49.2.8 Confirm all necessary cabling is correctly glanded to ensure the characteristics of the enclosure (e.g. IP56) which the cable enters can be maintained adequately.
49.2.9 Confirm all cabling has appropriate strain relief in place.
49.2.10 Confirm all device labelling is correct as per site labelling schedule.
49.2.11 Confirm piping materials / components are fully in accordance with the relevant project piping specification.
49.2.12 Confirm all deficiencies/comments from FWT/FAT have been closed.
49.2.13 Confirm room/area condition is acceptable as per the Equinix room readiness checklist.
49.2.14 Confirm equipment has been installed/positioned as per approved design drawings, manufactures specifications and approved technical submittals
49.2.15 Confirm the unit is correct dimensionally, handed correctly and accessible for operation and maintenance as per local code.
49.2.16 Confirm the equipment has the correct ratings, components, protective devices, interlocks (if applicable) as per approved design drawings, manufactures specifications and approved technical submittals
49.2.17 Confirm appropriate warning/safety labels are in place.
49.2.18 Confirm all device labelling is correct as per approved Equinix naming convention.
49.2.19 Confirm no damage has occurred in transit and all transit bolts, wedges etc. have been removed.
49.2.20 Carry out all external and internal quality checks of the equipment.
49.2.21 Confirm equipment IPXX ratings are correct as per the approved technical submittals
49.2.22 Confirm network interface(s) have been supplied as per the approved technical submittals
49.2.23 Confirm system and equipment grounding installation is as per the approved design drawings and the approved technical submittals
49.2.24 Record all equipment details as per the Equinix provided template on the equipment parameter list within commissioning management platform.
49.2.25 Verify Cx level 2A Installation and QAQC inspection has been carried out as per the Equinix approved checklist.
49.2.26 Confirm all pipework connections conform with design drawings

### 49.3 Cool Wall L2A Documents Required:

(All documents **MUST** be available prior to commencing yellow tag)

49.3.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 49.4 Cool Wall L2A Sign Off:

49.4.1 All required documentation is uploaded to the Equinix document control platform by GC or Vendor.
49.4.2 All required documentation is uploaded to commissioning management platform by CxA.
49.4.3 CxA to sign off checklist as Approved on commissioning management platform.
49.4.4 Red tag applied to the equipment and signed by CxA.

## Cool Wall L2B Yellow Tag

### 49.5 Level 2B Commissioning – Yellow Tag

The following tests and checks to be undertaken by Equipment Vendor / contractor and verified by CxA prior prior to continuing to L3, with appropriate paperwork provided

### 49.6 Cool Wall L2B Pre-requisites:

(All below documentation **MUST** be available prior to commencing yellow tag)

49.6.1 Verify red tag has been applied to the equipment and signed off by the CxA.
49.6.2 Verify yellow tag has been applied to the earthing system and signed off by the CxA.
49.6.3 Verify the Cx level 3 start-up/pre functional testing method statement and risk assessment (RAMS) have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
49.6.4 Confirm As-Built documentation (if applicable) have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
49.6.5 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
49.6.6 GC to compile a test pack in line with Equinix document matrix.

### 49.7 Cool Wall L2B Physical checks:

49.7.1 Confirm earthing systems comply with Equinix Global Design Standards and/or design drawings.
49.7.2 Confirm power cables have been dead tested (refer to section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
49.7.3 Confirm control/monitoring cables have been dead tested (refer to section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
49.7.4 Confirm control/monitoring cables have been point to point tested, signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA
49.7.5 Confirm all power cables and control/monitoring cabling identification are present as per approved cable schedule and cable interfacing schedule.
49.7.6 Confirm ALL cables are identified with permanent labels, soundly fixed (glands/cable ties/cleats) identifying source, load, size & type as per the project specification provided by the EOR.
49.7.7 Verify all cable connections pull test is found satisfactory
49.7.8 Verify all connections are torqued correctly (if applicable) and double marked.
49.7.9 Confirm all trunking covers and equipment terminal/protection covers are in place and secured.
49.7.10 Confirm supply breaker/fuse has an equal or greater current capacity than the incoming breaker/fuse of the distribution board.
49.7.11 Confirm all cable entry points are sealed and watertight as per approved design drawings, manufactures specifications and approved technical submittals
49.7.12 Confirm cable entry box (if applicable) is installed as per approved design drawings, manufactures specifications and approved technical submittals
49.7.13 Confirm that the necessary binder points, temperature pockets, filters (if applicable), flush bypass leg, drain points have been installed as per design specification.
49.7.14 Confirm piping support are in accordance with the piping specification
49.7.15 Confirm that the in-line piping components are mounted in the correct orientation and with regard to flow direction.
49.7.16 Check levelling and alignment of units are correct and acceptable
49.7.17 Confirm that all uninsulated pipework is painted in accordance with the piping specification.
49.7.18 Confirm all insulated pipework lagging integrity, completed and vapour sealed.
49.7.19 Confirm ALL pipework flange bolts, are in place, show three (3) threads beyond the nut, and have been torqued correctly and documented accordingly
49.7.20 Confirm external pipework and has appropriate leak pressure test documentation (Pressure test duration is subjected to region specific)
49.7.21 Confirm external pipework has appropriate strength pressure test documentation to 1.5x working pressure or 150Psi whichever is higher. (Pressure test duration is subjected to region specific)
49.7.22 Confirm coil sections have been installed within the correct position
49.7.23 Confirm that the coil sections and fan assemblies have been installed and bolted down correctly as per manufacturer guidelines
49.7.24 Confirm the correct pipework orifice plate has been installed according to the project pipe specification.
49.7.25 Confirm fans can rotate freely within their casings.
49.7.26 Confirm control valves can operated freely under hand control.
49.7.27 Confirm that the electrical bonding joints are completed according to the project pipe specification
49.7.28 Confirm all insulated pipework lagging integrity, completed and vapour sealed.
49.7.29 Confirm sufficient maintenance access.
49.7.30 Confirm internal pipework has appropriate leak pressure test documentation
49.7.31 Confirm ALL pipework has been flushed and results are to BISRIA standards and recorded accordingly. Back flushing of coils has been performed and the strainers have been removed and cleaned

49.7.32 Confirm PTW/LOTO procedures are implemented correctly by the GC's approved SAP/AP.
49.7.33 Conduct a White Glove Inspection to ensure equipment is clean and free of debris or foreign materials and the appropriate protection is in place prior to energisation.
49.7.34 Verify vendor Cx level 2B static testing has been carried out as per the vendors Cx level 2B static testing method statement approved by the CxA.
49.7.35 Verify Cx level 2B static testing has been carried out as per the Equinix approved checklist
49.7.36 Confirm all vendor Cx level 2B checks/tests are complete and all documentation has been uploaded to Equinix document control platform by the vendor and approved by the CxA.

### 49.8 Cool Wall L2B Documents Required:

(All documents **MUST** be available prior to commencing yellow tag)
49.8.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 49.9 Cool Wall L2B Sign Off:

49.9.1 All required documentation is uploaded to the Equinix document control platform by GC or Vendor.
49.9.2 All required documentation is uploaded to commissioning management platform by CxA.
49.9.3 CxA to sign off checklist as Approved on commissioning management platform.
49.9.4 Yellow tag applied to the equipment and signed by CxA.

## Cool Wall L2B Green Tag

The following tests and checks to be undertaken and verified by contractor prior to continuing to L4, with appropriate documentation provided

### 49.10 Cool Wall L3 Pre-requisites:

(All below documentation **MUST** be available prior to commencing green tag)
49.10.1 Verify yellow tag has been applied to the associated chilled water system and signed by the CxA.
49.10.2 Verify water balancing has been completed and signed by the CxA.
49.10.3 Refer to section XX for DCOS/BMS requirements
49.10.4 Verify the Cx level 4 functional & performance test script have been uploaded to Equinix commissioning management platform by CxA.
49.10.5 Verify switching schedule and energisation plan is implemented by the GC's approved SAP/AP.
49.10.6 Verify approved SOO have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
49.10.7 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
49.10.8 GC to compile a test pack in line with Equinix document matrix.
49.10.9 Confirm ALL pipework has been flushed and results are to BISRIA standards and recorded accordingly. Back flushing of coils has been performed and the strainers have been removed and cleaned

### 49.11 Cool Wall L3 Physical Checks:

49.11.1 Confirm LOTO procedures are implemented correctly by the GC's approved SAP/AP.
49.11.2 Confirm supply cables have been live tested (refer to section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
49.11.3 Confirm DCOS/BMS point to graphic testing is complete, signed off and documentation has been uploaded to Equinix document control platform by the vendor and approved by the CxA.
49.11.4 Verify Cool Wall settings comply with approved design
49.11.5 Verify firmware versions for all Cool Wall controllers comply with approved Equinix global design standards
49.11.6 Record firmware versions for all Cool Wall controllers on checklist within commissioning management platform.
49.11.7 Confirm that the remote sensor locations are as per design.
49.11.8 Confirm all level 3 vendor commissioning is completed.
49.11.9 Confirm all sensors have been calibrated in their final position with the relevant calibration certificates.
49.11.10 Confirm all Cool Wall components are operational
49.11.11 Confirm Cool Wall vendor commissioning records include a full parameter list, including but not limited to:
- Alarm thresholds
- Setpoints
- Control Loop Parameters

49.11.12 Verify Cool Wall operation and alarms in accordance with approved SOO and approved Equinix global design standards.
49.11.13 Confirm phase rotation is correct (if applicable).
49.11.14 Confirm ATS settings have Equinix conform to standards and confirm operation on each supply.
49.11.15 Confirm ATS source seek function
49.11.16 Verify and record ATS changeover
49.11.17 Verify CHW design flowrate
49.11.18 Verify air flow volume design flowrate
49.11.19 Confirm no water flow through cooling coil when control valve is positioned at 0%
49.11.20 Confirm the cool wall controller has Equinix standard software and settings
49.11.21 Confirm that the relevant BMS communication has been installed as per site specification.
49.11.22 Verify and record air On/Off Temperatures across coil
49.11.23 Verify Cx level 3 start-up/pre-functional testing has been carried out as per the Equinix approved checklist
49.11.24 Confirm all vendor Cx level 3 checks/tests are complete and all documentation has been uploaded to Equinix document control platform by the vendor and approved by the CxA.

### 49.12 Cool Wall L3 Documents Required:

(All documents **MUST** be available prior to commencing yellow tag)

49.12.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 49.13 Cool Wall L3 Sign off:

49.13.1 All required documentation is uploaded to commissioning management platform by CxA. (refer to section XX documentation matrix)
49.13.2 CxA to sign off checklist as Approved on commissioning management platform.
49.13.3 Green tag applied to the equipment and signed by CxA.

## Cool Wall L4 Blue Tag

The following tests and checks to be undertaken contractor and verified by CxA prior to continuing to L5, with appropriate documentation provided **Note**: Due to the design of the cool wall assembly and its control, temporary Hot Aisle/Cold Aisle containment must be set up to prove the correct operation. Rack Emulators or Low 15-20kW heaters to be placed in locations of racks with any spaces blocked off to simulate final set up

### 49.14 Cool Wall Prerequisites:

(All below documentation **MUST** be available prior to commencing blue tag)

49.14.1 Verify green tag has been applied to Chilled Water System assets and signed off by the CxA.
49.14.2 Refer to section XX for DCOS/BMS requirements
49.14.3 Confirm layout of temporary aisle containment and heaters has been agreed
49.14.4 Verify all related P1 Cx issues are closed on the IRL
49.14.5 Confirm DCOS/BMS verifications are complete and alarm free

### 49.15 Cool Wall Physical checks:

49.15.1 Confirm that the chilled water system is operating before applying any load.
49.15.2 Apply heat load, in steps, up to 100% of unit design capacity and record readings from associated instrumentation
49.15.3 Verify Cool Wall operates in accordance with the approved sequence of operations including, but not limited to;
49.15.4 Sequencing of cool wall sections for load as per (if applicable)
49.15.5 Failure changeover of cool wall sections (if applicable)
49.15.6 Fan modulation control based on their respective sensors (Eg: Supply / Return air sensor or pressure sensors)
49.15.7 Supply air temperature control (valve modulation) from relevant sensor(s)
49.15.8 Component failure scenarios (fans / flow / valves switch etc.)
49.15.9 Unit response to alarms (high/low temperature / water leak detection, etc.)
49.15.10 CHW valve position during power failure and upon power restored. Record valve opening timing
49.15.11 Unit response to smoke detection interface (If applicable)
49.15.12 Group network failure (if applicable)
49.15.13 Confirm tuning of all control loops (e.g. valve and fan modulation, etc.)
49.15.14 Confirm vendor's calibration of sensors with a 10% spot check. If any issues are identified then a further 10% to be checked.
49.15.15 Verify network and network controller failure alarm.
49.15.16 Confirm all cool wall components are operational and cool wall vendor commissioning records to include a full parameter list during the load test, including but not limited to:
49.15.17 Alarm thresholds
49.15.18 Setpoints
49.15.19 Control Loop Parameters
49.15.20 Remove power and re-instate to verify that unit re-starts correctly and record unit restart / controller reboot time
49.15.21 Verify IBX network comms failure has no impact on operation of unit

### 49.16 Cool Wall Documents Required:

(All documents **MUST** be available prior to commencing yellow tag)

49.16.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 49.17 Cool Wall Sign off:

49.17.1 All required documentation is uploaded to commissioning management platform by CxA. (refer to section XX documentation matrix)
49.17.2 CxA to sign off checklist as Approved on commissioning management platform.
49.17.3 Blue tag applied to the equipment and signed by CxA.

# 50 Computer Room Air Handler (CRAH)

## Computer Room Air Handler (CRAH) L2A Red Tag

The following tests and checks to be undertaken by Equipment Vendor / contractor and verified by CxA prior to continuing to Yellow Tag, with appropriate documentation provided

### 50.1 CRAH L2A Pre-requisites:

(All below documentation **MUST** be available prior to commencing red tag)

Verify the technical submittals and as built drawings have been uploaded to Equinix document control platform and approved by the EOR.

50.1.1 Verify the shop drawings have been uploaded to Equinix document control platform and approved by the EOR.

50.1.2 Verify the cable schedules/cable interface schedules have been uploaded to Equinix document control platform and approved by the EOR.

50.1.3 Verify the DCOS/BMS points list has been uploaded to Equinix document control platform and approved by the EOR.

50.1.4 Verify the FAT/FWT documentation have been uploaded to Equinix document control platform and approved by the CxA. Any issues raised in FAT/FWT have been included on the IRL

50.1.5 Verify the Cx level 2B static testing method statement and risk assessment (RAMS) have been uploaded to Equinix document control platform by the GC/vendor and approved by the CxA.

50.1.6 GC to compile a test pack in line with Equinix document matrix

### 50.2 CRAH L2A Physical Checks

50.2.1 Confirm no damage has occurred in transit and all transit bolts, wedges etc. have been removed

50.2.2 Confirm equipment has been installed / positioned as per approved shop drawings

50.2.3 Confirm the correct equipment as per design specification has been delivered and record nameplate information. Check serial numbers and other identification and appropriate warning labels are in place.

50.2.4 Confirm the unit is correct dimensionally

50.2.5 Check equipment is properly mounted as per manufacturer's recommendations, for example, anti-vibration mounts where required

50.2.6 Check adequate maintenance access has been provided for equipment

50.2.7 Check no debris or foreign materials have entered the equipment

50.2.8 Confirm all external accessories supplied, such as baffle plates / sensors / tubing, are securely mounted in appropriate containment

50.2.9 Confirm all internal cabling has appropriate strain relief in place.

50.2.10 Confirm all device labelling is correct as per site labelling schedule.

50.2.11 Confirm the face of each coil is clean and free from damage

50.2.12 Confirm the correct DCOS interface card has been supplied.

50.2.13 Red tag applied to the equipment and signed, recorded accordingly.

### 50.3 CRAH L2A Documents Required:

(All documents **MUST** be available prior to commencing Yellow tag)

50.3.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 50.4 CRAH L2A L3 Sign off:

50.4.1 All required documentation is uploaded to commissioning management platform by CxA. (refer to section XX documentation matrix)

50.4.2 CxA to sign off checklist as Approved on commissioning management platform.

50.4.3 Red tag applied to the equipment and signed by CxA.

## Computer Room Air Handler (CRAH) L2B Yellow Tag

The following tests and checks to be undertaken and verified by contractor prior to continuing to L3, with appropriate paperwork provided

### 50.5 CRAH L2B Prerequisites:

(All below documentation **MUST** be available prior to commencing yellow tag)

50.5.1 Verify red tag has been applied to the equipment and signed off by the CxA.

50.5.2 Verify yellow tag has been applied to the earthing system and signed off by the CxA.

50.5.3 Verify the Cx level 3 start-up/pre functional testing method statement and risk assessment (RAMS) have been uploaded to Equinix document control platform by the vendor and approved by the CxA.

50.5.4 Confirm As-Built documentation (if applicable) have been uploaded to Equinix document control platform by the vendor and approved by the EOR.

50.5.5 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA.

50.5.6 GC to compile a test pack in line with Equinix document matrix.

### 50.6 CRAH L2B Physical Checks

50.6.1 Confirming all earthing is completed and recorded

50.6.2 Confirm all insulation resistance testing of cable is as per specification and requirements.

50.6.3 Confirm all electrical torque terminal records have been completed.

50.6.4 Check no debris or foreign materials have entered the equipment

50.6.5 Check all belts are fitted and tightened (if applicable)

50.6.6 Ensure condensate tray is installed

50.6.7 Confirm ALL pipework flange bolts, are in place, show three (3) threads beyond the nut, and have been torqued correctly and documented accordingly

50.6.8 Confirm piping support are in accordance with the piping specification
50.6.9 Confirm that the in-line piping components are mounted in the correct orientation and with regard to flow direction.
50.6.10 Confirm that butterfly valves are provided with sufficient pipe lengths either side of the valve to enable operation.
50.6.11 Confirm ALL pipework flange bolts, are in place, show three (3) threads beyond the nut, and have been torqued correctly and documented accordingly.
50.6.12 Confirm all pipework pressure testing and flushing is complete and documentation issued.
50.6.13 Confirm that the electrical bonding joints are completed according to the project pipe specification
50.6.14 Local CRAH isolators are labelled accordingly.
50.6.15 Confirm all CRAH air filters are clean and fitted.
50.6.16 Yellow tag applied to the equipment and signed, recorded accordingly

### 50.7 CRAH L2B Documents Required:

(All documents **MUST** be available prior to commencing Yellow tag)
50.7.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 50.8 CRAH L2B Sign off:

50.8.1 All required documentation is uploaded to commissioning management platform by CxA. (refer to section XX documentation matrix)
50.8.2 CxA to sign off checklist as Approved on commissioning management platform.
50.8.3 Yellow tag applied to the equipment and signed by CxA.

## Computer Room Air Handler (CRAH) L3 Green Tag

The following tests and checks to be undertaken and verified by contractor prior to continuing to L4, with appropriate paperwork provided
50.8.4 Confirm ALL pipework has been balanced and results are recorded accordingly.
50.8.5 Confirm the CRAH has Equinix standard software and settings
50.8.6 Verify that the CRAH unit firmware, settings and configuration are as per Equinix approved settings
50.8.7 Verify and record ATS switch, if available, under-voltage and phase monitor relay settings per Equinix approved settings
50.8.8 Confirm that the relevant DCOS communication has been installed as per site specification.
50.8.9 Confirm all vendor CRAH documentation has been received.
50.8.10 Confirm ATS settings have Equinix standards and confirmed operation with both supplies.
50.8.11 Confirm ATS source seek function
50.8.12 Measurement of CHW at 100% design flowrate
50.8.13 Confirm no water flow through cooling coil when control valve is positioned at 0%
50.8.14 Confirm CRAH air flow design measurement is carried out and is as per design specification
50.8.15 Confirm all sensors have been calibrated in their final position with the relevant calibration certificates.
50.8.16 Confirm 100% DCOS point to point has been completed.
50.8.17 Confirm air On/Off Temperatures across coil
50.8.18 Verify the operation of the filter clog switch and verify setting is correct
50.8.19 Green tag applied to the equipment, signed and recorded accordingly

### 50.9 CRAH L3 Documents Required:

(All documents **MUST** be available prior to commencing yellow tag)
50.9.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 50.10 CRAH L3 Sign off:

50.10.1 All required documentation is uploaded to commissioning management platform by CxA. (refer to section XX documentation matrix)
50.10.2 CxA to sign off checklist as Approved on commissioning management platform.
50.10.3 Green tag applied to the equipment and signed by CxA
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## Computer Room Air Handler (CRAH) L4 Blue Tag

The following tests and checks to be undertaken and verified by contractor prior to continuing to L5, with appropriate paperwork provided
50.10.4 Verify ATS supply failures & source seek function
50.10.5 Verify DCOS points to graphic
50.10.6 Fan modulation control based on ~~return air~~ their respective sensors (Eg: Supply / Return air sensor or pressure sensors)
50.10.7 Supply air control (valve modulation) from supply air sensors

50.10.8 Verify redundancy of CRAH units as per approved Sequence of Operations (undertaken where possible during the UPS load testing)
50.10.9 Prove operation of air fail switch (if fitted)
50.10.10 Remove power and re-instate to verify that unit re-starts correctly and record unit restart / controller reboot time
50.10.11 Verify CHW valve position during power failure and upon power restored. Valves should hold last state during startup or there may be issued during restart of the chiller plant.
50.10.12 Verify the operation of the filter clog switch and verify setting is correct
50.10.13 Verify during high/low temperature and water leak alarms present on system, that operation of CRAH is not affected – continues to run.
50.10.14 Verify proper response to sensor failures (return air temp, supply air temp, humidity sensor, damper end switch, etc
50.10.15 Verify dehumidification, humification and heater function (If applicable)
50.10.16 Verify network failure alarm.
50.10.17 Verify network switch and group controller failure
50.10.18 Blue tag applied to the equipment, signed and recorded accordingly

### 50.11 CRAH L4 Documents Required:

(All documents **MUST** be available prior to commencing yellow tag)

50.11.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 50.12 CRAH L4 Sign off:

50.12.1 All required documentation is uploaded to commissioning management platform by CxA. (refer to section XX documentation matrix)
50.12.2 CxA to sign off checklist as Approved on commissioning management platform.
50.12.3 Blue tag applied to the equipment and signed by CxA.

## 51 Computer Room Air Conditioner (CRAC) (DX)

**Computer Room Air Conditioning (CRAC) L2A Red Tag**

The following tests and checks to be undertaken and verified by contractor prior to continuing to L2, with appropriate paperwork provided

### 51.1 CRAC L2A Pre-requisites:

51.1.1 Confirm the correct equipment has been delivered per design specification has been delivered and record nameplate information. Check serial numbers and other identification and appropriate warning labels are in place
51.1.2 Confirm no damage has occurred in transit all transit bolts, wedges etc. have been removed
51.1.3 Confirm the unit is correct dimensionally
51.1.4 Confirm the CRAC outdoor unit has been secured on the appropriate floor / wall mountings using the appropriate bolt holes
51.1.5 Confirm equipment has been installed / positioned as per approved shop drawings
51.1.6 Check equipment is properly mounted as per manufacturer's recommendations
51.1.7 Check no debris or foreign materials have entered the equipment
51.1.8 Confirm all external accessories supplied, such as baffle plates / sensors / tubing, are securely mounted in appropriate containment
51.1.9 Confirm all necessary cabling is correctly glanded to ensure the characteristics of the enclosure (e.g. IP56) which the cable enters can be maintained adequately.
51.1.10 Confirm all internal cabling has appropriate strain relief in place.
51.1.11 Confirm all device labelling is correct as per site labelling schedule.
51.1.12 Confirm the face of each coil is clean and free from damage
51.1.13 Confirm piping materials / components are fully in accordance with the relevant project piping specification for the piping specification
51.1.14 Confirm the correct DCOS interface card has been supplied.
51.1.15 Red tag applied to the equipment and signed by the CxA

### 51.2 CRAC L2A Documents Required:

(All documents **MUST** be available prior to commencing yellow tag)

51.2.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 51.3 CRAC L2A L3 Sign off:

51.3.1 All required documentation is uploaded to commissioning management platform by CxA. (refer to section XX documentation matrix)
51.3.2 CxA to sign off checklist as Approved on commissioning management platform.
51.3.3 Red tag applied to the equipment and signed by CxA.

**Computer Room Air Conditioning (CRAC) L2B Yellow Tag**

The following tests and checks to be undertaken and verified by contractor prior to continuing to L3, with appropriate paperwork provided

### 51.4 CRAC L2B Prerequisites:

(All below documentation **MUST** be available prior to commencing yellow tag)

51.4.1 Verify red tag has been applied to the equipment and signed off by the CxA.
51.4.2 Verify yellow tag has been applied to the earthing system and signed off by the CxA.
51.4.3 Verify the Cx level 3 start-up/pre functional testing method statement and risk assessment (RAMS) have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
51.4.4 Confirm As-Built documentation (if applicable) have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
51.4.5 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
51.4.6 GC to compile a test pack in line with Equinix document matrix.

### 51.5 CRAH L2B Physical Checks

51.5.1 Confirming all earthing is completed and recorded
51.5.2 Ensure condensate tray is installed (If applicable)
51.5.3 Confirm all insulation resistance testing of cable is as per specification and requirements.
51.5.4 Confirm all electrical torque terminal records have been completed
51.5.5 Confirm refrigerant piping support are in accordance with the piping specification
51.5.6 Confirm that the in-line piping components are mounted in the correct orientation and regarding flow direction.
51.5.7 Confirm that all refrigerant pipework lagging integrity and completion
51.5.8 Confirm refrigerant CRAC pipework has appropriate leak pressure test documentation.
51.5.9 Confirm refrigerant CRAC pipework has appropriate strength pressure test documentation
51.5.10 Confirm refrigerant CRAC pipework has appropriate evacuation of system documentation to a vacuum of at least 0.5
51.5.11 Confirm that the refrigerant charge labelling is displayed according to F-Gas Legislation (kg)

51.5.12 Confirm that any internal condensate drainage pipework is routed to provide a continuous fall to the drain point.
51.5.13 Confirm that the electrical bonding joints are completed according to the project pipe specification
51.5.14 Local CRAC isolators are labelled accordingly.
51.5.15 Confirm any external condenser isolators electrical feeds are bottom entry.
51.5.16 Confirm all CRAC air filters are clean and fitted.
51.5.17 Confirm condenser coils are clean, no restricting air flow issues, damage free and appropriate protection guards in place.
51.5.18 Yellow tag applied to the equipment and signed, recorded accordingly.

### 51.6 CRAC L2B Documents Required:

(All documents **MUST** be available prior to commencing yellow tag)

51.6.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 51.7 CRAC L2B Sign off:

51.7.1 All required documentation is uploaded to commissioning management platform by CxA. (refer to section XX documentation matrix)
51.7.2 CxA to sign off checklist as Approved on commissioning management platform.
51.7.3 Yellow tag applied to the equipment and signed by CxA.

## Computer Room Air Handler (CRAC) L3 Green Tag

The following tests and checks to be undertaken and verified by contractor prior to continuing to L4, with appropriate paperwork provided

### 51.8 CRAC L3 Pre-requisites:

(All below documentation **MUST** be available prior to commencing green tag)

51.8.1 Verify yellow tag has been applied to the associated chilled water system and signed by the CxA.
51.8.2 Verify water balancing has been completed and signed by the CxA.
51.8.3 Refer to section XX for DCOS/BMS requirements
51.8.4 Verify the Cx level 4 functional & performance test script have been uploaded to Equinix commissioning management platform by CxA.
51.8.5 Verify switching schedule and energisation plan is implemented by the GC's approved SAP/AP.
51.8.6 Verify approved SOO have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
51.8.7 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
51.8.8 GC to compile a test pack in line with Equinix document matrix.
51.8.9 Confirm ALL pipework has been flushed and results are to BISRIA standards and recorded accordingly. Back flushing of coils has been performed and the strainers have been removed and cleaned

### 51.9 CRAC L3 Physical Checks:

51.9.1 Confirm phase rotation is correct (if applicable)
51.9.2 Confirm compressor redundancy (if applicable)
51.9.3 Confirm refrigerant CRAC pipework has appropriate leak pressure test documentation.
51.9.4 Confirm refrigerant CRAC pipework has appropriate strength pressure test documentation to 1.5x working pressure or 150Psi whichever is greater for a period of 24 hour (longer periods may be appropriate for larger systems
51.9.5 Confirm refrigerant CRAC pipework has appropriate evacuation of system documentation to a vacuum of at least 2 torr observed on the remote site calibrated vacuum gauge.
51.9.6 Verify that the refrigerant charge labelling is displayed according to F-Gas Legislation (kg)
51.9.7 Confirm refrigerant charge is correct
51.9.8 Confirm the CRAC has Equinix standard software and settings
51.9.9 Verify that the CRAC unit firmware, settings and configuration are as per Equinix approved settings
51.9.10 Verify and record ATS switch, if available, under-voltage and phase monitor relay settings per Equinix approved settings
51.9.11 Confirm ATS source seek function
51.9.12 Confirm that the relevant DCOS communication has been installed as per site specification.
51.9.13 Confirm all level 3 vendor commissioning is completed at in load conditions (per circuit) to ensure stable pressures and accurate refrigerant charges.
51.9.14 Confirm all vendor CRAC documentation has been uploaded to the Project Portal and approved by the CxA
51.9.15 Confirm ATS settings have Equinix standards and confirmed operation with both supplies.
51.9.16 Confirm all sensors have been calibrated in their final position with the relevant calibration certificates.
51.9.17 Confirm 100% DCOS point to point has been completed.

51.9.18 Verify 100% DCOS point to point to graphic and all alarms has been completed.
51.9.19 Confirm CRAC air flow design measurement is carried out and is as per design specification
51.9.20 Confirm air On/Off Temperatures across coil
51.9.21 Verify the operation of the filter clog switch and verify setting is correct
51.9.22 Green tag applied to the equipment, signed and recorded accordingly

### 51.10 CRAC L3 Documents Required:

(All documents **MUST** be available prior to commencing Yellow tag)

51.10.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 51.11 CRAC L3 Sign off:

51.11.1 All required documentation is uploaded to commissioning management platform by CxA. (refer to section XX documentation matrix)
51.11.2 CxA to sign off checklist as Approved on commissioning management platform.
51.11.3 Green tag applied to the equipment and signed by CxA.

## Computer Room Air Handler (CRAH) L4 Blue Tag

The following tests and checks to be undertaken and verified by contractor prior to continuing to L5, with appropriate paperwork provided
All units should be load tested at 100% of design load

### 51.12 CRAC Prerequisites:

(All below documentation **MUST** be available prior to commencing blue tag)
51.12.1 Verify green tag has been applied to Chilled Water System assets and signed off by the CxA.
51.12.2 Refer to section XX for DCOS/BMS requirements
51.12.3 Confirm layout of temporary aisle containment and heaters has been agreed
51.12.4 Verify all related P1 Cx issues are closed on the IRL
51.12.5 Confirm DCOS/BMS verifications are complete and alarm free

### 51.13 CRAC Physical Checks:

51.13.1 ATS supply failures and source seek function under load
51.13.2 BMS points to graphic
51.13.3 Confirm fan control (if applicable)
51.13.4 Supply air control from supply air sensors
51.13.5 Fan modulation control based on GDC, requirements.
51.13.6 Prove operation of air fail switch (if fitted)
51.13.7 Confirm compressor modulation control based on control variable
51.13.8 Verify proper minimum supply fan speeds or that there is some type of coil freeze protection
51.13.9 Remove power and re-instate to verify that unit re-starts correctly record unit restart / controller reboot time
51.13.10 Airflow and design airflow volume check
51.13.11 Verify the operation of the filter clog switch and verify setting is correct
51.13.12 Verify during high/low temperature and water leak alarms present on system, that operation of CRAC is not
51.13.13 Verify proper response to sensor failures (return air temp, supply air temp, humidity sensor, damper end switch, etc
51.13.14 Verify dehumidification, humification and heater function (If applicable)
51.13.15 Verify network failure alarm and group controller failure
51.13.16 Blue tag applied to the equipment, signed and recorded accordingly

### 51.14 CRAC L4 Documents Required:

(All documents **MUST** be available prior to commencing yellow tag)
51.14.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 51.15 CRAC L4 Sign off:

51.15.1 All required documentation is uploaded to commissioning management platform by CxA. (refer to section XX documentation matrix)
51.15.2 CxA to sign off checklist as Approved on commissioning management platform.
51.15.3 Blue tag applied to the equipment and signed by CxA.

## 52 Direct Expansion (DX) Split Units

## Direct Expansion (DX) Split Units L2A Red Tag

The following tests and checks to be undertaken and verified by contractor prior to continuing to L2, with appropriate paperwork provided

### 52.1 DX Unit L2A Pre-requisites:

52.1.1 Verify the technical submittals and as built drawings have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
52.1.2 Verify the shop drawings have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
52.1.3 Verify the cable schedules have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
52.1.4 Verify the BMS points list have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
52.1.5 Verify the Cx level 2B static testing method statement and risk assessment (RAMS) have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
52.1.6 Verify the material delivery receipt has been uploaded to Equinix document control platform by the GC, GC to identify upon kerbside delivery any defects/damages during transit.

### 52.2 DX Unit L2A Physical checks:

52.2.1 Conduct a visual inspection of the equipment, ensure there are no defects/damages present after installation/positioning and are the correct indoor/outdoor units.
52.2.2 Confirm no defects/damages has occurred in transit and all transit bolts, wedges etc. have been removed. If defects/damages are found, they are to be recorded on the IRL by the CxA.

52.2.3 Confirm the equipment has been installed/positioned as per approved shop drawings.
52.2.4 Confirm the equipment that has been delivered is correct as per design specification and approved technical submittal. Check serial numbers, nameplate information, switchgear/motor type/rating, IP rating, etc.
52.2.5 Confirm all device labelling is correct as per project naming convention and appropriate warning labels are in place.
52.2.6 Confirm the equipment is correct dimensionally and handed correctly.
52.2.7 Confirm the installation location is suitable – no major construction works ongoing etc.
52.2.8 Confirm equipment is properly mounted as per manufacturer's recommendations, for example: anti-vibration mounts where required.
52.2.9 Confirm all external accessories supplied, such as baffle plates/sensors/tubing/smoke detector are securely mounted in appropriate containment.
52.2.10 Confirm the coils are clean and free from damage.
52.2.11 Confirm refrigerant pipework materials/components are fully in accordance with the project design specification.
52.2.12 Check no debris or foreign materials have entered the equipment and the appropriate protection is in place.
52.2.13 Confirm all necessary cabling/containment is correctly glanded/fixed and ensure the characteristics of the enclosure remains unchanged i.e. IP rating etc.
52.2.14 Confirm all cabling has appropriate strain relief in place.
52.2.15 Confirm all protective covers are installed and suitable protection is provided.
52.2.16 Confirm appropriate access for maintenance.
52.2.17 All equipment information, equipment parameter list with nameplate photo evidence to be recorded on commissioning management platform, by the CxA.

### 52.3 DX Unit L2A Documents Required:

(All documents **MUST** be available prior to commencing yellow tag)

52.3.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 52.4 DX Unit L2A Sign Off

52.4.1 All required documentation is uploaded to commissioning management platform by CxA.
52.4.2 CxA to sign off checklist as Approved on commissioning management platform.
52.4.3 Red tag applied to the equipment and signed by CxA.

## Direct Expansion (DX) Split Units L2B Yellow Tag

The following tests and checks to be undertaken and verified by contractor prior to continuing to L3, with appropriate documentation provided

### 52.5 DX Unit L2B Pre-requisites:

- Verify red tag has been applied to the equipment and signed by the CxA.
- Verify the Cx level 3 start-up/pre functional testing method statement and risk assessment (RAMS) have been uploaded to Equinix document control platform and approved by the CxA.
- Verify calibration certificates for the test instruments/tools used are within manufacturers specifications and in date and have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
- Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
- Verify all P1 & P2 Issues have been closed

### 52.6 DX Unit L2B Physical checks:

52.6.1 Confirm all equipment identification and warning labels/signs etc are present.
52.6.2 Confirm Earth connections comply with Equinix Global Design Standards and/or design drawings.
52.6.3 Confirm AC Supply cables have been dead tested (continuity, polarity, and IR test) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
52.6.4 Confirm control cables have been dead tested (continuity, polarity, and IR test) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
52.6.5 Confirm control/signal cables have been point to point tested, signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA
52.6.6 Confirm As-Built documentation have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
52.6.7 Confirm all cables (as above) are identified with permanent labels, soundly fixed (cable ties/cleats) identifying source, load, size & type as per the project specification provided by the EOR.
52.6.8 Confirm all covers and equipment terminal/protection covers are in place and secured.
52.6.9 Confirm system configurations and settings are as per Equinix global approved settings.
52.6.10 Confirm LOTO procedures are implemented correctly by the GC's approved SAP/AP
52.6.11 Confirm all external accessories supplied, such as controller, sensors, thermostats are securely mounted in appropriate containment.
52.6.12 Confirm refrigerant DX pipework supports are in accordance with the project design specification.
52.6.13 Confirm that the in-line piping components are mounted in the correct orientation and with regard to flow direction.
Confirm that the refrigerant charge labelling is displayed according to F-Gas Legislation (kg).
52.6.14 Confirm that all refrigerant DX pipework lagging is complete.
52.6.15 Confirm refrigerant pipework has appropriate leak pressure test (test pressure and duration is subject to region specific).
52.6.16 Confirm refrigerant DX pipework has appropriate strength pressure test documentation to 1.5x working pressure for a period of 24 hour (longer periods may be appropriate for larger systems).
52.6.17 Confirm refrigerant DX pipework has appropriate evacuation of system documentation to a vacuum of at least 2 torr observed on the remote site calibrated vacuum gauge.

52.6.18 Confirm that any internal condensate pumps have been installed correctly.
52.6.19 Confirm condensate drainage pipework is routed correctly, has appropriate continuous fall to the drain point and no there are no stagnant areas.
52.6.20 Confirm condensate pipework has appropriate drip trays installed with leak detection provided.
52.6.21 Confirm all DX air filters are fitted and clean.
52.6.22 Confirm condenser coils are clean, no restricting air flow issues, damage free and appropriate protection guards in place.
52.6.23 Conduct a White Glove Inspection to ensure equipment is clean and free of debris or foreign materials and the appropriate protection is in place prior to energisation.
52.6.24 Confirm vendor Cx level 2B static testing has been carried out as per the vendors Cx level 2B static testing method statement approved by the CxA.
52.6.25 Confirm all vendor Cx level 2B checks/tests are complete and all documentation has been uploaded to Equinix document control platform by the vendor and approved by the CxA.

### 52.7 DX Unit L2B Documents Required:

(All documents **MUST** be available prior to commencing yellow tag)
52.7.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 52.8 DX Unit L2B Sign Off:

52.8.1 All required documentation is uploaded to commissioning management platform by CxA.
52.8.2 CxA to sign off checklist as Approved on commissioning management platform.
52.8.3 Yellow tag applied to the equipment and signed by CxA.

## Direct Expansion (DX) Split Units L3 Green Tag

The following tests and checks to be undertaken and verified by contractor prior to continuing to L4, w*ith appropriate documentation provided*

### 52.9 DX Unit L3 Pre-requisites:

52.9.1 Verify yellow tag has been applied to the equipment and signed by the CxA.
52.9.2 Verify the level 4 functional & performance test script have been uploaded to Equinix commissioning management platform by CxA.
52.9.3 Verify calibration certificates for the test instruments/tools used are within manufacturers specifications and in date and have been uploaded to Equinix document control platform approved by the CxA.
52.9.4 Verify switching schedule and energisation plan is implemented by the GC's approved SAP/AP.
52.9.5 Verify approved DCOS points lists have been uploaded to Equinix document control platform and approved by the EOR.
52.9.6 Verify refrigerant DX pipework leak pressure test documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
52.9.7 Verify refrigerant DX pipework strength pressure test documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
52.9.8 Verify refrigerant DX pipework evacuation of system documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
52.9.9 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform and approved by the CxA.

### 52.10 DX Unit L3 Physical checks:

52.10.1 Confirm LOTO procedures are implemented correctly by the GC's approved SAP/AP.
52.10.2 Confirm AC supply cables have been live tested (phase rotation, earth loop impedance, prospective short circuit current (PSCC), RCD trip test, if applicable) signed off and documentation has been uploaded to Equinix document control platform by the vendor and approved by the CxA.
52.10.3 Confirm DCOS point to graphic testing is complete, signed off and documentation has been uploaded to Equinix document control platform by the vendor and approved by the CxA.
52.10.4 Confirm all refrigerant pipework have been pressure and vacuum tested.
52.10.5 Confirm refrigerant charge is correct.
52.10.6 Confirm all level 3 vendor commissioning is completed at 100% load conditions (per circuit) to ensure stable pressures and accurate refrigerant charges.
52.10.7 Confirm all vendor documentation including all pressures and temperatures recorded variables has been received (calculate subcooling and superheat).
52.10.8 Confirm the DX unit is in accordance to Equinix standard software and settings.
52.10.9 Confirm VFD settings per approved Equinix settings.
52.10.10 Confirm ATS settings have Equinix standards and confirmed operation with both supplies.
52.10.11 Confirm ATS source seek function.
52.10.12 Verify and record ATS switch, if available, under-voltage and phase monitor relay settings per Equinix approved settings.
52.10.13 Confirm that the relevant DCOS communication has been installed as per site specification.
52.10.14 Confirm that the relevant hard-wired signals are installed as per site specification.
52.10.15 Confirm all sensors have been calibrated in their final position with the relevant calibration certificates.
52.10.16 Confirm 100% DCOS point to point has been completed.
52.10.17 Verify 100% DCOS point to point to graphic and all alarms has been completed.
52.10.18 Verify the operation of the filter clog switch and verify setting is correct.
52.10.19 Confirm air On/Off Temperatures across coil.
52.10.20 Confirm compressor redundancy (if applicable)

52.10.21 Confirm system operational checks completed as per sequence of operation.
52.10.22 Confirm vendor Cx level 3 start-up/pre functional testing has been carried out as per the vendors Cx level 3 start-up/pre functional method statement approved by the CxA.
52.10.23 Confirm all vendor Cx level 3 checks/tests are complete and all documentation has been uploaded to Equinix document control platform by the vendor and approved by the CxA.

### 52.11 DX Unit L3 Documents Required:

(All documents **MUST** be available prior to commencing yellow tag)
52.11.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 52.12 DX Unit L3 Sign Off:

52.12.1 All required documentation is uploaded to commissioning management platform by CxA.
52.12.2 CxA to sign off checklist as Approved on commissioning management platform.
52.12.3 Green tag applied to the equipment and signed by CxA.

## Direct Expansion (DX) Split Units L4 Blue Tag

The following tests and checks to be undertaken and verified by contractor prior to continuing to L5, w*ith appropriate documentation provided.*
All testing carried out with max available load (load banks connected plus building load)

### 52.13 DX Unit L4 Pre-requisites:

52.13.1 Verify green tag has been applied to the equipment and signed by the CxA.
52.13.2 Verify calibration certificates for the test instruments/tools used are within manufacturers specifications and in date and have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
52.13.3 Verify DCOS screen shots are captured and recorded in test scripts and have been uploaded to Equinix document control platform and approved by the CxA.
52.13.4 Verify all related scripts are complete, signed and have been uploaded to Equinix document control platform and approved by CxA.
52.13.5 Confirm that all issues are closed

### 52.14 DX Unit L4 Physical checks:

52.14.1 Confirm smoke detector interface with unit and proven in fire alarm cause and effect test. (Where applicable)
52.14.2 Verify proper control of the system as required, depending on the control strategy employed as per the sequence of operation.
52.14.3 Fail 1 fan in external heat rejection unit and verify unit continues to run (where applicable).
52.14.4 Fail 1 compressor and verify unit continues to run (where applicable).
52.14.5 Confirm compressor redundancy (Where applicable).
52.14.6 If controlled by room temperature sensor, verify start/stop operation.
52.14.7 Reduce temperature set point and verify controls to the set point
52.14.8 Increase the set point back to its design and verify that the unit controls to its design set point
52.14.9 If part of run and standby fail 1 unit and verify redundant unit starts and controls to design set point
52.14.10 If part of backup system, fail associated cooling and verify that DX unit starts and maintains set point.
52.14.11 Verify auto restart following power utility failure.

52.14.12 Verify alarms back to DCOS graphics-unit controller.
52.14.13 Verify all sensor calibration
52.14.14 Verify proper minimum supply fan speeds or that there is some type of coil freeze protection.
52.14.15 Fan modulation control based upon the approved SOO
52.14.16 Short and long cycle power failure testing to confirm auto restart of VFD and Compressors.
52.14.17 Verify proper response to sensor failures (return air temp, supply air temp, humidity sensor, damper end switch, etc.)
52.14.18 Verify VFD inverter bypass operation.
52.14.19 Verify economizer system functioning (ambient temps. Permitting).
52.14.20 Confirm system is left fault/snag free.

### 52.15 DX Unit L4 Documents Required:

(All documents **MUST** be available prior to commencing yellow tag)
52.15.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 52.16 DX Unit L4 Sign Off:

52.16.1 All required documentation is uploaded to commissioning management platform by CxA.
52.16.2 CxA to sign off test script as Approved on commissioning management platform.
52.16.3 Blue tag applied to the equipment and signed by CxA.

# 53 Pumps

**Pumps & Pump Sets L2A Red Tag**

The following tests and checks to be undertaken by Equipment Vendor / contractor and verified by CxA prior to continuing to Yellow Tag, with appropriate documentation provided

## 53.1 Pumps L2A Prerequisites:

(All below documentation **MUST** be available prior to commencing red tag)

53.1.1 Verify the technical submittals and as built drawings have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
53.1.2 Verify the shop drawings have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
53.1.3 Verify the cable schedules/cable interface schedules have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
53.1.4 Verify the DCOS/BMS points list has been uploaded to Equinix document control platform by the vendor and approved by the EOR.
53.1.5 Verify the FAT/FWT documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA. Any issues raised in FAT/FWT have been addressed. (Routine FAT QAQC documentation acceptable where FWT testing has not been procured).
53.1.6 Verify the Cx level 2B static testing method statement and risk assessment (RAMS) have been uploaded to Equinix document control platform by the GC/vendor and approved by the CxA.
53.1.7 Verify the material delivery receipt has been uploaded to Equinix document control platform by the GC, GC to identify upon kerbside delivery any defects/damages during transit.
53.1.8 GC to compile a test pack in line with Equinix document matrix.

## 53.2 Pumps L2A Physical checks:

53.2.1 Confirm installation location is available and correctly prepared – Level floor, no ongoing works, etc. if pump is not integrated with associated plant
53.2.2 Confirm the correct pump has been delivered as per design specification and record nameplate information (check serial numbers, other identification, appropriate warning labels are in place, integral pump packages, any loose items)
53.2.3 Confirm no damage occurred between delivery and installation
53.2.4 Check equipment is properly mounted as per manufacturer's recommendations, for example, anti-vibration mounts where required
53.2.5 Check no debris or foreign materials have entered the equipment
53.2.6 Confirm all external accessories supplied are securely mounted in appropriate containment as per design drawings
53.2.7 Confirm all lifting eyes have been removed (if applicable) and any transit materials
53.2.8 Confirm all necessary cabling is correctly glanded to ensure the characteristics of the enclosure (e.g. IP56) which the cable enters can be maintained adequately.
53.2.9 Confirm all cabling has appropriate strain relief in place.
53.2.10 Confirm all device labelling is correct as per site labelling schedule.
53.2.11 Confirm piping materials / components are fully in accordance with the relevant project piping specification for the piping specification
53.2.12 Confirm all deficiencies/comments from FWT/FAT have been closed.
53.2.13 Confirm room/area condition is acceptable as per the Equinix room readiness checklist.
53.2.14 Confirm equipment has been installed/positioned as per approved design drawings, manufactures specifications and approved technical submittals
53.2.15 Confirm the unit is correct dimensionally, handed correctly and accessible for operation and maintenance as per local code.
53.2.16 Confirm the equipment has the correct ratings, components, protective devices, interlocks (if applicable) as per approved design drawings, manufactures specifications and approved technical submittals
53.2.17 Confirm appropriate warning/safety labels are in place
53.2.18 Confirm all device labelling is correct as per approved Equinix naming convention.
53.2.19 Confirm no damage has occurred in transit and all transit bolts, wedges etc. have been removed.
53.2.20 Carry out all external and internal quality checks of the equipment.

53.2.21 Confirm equipment IPXX ratings are correct as per the approved technical submittals
53.2.22 Confirm network interface(s) have been supplied as per the approved technical submittals
53.2.23 Confirm system and equipment grounding installation is as per the approved design drawings and the approved technical submittals
53.2.24 Record all equipment details as per the Equinix provided template on the equipment parameter list within commissioning management platform.
53.2.25 Verify Cx level 2A Installation and QAQC inspection has been carried out as per the Equinix approved checklist.
53.2.26 Confirm all pipework connections conform with design drawings

## 53.3 Pumps L2A Documents Required:

(All documents **MUST** be available prior to commencing yellow tag)

53.3.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

## 53.4 Pumps L2A Sign Off:

53.4.1 All required documentation is uploaded to the Equinix document control platform by GC or Vendor.
53.4.2 All required documentation is uploaded to commissioning management platform by CxA.
53.4.3 CxA to sign off checklist as Approved on commissioning management platform.
53.4.4 Red tag applied to the equipment and signed by CxA.

## Pumps & Pump Sets L2B Yellow Tag

The following tests and checks to be undertaken by Equipment Vendor / contractor and verified by CxA prior to continuing to L3, with appropriate paperwork provided

### 53.5 Pumps L2B Prerequisites:

53.5.1 *(All below documentation MUST be available prior to commencing yellow tag)*
53.5.2 Verify red tag has been applied to the equipment and signed off by the CxA.
53.5.3 Verify yellow tag has been applied to the earthing system and signed off by the CxA.
53.5.4 Verify the Cx level 3 start-up/pre functional testing method statement and risk assessment (RAMS) have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
53.5.5 Confirm As-Built documentation (if applicable) have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
53.5.6 Confirm local authority environmental permits are secured.
53.5.7 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
53.5.8 GC to compile a test pack in line with Equinix document matrix.

### 53.6 Pumps L2B Physical checks:

53.6.1 Confirm earthing systems comply with Equinix Global Design Standards and/or design drawings.
53.6.2 Confirm power cables have been dead tested (refer to section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
53.6.3 Confirm control/monitoring cables have been dead tested (refer to section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
53.6.4 Confirm control/monitoring cables have been point to point tested, signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA
53.6.5 Confirm all power cables and control/monitoring cabling identification are present as per approved cable schedule and cable interfacing schedule.
53.6.6 Confirm ALL cables are identified with permanent labels, soundly fixed (glands/cable ties/cleats) identifying source, load, size & type as per the project specification provided by the EOR.
53.6.7 Verify all cable connections pull test is found satisfactory
53.6.8 Verify all connections are torqued correctly (if applicable) and double marked.
53.6.9 Confirm all trunking covers and equipment terminal/protection covers are in place and secured.
53.6.10 Confirm supply breaker/fuse has an equal or greater current capacity than the incoming breaker/fuse of the distribution board.
53.6.11 Confirm all cable entry points are sealed and watertight as per approved design drawings, manufactures specifications and approved technical submittals
53.6.12 Confirm cable entry box (if applicable) is installed as per approved design drawings, manufactures specifications and approved technical submittals
53.6.13 Confirm that any associated in-line piping components are mounted in the correct orientation with regards to flow direction.
53.6.14 Check levelling and alignment of units are correct and acceptable
53.6.15 Confirm that the electrical bonding joints are completed according to the project pipe specification
53.6.16 Confirm any insulation required for pump is installed as per design specification
53.6.17 Confirm that trace heating has been installed (if applicable)
53.6.18 Confirm ALL pipework flange bolts, are in place, show three (3) threads beyond the nut, and have been torqued correctly and documented accordingly
53.6.19 Confirm external pipework and has appropriate leak pressure test documentation (Pressure test duration is subjected to region specific)
53.6.20 Confirm external pipework has appropriate strength pressure test documentation to 1.5x working pressure or 150Psi whichever is higher. (Pressure test duration is subjected to region specific)
53.6.21 Confirm pipework has been hydrostatically tested and that there is no evidence of leakage at joints or valves
53.6.22 Confirm pump alignment test has been carried out.
53.6.23 Confirm Motor/pump lubrication has been carried out as per manufacturer recommendations
53.6.24 Confirm PTW/LOTO procedures are implemented correctly by the GC's approved SAP/AP.
53.6.25 Conduct a White Glove Inspection to ensure equipment is clean and free of debris or foreign materials and the appropriate protection is in place prior to energisation.
53.6.26 Verify vendor Cx level 2B static testing has been carried out as per the vendors Cx level 2B static testing method statement approved by the CxA.
53.6.27 Verify Cx level 2B static testing has been carried out as per the Equinix approved checklist
53.6.28 Confirm all vendor Cx level 2B checks/tests are complete and all documentation has been uploaded to Equinix document control platform by the vendor and approved by the CxA.

### 53.7 Pumps L2B Documents Required:

(All documents **MUST** be available prior to commencing yellow tag)
53.7.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 53.8 Pumps L2B Sign Off:

53.8.1 All required documentation is uploaded to the Equinix document control platform by GC or Vendor.
53.8.2 All required documentation is uploaded to commissioning management platform by CxA.
53.8.3 CxA to sign off checklist as Approved on commissioning management platform.
53.8.4 Yellow tag applied to the equipment and signed by CxA.

## Pumps & Pump Sets L3 Green Tag

The following tests and checks to be undertaken and verified by contractor prior to continuing to L4, with appropriate documentation provided

### 53.9 Pumps L3 Prerequisites:

(All below documentation **MUST** be available prior to commencing green tag)

53.9.1 Verify all relevant valves are in correct position to allow for circulation
53.9.2 Verify yellow tag has been applied to associated pipework systems (if applicable) equipment and signed by the CxA.
53.9.3 Verify switching schedule and energisation plan is implemented by the GC's approved SAP/AP.
53.9.4 Verify approved SOO have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
53.9.5 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
53.9.6 GC to compile a test pack in line with Equinix document matrix.

### 53.10 Pumps L3 Physical Checks:

53.10.1 Confirm LOTO procedures are implemented correctly by the GC's approved SAP/AP.
53.10.2 Confirm supply cables have been live tested (refer to section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
53.10.3 Confirm DCOS/BMS and point to graphic testing is complete, signed off and documentation has been uploaded to Equinix document control platform by the vendor and approved by the CxA (if applicable)
53.10.4 Confirm system and pump casing is vented of air
53.10.5 Confirm no excessive vibration
53.10.6 Verify pump rotation / direction is correct
53.10.7 Verify pump head and flow meets pump curve
53.10.8 Verify pump is able to deliver design flow
53.10.9 Measure motor running current on all phases at design flow
53.10.10 Verify vendor Cx level 3 start-up/pre-functional testing has been carried out as per the vendors Cx level 3 start-up/pre functional method statement approved by the CxA.
53.10.11 Verify Cx level 3 start-up/pre-functional testing has been carried out as per the Equinix approved checklist
53.10.12 Confirm all vendor Cx level 3 checks/tests are complete and all documentation has been uploaded to Equinix document control platform by the vendor and approved by the CxA.

### 53.11 Pumps L3 Documents Required:

(All documents **MUST** be available prior to commencing yellow tag)

53.11.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 53.12 Pumps L3 Sign off:

53.12.1 All required documentation is uploaded to commissioning management platform by CxA. (refer to section XX documentation matrix)
53.12.2 CxA to sign off checklist as Approved on commissioning management platform.
53.12.3 Green tag applied to the equipment and signed by CxA.

## Pumps & Pump Sets L4 Blue Tag

### 53.13 Pumps L4 Prerequisites

Verify that all issues have been closed
Verify that all L3 commissioning has been completed with documentation has been uploaded to the project Portal and signed off by CxA

### 53.14 Pumps L4 Physical Checks:

Verify all DCOS point to graphics and capture appropriate screen shots
Verify all DCOS alarms
Verify all redundancies where applicable
Verify Short and long cycle power failure testing to confirm auto restart of VFD
Verify network DCOS failure adheres to approved SOO

### 53.15 Pumps L4 Documents Required:

(All documents **MUST** be available prior to commencing L5 White tag)

53.15.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 53.16 Pumps L4 Sign Off:

53.16.1 All required documentation is uploaded to the Equinix document control platform by GC or Vendor.
53.16.2 All required documentation is uploaded to commissioning management platform by CxA.
53.16.3 CxA to sign off checklist as Approved on commissioning management platform.
Blue tag applied to the equipment and signed by CxA
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## 54 Pressurisation Unit

**Pressurisation Units L2A Red Tag**

The following tests and checks to be undertaken by Equipment Vendor / contractor and verified by CxA prior to continuing to Yellow Tag, with appropriate documentation provided

### 54.1 Pressurisation Unit L2A Prerequisites:

(All below documentation **MUST** be available prior to commencing red tag)

54.1.1 Verify the technical submittals and as built drawings have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
54.1.2 Verify the shop drawings have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
54.1.3 Verify the cable schedules/cable interface schedules have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
54.1.4 Verify the DCOS/BMS points list has been uploaded to Equinix document control platform by the vendor and approved by the EOR.
54.1.5 Verify the FAT/FWT documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA. Any issues raised in FAT/FWT have been addressed. (Routine FAT QAQC documentation acceptable where FWT testing has not been procured).
54.1.6 Verify the Cx level 2B static testing method statement and risk assessment (RAMS) have been uploaded to Equinix document control platform by the GC/vendor and approved by the CxA.
54.1.7 Verify the material delivery receipt has been uploaded to Equinix document control platform by the GC, GC to identify upon kerbside delivery any defects/damages during transit.
54.1.8 GC to compile a test pack in line with Equinix document matrix.

### 54.2 Pressurisation Unit L2A Physical checks:

54.2.1 Confirm installation location is available and correctly prepared – Level floor, no ongoing works, etc. if Pressurisation Unit is not integrated with associated plant
54.2.2 Confirm the correct Pressurisation Unit has been delivered as per design specification and record nameplate information (check serial numbers, other identification, appropriate warning labels are in place, integral Pressurisation Unit packages, any loose items)
54.2.3 Confirm no damage occurred between delivery and installation
54.2.4 Check equipment is properly mounted as per manufacturer's recommendations, for example, anti-vibration mounts where required
54.2.5 Check no debris or foreign materials have entered the equipment
54.2.6 Confirm all external accessories supplied are securely mounted in appropriate containment as per design drawings
54.2.7 Confirm all lifting eyes have been removed (if applicable) and any transit materials
54.2.8 Confirm all necessary cabling is correctly glanded to ensure the characteristics of the enclosure (e.g. IP56) which the cable enters can be maintained adequately.
54.2.9 Confirm all cabling has appropriate strain relief in place.
54.2.10 Confirm all device labelling is correct as per site labelling schedule.

54.2.11 Confirm piping materials / components are fully in accordance with the relevant project piping specification for the piping specification
54.2.12 Confirm all deficiencies/comments from FWT/FAT have been closed.
54.2.13 Confirm room/area condition is acceptable as per the Equinix room readiness checklist.
54.2.14 Confirm equipment has been installed/positioned as per approved design drawings, manufactures specifications and approved technical submittals
54.2.15 Confirm the unit is correct dimensionally, handed correctly and accessible for operation and maintenance as per local code.
54.2.16 Confirm the equipment has the correct ratings, components, protective devices, interlocks (if applicable) as per approved design drawings, manufactures specifications and approved technical submittals
54.2.17 Confirm appropriate warning/safety labels are in place.
54.2.18 Confirm all device labelling is correct as per approved Equinix naming convention.
54.2.19 Carry out all external and internal quality checks of the equipment.
54.2.20 Confirm network interface(s) have been supplied as per the approved technical submittals
54.2.21 Confirm system and equipment grounding installation is as per the approved design drawings and the approved technical submittals
54.2.22 Record all equipment details as per the Equinix provided template on the equipment parameter list within commissioning management platform.
54.2.23 Verify Cx level 2A Installation and QAQC inspection has been carried out as per the Equinix approved checklist.
54.2.24 Confirm all pipework connections conform with design drawings
54.2.25 Record pressure vessels are set to design pressure

### 54.3 Pressurisation Unit L2A Documents Required:

(All documents **MUST** be available prior to commencing yellow tag)

54.3.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 54.4 Pressurisation Unit L2A Sign Off:

54.4.1 All required documentation is uploaded to the Equinix document control platform by GC or Vendor.
54.4.2 All required documentation is uploaded to commissioning management platform by CxA.
54.4.3 CxA to sign off checklist as Approved on commissioning management platform.
54.4.4 Red tag applied to the equipment and signed by CxA.

## Pressurisation Units L2B Yellow Tag

The following tests and checks to be undertaken by Equipment Vendor / contractor and verified by CxA prior to continuing to L3, with appropriate paperwork provided

### 54.5 Pressurisation Unit L2B Prerequisites:

(All below documentation **MUST** be available prior to commencing yellow tag)

54.5.1 Verify red tag has been applied to the equipment and signed off by the CxA.
54.5.2 Verify yellow tag has been applied to the earthing system and signed off by the CxA.
54.5.3 Verify the Cx level 3 start-up/pre functional testing method statement and risk assessment (RAMS) have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
54.5.4 Confirm As-Built documentation (if applicable) have been uploaded to Equinix document control platform and approved by the EOR.
54.5.5 Confirm local authority environmental permits are secured.
54.5.6 Verify all related test reports are complete, and have been uploaded to Equinix document control platform and approved by the CxA.
54.5.7 GC to compile a test pack in line with Equinix document matrix.

### 54.6 Pressurisation Unit L2B Physical checks:

54.6.1 Confirm earthing systems comply with Equinix Global Design Standards and/or design drawings.
54.6.2 Confirm power cables have been dead tested (refer to section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
54.6.3 Confirm control/monitoring cables have been dead tested (refer to section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
54.6.4 Confirm control/monitoring cables have been point to point tested, signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA
54.6.5 Confirm all power cables and control/monitoring cabling identification are present as per approved cable schedule and cable interfacing schedule.
54.6.6 Confirm ALL cables are identified with permanent labels, soundly fixed (glands/cable ties/cleats) identifying source, load, size & type as per the project specification provided by the EOR.
54.6.7 Verify all cable connections pull test is found satisfactory
54.6.8 Verify all connections are torqued correctly (if applicable) and double marked.
54.6.9 Confirm all trunking covers and equipment terminal/protection covers are in place and secured.
54.6.10 Confirm supply breaker/fuse has an equal or greater current capacity than the incoming breaker/fuse of the distribution board.
54.6.11 Confirm all cable entry points are sealed and watertight as per approved design drawings, manufactures specifications and approved technical submittals
54.6.12 Confirm cable entry box (if applicable) is installed as per approved design drawings, manufactures specifications and approved technical submittals
54.6.13 Confirm that any associated in-line piping components are mounted in the correct orientation with regards to flow direction.
54.6.14 Confirm that the in-line piping components are mounted in the correct orientation and with regard to flow direction.

54.6.15 Confirm that butterfly valves are provided with sufficient pipe lengths either side of the valve to enable operation.
54.6.16 Confirm the correct pipework orifice plate has been installed according to the project pipe specification.
54.6.17 Confirm that the necessary binder points, temperature pockets, filters (if applicable), flush bypass leg, drain points have been installed as per design specification.
54.6.18 Confirm that the electrical bonding joints are completed according to the project pipe specification
54.6.19 Confirm that all uninsulated pipework is painted in accordance with the piping specification.
54.6.20 Confirm all insulated pipework lagging integrity, completed and vapour sealed.
54.6.21 Confirm pump alignment test have been carried out.
54.6.22 Confirm Motor/pump lubrication has been carried out as per manufacturer recommendations
54.6.23 Confirm all tanks are leakage free
54.6.24 Confirm make up water is available
54.6.25 Confirm all gauges are reading accurately
54.6.26 Confirm top up water is available
54.6.27 Confirm drains installed and run free
54.6.28 Confirm gauges read correctly
54.6.29 Confirm PTW/LOTO procedures are implemented correctly by the GC's approved SAP/AP.
54.6.30 Conduct a White Glove Inspection to ensure equipment is clean and free of debris or foreign materials and the appropriate protection is in place prior to energisation.
54.6.31 Verify vendor Cx level 2B static testing has been carried out as per the vendors Cx level 2B static testing method statement approved by the CxA.
54.6.32 Verify Cx level 2B static testing has been carried out as per the Equinix approved checklist
54.6.33 Confirm all vendor Cx level 2B checks/tests are complete and all documentation has been uploaded to Equinix document control platform by the vendor and approved by the CxA.

### 54.7 Pressurisation Unit L2B Documents Required:

(All documents **MUST** be available prior to commencing yellow tag)

54.7.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 54.8 Pressurisation Unit L2B Sign Off:

54.8.1 All required documentation is uploaded to the Equinix document control platform by GC or Vendor.
54.8.2 All required documentation is uploaded to commissioning management platform by CxA.
54.8.3 CxA to sign off checklist as Approved on commissioning management platform.
54.8.4 Yellow tag applied to the equipment and signed by CxA.

## Pressurisation Units L3 Green Tag

The following tests and checks to be undertaken and verified by contractor prior to continuing to L4, with appropriate documentation provided

### 54.9 Pressurisation Unit L3 Prerequisites:

(All below documentation **MUST** be available prior to commencing green tag)

54.9.1 Verify all relevant valves are in correct position to allow for circulation
54.9.2 Verify yellow tag has been applied to associated pipework systems (if applicable) equipment and signed by the CxA.
54.9.3 Refer to section XX for DCOS/BMS requirements
54.9.4 Verify switching schedule and energisation plan is implemented by the GC's approved SAP/AP.
54.9.5 Verify approved SOO have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
54.9.6 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
54.9.7 GC to compile a test pack in line with Equinix document matrix.

### 54.10 Pressurisation Unit L3 Physical Checks:

54.10.1 Confirm LOTO procedures are implemented correctly by the GC's approved SAP/AP.
54.10.2 Confirm supply cables have been live tested (refer to section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
54.10.3 Confirm DCOS/BMS and point to graphic testing is complete, signed off and documentation has been uploaded to Equinix document control platform by the vendor and approved by the CxA
54.10.4 Confirm pipework has been hydrostatically tested and that there is no evidence of leakage at joints or valves
54.10.5 Confirm pipework has been flushed and cleaned with the required test results documentation
54.10.6 Confirm system and pump casing is vented of air
54.10.7 Check power supply is available at the correct voltage
54.10.8 Verify VFD settings are as per approved Equinix settings (If applicable)
54.10.9 Verify vibration signature meets specification
54.10.10 Verify pump rotation / direction is correct
54.10.11 Verify pump head and flow meets pump curve
54.10.12 Carry out closed head test and check against the pump curve to confirm the impeller size corresponds to the curve
54.10.13 Verify pump flow at 30Hz, 40Hz and 50Hz. (If applicable)

54.10.14 Measure motor running current on all phases
54.10.15 Confirm that pump pressure developed does not exceed system design pressure
54.10.16 Confirm that the water supply to the system shut off at the correct level.
54.10.17 Confirm correct pressure is achieved and adjust the high / low pressure cut-out switches to the correct pressures
54.10.18 Confirm make up water flow exceeds or matches pump delivery volumes
54.10.19 Confirm operations of dry running cut off switch
54.10.20 Confirm all sensors have been calibrated in their final position with the relevant calibration certificates
54.10.21 Confirm 100% BMS point to point to graphic and all alarms has been completed
54.10.22 Verify vendor Cx level 3 start-up/pre-functional testing has been carried out as per the vendors Cx level 3 start-up/pre functional method statement approved by the CxA.
54.10.23 Verify Cx level 3 start-up/pre-functional testing has been carried out as per the Equinix approved checklist
54.10.24 Confirm all vendor Cx level 3 checks/tests are complete and all documentation has been uploaded to Equinix document control platform by the vendor and approved by the CxA.

### 54.11 Pressurisation Unit L3 Documents Required:

(All documents **MUST** be available prior to commencing yellow tag)

54.11.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 54.12 Pressurisation Unit L3 Sign off:

54.12.1 All required documentation is uploaded to commissioning management platform by CxA. (refer to section XX documentation matrix)
54.12.2 CxA to sign off checklist as Approved on commissioning management platform.
54.12.3 Green tag applied to the equipment and signed by CxA.

## Pressurisation Units L4 Blue Tag

(All below documentation **MUST** be available prior to commencing blue tag]

### 54.13 Pressurisation Unit L4 Prerequisites:

54.13.1 Verify green tag has been applied to the applicable system and signed off by the CxA. (If Applicable)
54.13.2 Verify green tag has been applied to any associated DCOS/BMS panel/s if hard wired.
54.13.3 Verify all related P1 Cx issues are closed on the IRL
54.13.4 Confirm DCOS/BMS verifications are complete and alarm free

### 54.14 Pressurisation Unit L4 Physical checks:

54.14.1 Verify that the pressurization unit pump cuts-in and refills the system to the correct pressure and the pumps cut-out at the correct system pressure
54.14.2 Verify system low pressure cut-out setting and ensure the system operates as per design sequence of operations
54.14.3 Verify system high pressure cut-out setting and ensure the system operates as per design sequence of operations
54.14.4 Blue tag applied to the equipment and signed, recorded accordingly
54.14.5 Verify alarms back to BMS graphics and alarm console

### 54.15 Pressurisation Unit L4 Documents Required:

(All documents **MUST** be available prior to commencing yellow tag)

54.15.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 54.16 Pressurisation Unit L4 Sign off:

54.16.1 All required documentation is uploaded to commissioning management platform by CxA. (refer to section XX documentation matrix)
54.16.2 CxA to sign off checklist as Approved on commissioning management platform.
54.16.3 Green tag applied to the equipment and signed by CxA.

## 55 Generators Fuel Oil Systems

**Generator Fuel Oil SystemsL2A Red Tag**

The following tests and checks to be undertaken and verified by contractor prior to continuing to L2A, with appropriate paperwork provided

### 55.1 Fuel Oil L2A Prerequisites:

55.1.1 Verify the technical submittals and as built drawings have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
55.1.2 Verify the shop drawings have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
55.1.3 Verify the cable schedules/cable interface schedules have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
55.1.4 Verify the DCOS/BMS points list has been uploaded to Equinix document control platform by the vendor and approved by the EOR.
55.1.5 Verify the FAT/FWT documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA. Any issues raised in FAT/FWT have been addressed. (Routine FAT QAQC documentation acceptable where FWT testing has not been procured).
55.1.6 Verify the Cx level 2B static testing method statement and risk assessment (RAMS) have been uploaded to Equinix document control platform by the GC/vendor and approved by the CxA.
55.1.7 Verify the material delivery receipt has been uploaded to Equinix document control platform by the GC, GC to identify upon kerbside delivery any defects/damages during transit.
55.1.8 GC to compile a test pack in line with Equinix document matrix.

### 55.2 Fuel Oil L2A Physical Checks:

55.2.1 Confirm the correct equipment has been delivered per design specification has been delivered and record nameplate
55.2.2 Confirm no damage has occurred in transit and all transit bolts, wedges etc. have been removed
55.2.3 Confirm equipment has been installed / positioned as per approved shop drawings
55.2.4 Check levelling and alignment of units are correct and acceptable
55.2.5 Check equipment is properly mounted as per manufacturer's recommendations
55.2.6 Check adequate maintenance access has been provided for equipment
55.2.7 Confirm that the coil sections and fan assemblies have been installed and bolted down correctly as per manufacturer guidelines
55.2.8 Confirm all external accessories supplied, such as sensors / transmitters, are securely mounted in appropriate containment
55.2.9 Check no debris or foreign materials have entered the equipment
55.2.10 Confirm all lifting eyes have been removed (if applicable)
55.2.11 Confirm all internal cabling is correctly glanded to ensure the characteristics of the enclosure (e.g. IP56) which the cable enters can be maintained adequately.
55.2.12 Confirm all cabling has appropriate strain relief in place.
55.2.13 Confirm all device labelling is correct as per site labelling schedule.
55.2.14 Confirm piping materials / components are fully in accordance with the relevant project piping specification for the piping specification
55.2.15 Confirm the correct DCOS interface card has been supplied.
55.2.16 Confirm system and equipment grounding installation is per approved Equinix grounding installation drawing
55.2.17 Red tag applied to the equipment and signed, recorded accordingly

### 55.3 Fuel Oil L2A Documents Required:

(All documents **MUST** be available prior to commencing yellow tag)
55.3.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 55.4 Fuel Oil L2A Sign Off:

55.4.1 All required documentation is uploaded to the Equinix document control platform by GC or Vendor.
55.4.2 All required documentation is uploaded to commissioning management platform by CxA.
55.4.3 CxA to sign off checklist as Approved on commissioning management platform.
55.4.4 Red tag applied to the equipment and signed by CxA.

**Generator Fuel Oil Systems L2B Yellow Tag**

The following tests and checks to be undertaken and verified by contractor prior to continuing to L3, with appropriate paperwork provided

### 55.5 Fuel Oil L2B Prerequisites:

(All below documentation **MUST** be available prior to commencing yellow tag)
55.5.1 Verify red tag has been applied to the equipment and signed off by the CxA.
55.5.2 Verify yellow tag has been applied to the earthing system and signed off by the CxA.
55.5.3 Verify the Cx level 3 start-up/pre functional testing method statement and risk assessment (RAMS) have been uploaded to Equinix document control platform by the vendor and approved by the CxA.

55.5.4 Confirm As-Built documentation (if applicable) have been uploaded to Equinix document control platform and approved by the EOR.
55.5.5 Confirm local authority environmental permits are secured.
55.5.6 Verify all related test reports are complete and have been uploaded to Equinix document control platform and approved by the CxA.
55.5.7 GC to compile a test pack in line with Equinix document matrix.

### 55.6 Fuel Oil L2A Physical Checks:

55.6.1 Confirm associated rooms ventilation system installation is completed
55.6.2 Confirm bunds/drains/vents installation is completed
55.6.3 Confirm adequate access to filters/strainers
55.6.4 Confirming all earthing is completed and recorded
55.6.5 Confirm all insulation resistance testing of cable is as per specification and requirements.
55.6.6 Confirm all electrical torque terminal records have been completed.
55.6.7 Confirm piping support are in accordance with the piping specification
55.6.8 Check levelling and alignment of units are correct and acceptable
55.6.9 Confirm that the in-line piping components are mounted in the correct orientation and with regard to flow direction.
55.6.10 Confirm that butterfly valves are provided with sufficient pipe lengths either side of the valve to enable operation.
55.6.11 Confirm that the necessary binder points, temperature pockets, filters (if applicable), flush bypass leg, drain points have been installed as per design specification.
55.6.12 Confirm loose items are fitted in correct location and orientation.
55.6.13 Confirm control valves can operated freely under hand control.
55.6.14 Confirm that all uninsulated pipework is painted in accordance with the piping specification.
55.6.15 Confirm all insulated pipework lagging integrity, completed and vapour sealed.
55.6.16 Confirm bulk fuel tanks and underground storage tanks (Primary & Secondary Layer) have been pressure tested to the appropriate pressure / duration and test results documented
55.6.17 Confirm fuel pipe welded joint test, pressure test and flushing have been completed and test results documented
55.6.18 Confirm ALL pipework flange bolts, are in place, show three (3) threads beyond the nut, and have been torqued correctly and documented accordingly.
55.6.19 Confirm fuel pipework and appropriate equipment has appropriate strength pressure test documentation
55.6.20 Confirm fuel pumps and its associated accessories installation have been completed and documented
55.6.21 Confirm all pipe joints are inspected and brackets secure
55.6.22 Confirm all electrical and control cabling are installed correctly for application
55.6.23 Confirm all control devices are installed as per design installation drawing
55.6.24 Verify control devices matches approved system architecture
55.6.25 Confirm system installed as per DGS and to manufacturers specification
55.6.26 Confirm ventilation system is installed
55.6.27 Confirm adequate access to filters/strainers
55.6.28 Yellow tag applied to the equipment and signed, recorded accordingly

### 55.7 Fuel Oil L2B Documents Required:

(All documents **MUST** be available prior to commencing yellow tag)
55.7.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 55.8 Fuel Oil L2B Sign Off:

55.8.1 All required documentation is uploaded to the Equinix document control platform by GC or Vendor.
55.8.2 All required documentation is uploaded to commissioning management platform by CxA.
55.8.3 CxA to sign off checklist as Approved on commissioning management platform.
55.8.4 Yellow tag applied to the equipment and signed by CxA.

## Generator Fuel Oil Systems L3 Green Tag

The following tests and checks to be undertaken and verified by contractor prior to continuing to L4, with appropriate paperwork provided

### 55.9 Fuel Oil L3 Pre-requisites:

(All below documentation **MUST** be available prior to commencing yellow tag)
55.9.1 Verify red tag has been applied to the equipment and signed off by the CxA.
55.9.2 Verify yellow tag has been applied to the earthing system and signed off by the CxA.
55.9.3 Verify the Cx level 3 start-up/pre functional testing method statement and risk assessment (RAMS) have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
55.9.4 Confirm As-Built documentation (if applicable) have been uploaded to Equinix document control platform and approved by the EOR.
55.9.5 Confirm local authority environmental permits are secured.
55.9.6 Verify all related test reports are complete, and have been uploaded to Equinix document control platform and approved by the CxA.
55.9.7 GC to compile a test pack in line with Equinix document matrix.

### 55.10 Fuel Oil L3 Physical Checks:

55.10.1 Confirm ALL pipework flange bolts, are in place, show three (3) threads beyond the nut, and have been torqued correctly and documented accordingly.
55.10.2 Confirm fuel pipework and appropriate equipment has appropriate strength pressure test documentation to 1.5x working pressure or 150Psi whichever is higher for a period of 2 hour
55.10.3 Confirm ALL pipework has been flushed and test results are documented.
55.10.4 Confirm pump performance test have been completed and the flow rates are verified against design specification
55.10.5 Confirm all sensors have been calibrated in their final position with the relevant calibration certificates
55.10.6 Confirm 100% BMS point to point to graphic and all alarms has been completed
55.10.7 100% Field Instrument / Sensors Point to Point Testing
55.10.8 100% Field Instrument / Sensors Failure / Alarms Testing
55.10.9 100% 3rd Party Equipment Point to Point Testing
55.10.10 100% 3rd Party Equipment Failure / Alarms Testing
55.10.11 Verify BMS graphics matches site installation and approved schematics / graphics
55.10.12 Verify trending and logging are available on the BMS
55.10.13 Verify that the equipment firmware, settings and configuration are as per Equinix approved settings
55.10.14 Verify and record ATS switch, if available, under-voltage and phase monitor relay settings per Equinix approved settings
55.10.15 Confirm ATS settings have Equinix standards and confirmed operation with both supplies.
55.10.16 Confirm ATS source seek function
55.10.17 ATS operation
55.10.18 Verify 100% Field Instrument Failure Testing
55.10.19 Verify 100% Field Instrument Alarms Testing
55.10.20 Verify 100% 3rd Party Equipment Failure Testing
55.10.21 Verify 100% 3rd Party Equipment Alarms Testing
55.10.22 Verify 100% Setpoint Testing
55.10.23 Verify 100% Alarms Testing
55.10.24 Verify 100% Communication Failure Testing
55.10.25 Verify 100% Communication Alarm Testing
55.10.26 Verify Flow switches
55.10.27 Verify Differential pressure
55.10.28 Verify Discharge pressure
55.10.29 Verify Water separator
55.10.30 Check monitoring/Alarms of day tanks
55.10.31 Check Monitoring/Alarms of Bulk tanks
55.10.32 Full design flow rate prove, including Day 1 flow rates
55.10.33 Green tag applied to the equipment and signed, recorded accordingly

### 55.11 Fuel Oil L3 Documents Required:

(All documents **MUST** be available prior to commencing yellow tag)
55.11.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 55.12 Fuel Oil L3 Sign off:

55.12.1 All required documentation is uploaded to commissioning management platform by CxA. (refer to section XX documentation matrix)
55.12.2 CxA to sign off checklist as Approved on commissioning management platform.
55.12.3 Green tag applied to the equipment and signed by CxA.

## Generator Fuel Oil Systems L4 Blue Tag

The following tests and checks to be undertaken and verified by contractor prior to continuing to L5, with appropriate paperwork provided

### 55.13 Fuel Oil L4 Pre-requisites:

55.13.1 Verify green tag has been applied to the applicable system and signed off by the CxA. (If Applicable)
55.13.2 Verify green tag has been applied to any associated DCOS/BMS panel/s if hard wired.
55.13.3 Verify all related P1 Cx issues are closed on the IRL
55.13.4 Confirm DCOS/BMS verifications are complete and alarm free

### Fuel Oil L4 Physical Checks:

55.13.5 All valves automation and failure scenarios (Eg: power failures, fail open / close)
55.13.6 Verify fuel dump strategy operations and record timing for fuel to be fully drained back to bulk tanks
55.13.7 Verify fuel overflow system
55.13.8 Verify operation of level switches
55.13.9 Verify ALL fuel leak detection alarms (Eg: Bund, Pipe in Pipe etc)
55.13.10 Verify water detection alarms
55.13.11 Verify fuel polishing and water separator operations
55.13.12 Verify fuel cooling operations (If applicable)
55.13.13 Verify that the power source to primary and secondary fuel system are from separate power blocks
55.13.14 Verify Master / Slave controllers' operations and failures
55.13.15 Verify system operations on both Master and Slave controllers
55.13.16 Network and servers' failures

55.13.17 Verify All devices failures (Eg: PLC / Controllers)
55.13.18 Verify Graphics and point to Graphics testing will need to be verified on both Master / Slave controllers (If applicable)
55.13.19 Verify Bulk tank sequences in maintenance and overfill alarm modes
55.13.20 Verify Manual bulk tank to bulk tank transfer
55.13.21 Verify Lead/lag assignment for fuel requests
55.13.22 Valve power failures, fail close/open scenarios
55.13.23 Verify Pump assignment starts on fuel request
55.13.24 Verify Pump failure testing
55.13.25 Verify Leak detect and pump switch over scenarios
55.13.26 Verify Fuel filling flow rate allows all tanks to fill at same time. - confirm
55.13.27 Verify Fuel flow rate check to design
55.13.28 Verify Fuel cooling operation

55.13.29 Verify Manual pump Changeover
55.13.30 Verify Fuel dump strategy operation
55.13.31 Verify Fuel polishing operation
55.13.32 Verify operation of level switches
55.13.33 Verify Water detection in bulk tanks
55.13.34 Verify Bund leak detection operation,
55.13.35 Verify If Pipe in Pipe installed, leak detection system check
55.13.36 Verify Redundancy testing including PLC
55.13.37 Check all relevant alarms are available to DCOS
55.13.38 Blue tag applied to the equipment and signed, recorded accordingly

### 55.14 Fuel Oil L4 Documents Required:

(All documents **MUST** be available prior to commencing yellow tag)

55.14.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 55.15 Fuel Oil L4 Sign off:

55.15.1 All required documentation is uploaded to commissioning management platform by CxA. (refer to section XX documentation matrix)
55.15.2 CxA to sign off checklist as Approved on commissioning management platform.
Green tag applied to the equipment and signed by CxA.

## 56 Reverse Osmosis

**Reverse Osmosis L2A Red Tag**

The Equipment Vendor/contractor must perform the following tests and checks, which will be verified by the CxA before proceeding to the Yellow Tag stage. All necessary documentation must be provided.

### 56.1 Reverse Osmosis L2A Prerequisites:

56.1.1 Ensure that all technical submittals, as-built drawings, shop drawings, cable schedules, DCOS/BMS points list, and FAT/FWT documentation have been uploaded to Equinix document control platform and approved.
56.1.2 Verify that the Cx level 2B static testing method statement and risk assessment have been uploaded and approved.
56.1.3 Confirm the receipt of materials and compile a test pack according to Equinix document matrix.

### 56.2 Reverse Osmosis L2A Physical checks:

56.2.1 Verify that the correct Reverse Osmosis equipment has been delivered and installed according to the design specifications.
56.2.2 Confirm that there is no damage to the equipment.
56.2.3 Ensure proper mounting and anti-vibration measures are in place.
56.2.4 Check for any debris or foreign materials in the equipment.
56.2.5 Confirm that all external accessories are securely mounted.
56.2.6 Remove any lifting eyes and transit materials.
56.2.7 Ensure proper cable gland and strain relief.
56.2.8 Verify correct device labelling and piping materials/components.
56.2.9 Address any deficiencies or comments from FAT/FWT.
56.2.10 Confirm the room/area condition meets Equinix standards.
56.2.11 Verify proper installation and positioning of the equipment.
56.2.12 Confirm the equipment has the correct ratings, components, and protective devices.
56.2.13 Ensure appropriate warning/safety labels are in place.
56.2.14 Perform external and internal quality checks.
56.2.15 Confirm the presence of network interfaces have been provided.
56.2.16 Record all equipment details in the commissioning management platform.
56.2.17 Verify that Cx level 2A Installation and QAQC inspection have been carried out.
56.2.18 Ensure provisions for sampling permeate and various streams.
56.2.19 Confirm pressure relief protection is installed correctly.

### 56.3 Reverse Osmosis L2A Documents Required:

56.3.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

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### 56.4 Reverse Osmosis L2A Sign Off:

56.4.1 Upload all required documentation to the Equinix document control platform and commissioning management platform.
56.4.2 CxA signs off the checklist as Approved.
56.4.3 Apply the Red Tag to the equipment, signed by CxA. Reverse Osmosis L2A Red Tag

## Reverse Osmosis L2B Yellow Tag

The Equipment Vendor/contractor must perform the following tests and checks, which will be verified by the CxA before proceeding to Level 3. All necessary paperwork must be provided.

### 56.5 Reverse Osmosis L2B Prerequisites:

56.5.1 Verify that the Red Tag has been applied and signed off by the CxA.
56.5.2 Confirm the Yellow Tag has been applied to the earthing system and signed off by the CxA.
56.5.3 Ensure the Cx level 3 start-up/pre functional testing method statement and risk assessment have been uploaded and approved.
56.5.4 Verify the completion and approval of As-Built documentation, local authority environmental permits, and all related test reports uploaded to Equinix document control platform.

### 56.6 Reverse Osmosis L2B Physical checks:

56.6.1 Confirm compliance of earthing systems and perform dead testing of power and control/monitoring cables.
56.6.2 Check cable identification, connections, and sealing.
56.6.3 Verify proper mounting, piping support, levelling, and alignment.
56.6.4 Confirm the installation of necessary components and fittings.
56.6.5 Check pump alignment, lubrication, tank conditions, gauges, and instrument calibration.
56.6.6 Ensure provisions for chemical mixing, sampling, pressure relief, and PTW/LOTO procedures.
56.6.7 Perform a White Glove Inspection to ensure cleanliness and proper protection.
56.6.8 Verify the completion of vendor Cx level 2B static testing and Equinix approved checklist.

### 56.7 Reverse Osmosis L2B Documents Required:

56.7.1 Verify the completion and approval of all related test reports uploaded to Equinix document control platform.

### 56.8 Reverse Osmosis L2B Sign Off:

56.8.1 Upload all required documentation to the Equinix document control platform and commissioning management platform.
56.8.2 CxA signs off the checklist as Approved.
56.8.3 Apply the Yellow Tag to the equipment, signed by CxA.

## Reverse Osmosis L3 Green Tag

The contractor must perform the following tests and checks, which will be verified before proceeding to Level 4. All necessary documentation must be provided.

### 56.9 Reverse Osmosis L3 Prerequisites:

56.9.1 Verify the application of the Green Tag to the applicable system and associated DCOS/BMS panel/s.
56.9.2 Confirm the closure of all relevant P1 Cx issues and completion of DCOS/BMS verifications.

### 56.10 Reverse Osmosis L3 Physical checks:

56.10.1 Verify system functionality, firmware version, flow rates, and alarms.
56.10.2 Ensure proper power supply, vibration signature, pump rotation, and motor running current.
56.10.3 Check pipework hydrostatic testing, flushing, and cleaning.
56.10.4 Confirm proper venting, cable testing, and control/monitoring cable point-to-point testing.
56.10.5 Verify the completion of vendor Cx level 3 start-up/pre-functional testing and Equinix approved checklist.

### 56.11 Reverse Osmosis L3 Documents Required:

56.11.1 Verify the completion and approval of all related test reports uploaded to Equinix document control platform.

### 56.12 Reverse Osmosis L3 Sign Off:

56.12.1 Upload all required documentation to the commissioning management platform.
56.12.2 CxA signs off the checklist as Approved.
56.12.3 Apply the Green Tag to the equipment, signed by CxA.

## Reverse Osmosis L4 Blue Tag

The contractor must perform the following tests and checks, which will be verified before completing the commissioning process. All necessary documentation must be provided.

### 56.13 Reverse Osmosis L4 Prerequisites:

56.13.1 Verify the application of the Green Tag to the applicable system and associated DCOS/BMS panel/s.
56.13.2 Confirm the closure of all relevant P1 Cx issues and completion of DCOS/BMS verifications.

### 56.14 Reverse Osmosis L4 Physical checks:

56.14.1 Verify system functionality, firmware version, flow rates, and alarms.
56.14.2 Ensure proper power supply, vibration signature, pump rotation, and motor running current.
56.14.3 Check pipework hydrostatic testing, flushing, and cleaning.
56.14.4 Confirm proper venting, cable testing, and control/monitoring cable point-to-point testing.

56.14.5 Reverse Osmosis L4 Documents Required:
56.14.6 Verify the completion and approval of all related test reports uploaded to Equinix document control platform.

### 56.15 Reverse Osmosis L4 Sign Off:

56.15.1 Upload all required documentation to the commissioning management platform.
56.15.2 CxA signs off the checklist as Approved.
56.15.3 Apply the Blue Tag to the equipment, signed by CxA.

## 57 Heat Trace

**Heat Trace L2A Red Tag**

The following tests and checks to be undertaken by Equipment Vendor / contractor and verified by CxA prior to continuing to Yellow Tag, with appropriate documentation provided

### 57.1 Heat Trace L2A Prerequisites:

(All below documentation **MUST** be available prior to commencing red tag)

57.1.1 Verify the technical submittals and as built drawings have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
57.1.2 Verify the shop drawings have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
57.1.3 Verify the cable schedules/cable interface schedules have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
57.1.4 Verify the DCOS/BMS points list has been uploaded to Equinix document control platform by the vendor and approved by the EOR.
57.1.5 Verify the FAT/FWT documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA. Any issues raised in FAT/FWT have been addressed. (Routine FAT QAQC documentation acceptable where FWT testing has not been procured).
57.1.6 Verify the Cx level 2B static testing method statement and risk assessment (RAMS) have been uploaded to Equinix document control platform by the GC/vendor and approved by the CxA.
57.1.7 Verify the material delivery receipt has been uploaded to Equinix document control platform by the GC, GC to identify upon kerbside delivery any defects/damages during transit.
57.1.8 GC to compile a test pack in line with Equinix document matrix.

### 57.2 Heat Trace L2A Physical checks:

57.2.1 Confirm no damage occurred between delivery and installation
57.2.2 Check the design specification to ensure that the correct heating cable has been applied and controller offers the require BMS and user ability.
57.2.3 Ensure that the pressure test of the pipework has been completed prior to any trace heating been completed.
57.2.4 Ensure that the controller modules are easily accessible.
57.2.5 Confirm all necessary cabling is correctly glanded to ensure the characteristics of the enclosure (e.g. IP56) which the cable enters can be maintained adequately.

57.2.6 Confirm all device labelling is correct as per site labelling schedule
57.2.7 Confirm the correct equipment as per design specification has been delivered and record nameplate information. Check serial numbers and other identification and appropriate warning labels are in place.
57.2.8 Check equipment is properly mounted as per manufacturer's recommendations.
57.2.9 Check no debris or foreign materials have entered the equipment
57.2.10 Confirm all cabling has appropriate strain relief in place.
57.2.11 Confirm the correct BMS interface card has been supplied
57.2.12 Confirm system and equipment grounding installation is per approved Equinix grounding installation drawing
57.2.13 Confirm all external accessories supplied are securely mounted in appropriate containment as per design drawings
57.2.14 Confirm the equipment has the correct ratings, components, protective devices, interlocks (if applicable) as per approved design drawings, manufactures specifications and approved technical submittals
57.2.15 Confirm appropriate warning/safety labels are in place.
57.2.16 Confirm all device labelling is correct as per approved Equinix naming convention.
57.2.17 Carry out all external and internal quality checks of the equipment.
57.2.18 Confirm equipment IPXX ratings are correct as per the approved technical submittals
57.2.19 Confirm system and equipment grounding installation is as per the approved design drawings and the approved technical submittals
57.2.20 Record all equipment details as per the Equinix provided template on the equipment parameter list within commissioning management platform.
57.2.21 Verify Cx level 2A Installation and QAQC inspection has been carried out as per the Equinix approved checklist.

### 57.3 Heat Trace L2A Documents Required:

(All documents **MUST** be available prior to commencing yellow tag)

57.3.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX)
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### 57.4 Heat Trace L2A Sign Off:

57.4.1 All required documentation is uploaded to the Equinix document control platform by GC or Vendor.
57.4.2 All required documentation is uploaded to commissioning management platform by CxA.
57.4.3 CxA to sign off checklist as Approved on commissioning management platform.
57.4.4 Red tag applied to the equipment and signed by CxA.

## Heat Trace L2B Yellow Tag

The following tests and checks to be undertaken by Equipment Vendor / contractor and verified by CxA prior to continuing to L3, with appropriate paperwork provided

### 57.5 Heat Trace L2B Prerequisites:

(All below documentation **MUST** be available prior to commencing yellow tag)

57.5.1 Verify red tag has been applied to the equipment and signed off by the CxA.
57.5.2 Verify yellow tag has been applied to the earthing system and signed off by the CxA.
57.5.3 Verify the Cx level 3 start-up/pre functional testing method statement and risk assessment (RAMS) have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
57.5.4 Confirm As-Built documentation (if applicable) have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
57.5.5 Confirm local authority environmental permits are secured.
57.5.6 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
57.5.7 GC to compile a test pack in line with Equinix document matrix.

### 57.6 Heat Trace L2B Physical checks:

57.6.1 Confirm earthing systems comply with Equinix Global Design Standards and/or design drawings.
57.6.2 Confirm power cables have been dead tested (refer to section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
57.6.3 Confirm control/monitoring cables have been dead tested (refer to section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
57.6.4 Confirm control/monitoring cables have been point to point tested, signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA
57.6.5 Confirm all power cables and control/monitoring cabling identification are present as per approved cable schedule and cable interfacing schedule.
57.6.6 Confirm ALL cables are identified with permanent labels, soundly fixed (glands/cable ties/cleats) identifying source, load, size & type as per the project specification provided by the EOR.
57.6.7 Verify all cable connections pull test is found satisfactory
57.6.8 Verify all connections are torqued correctly (if applicable) and double marked.
57.6.9 Confirm all trunking covers and equipment terminal/protection covers are in place and secured.
57.6.10 Confirm supply breaker/fuse has an equal or greater current capacity than the incoming breaker/fuse of the distribution board.
57.6.11 Confirm all cable entry points are sealed and watertight as per approved design drawings, manufactures specifications and approved technical submittals
57.6.12 Confirm cable entry box (if applicable) is installed as per approved design drawings, manufactures specifications and approved technical submittals
57.6.13 Confirm that the heating tape shows no signs of kinks or damage during install.
57.6.14 Confirm the heating tape is mounted on the lower part of the pipe at 4 o'clock or 8 o'clock position (depending either one or two heating cables are used)
57.6.15 Confirm that fibre glass or aluminium tape is used to secure correctly on to the pipework
57.6.16 Confirm heating tape is installed to manufacturer guidelines.
57.6.17 Confirm that the ground-faulting equipment is used on each heating cable branch circuit.
57.6.18 Confirm PTW/LOTO procedures are implemented correctly by the GC's approved SAP/AP.
57.6.19 Conduct a White Glove Inspection to ensure equipment is clean and free of debris or foreign materials and the appropriate protection is in place prior to energisation.
57.6.20 Verify vendor Cx level 2B static testing has been carried out as per the vendors Cx level 2B static testing method statement approved by the CxA.
57.6.21 Verify Cx level 2B static testing has been carried out as per the Equinix approved checklist
57.6.22 Confirm all vendor Cx level 2B checks/tests are complete and all documentation has been uploaded to Equinix document control platform by the vendor and approved by the CxA.

### 57.7 Heat Trace L2B Documents Required:

(All documents **MUST** be available prior to commencing yellow tag)
Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 57.8 Heat Trace L2B Sign Off:

57.8.1 All required documentation is uploaded to the Equinix document control platform by GC or Vendor.
57.8.2 All required documentation is uploaded to commissioning management platform by CxA.
57.8.3 CxA to sign off checklist as Approved on commissioning management platform.
57.8.4 Yellow tag applied to the equipment and signed by CxA.

## Heat Trace L3 Green Tag

The following tests and checks to be undertaken and verified by contractor prior to continuing to L4, with appropriate documentation provided

### 57.9 Heat Trace L3 Prerequisites:

(All below documentation **MUST** be available prior to commencing green tag)

57.9.1 Verify yellow tag has been applied to associated pipework systems (if applicable) equipment and signed by the CxA.
57.9.2 Refer to section XX for DCOS/BMS requirements
57.9.3 Verify switching schedule and energisation plan is implemented by the GC's approved SAP/AP.
57.9.4 Verify approved SOO have been uploaded to Equinix document control platform (where applicable)
57.9.5 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
57.9.6 GC to compile a test pack in line with Equinix document matrix.

### 57.10 Heat Trace L3 Physical Checks:

57.10.1 Confirm LOTO procedures are implemented correctly by the GC's approved SAP/AP.
57.10.2 Confirm supply cables have been live tested (refer to section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
57.10.3 Confirm DCOS/BMS and point to graphic testing is complete, signed off and documentation has been uploaded to Equinix document control platform by the vendor and approved by the CxA
57.10.4 Visual inspection (check control and monitoring system for moisture, corrosion, setpoints, switch operations and capillary damage)
57.10.5 Confirm vendor commissioning documentation indicated insulation resistance and continuity check on all heating cables to verify the integrity
57.10.6 Confirm 100% BMS point to point has been completed.
57.10.7 Confirm 100% BMS point to point to graphic has been completed.
57.10.8 Each heater control system shall be validated to control to changes in temperature set points i.e. On/Off control with adjustment of temperature set point
57.10.9 Confirm vendor commissioning records include a full parameter list, including but not limited to:

- Alarm thresholds
- Setpoints
- Control Loop Parameters

57.10.10 Verify vendor Cx level 3 start-up/pre-functional testing has been carried out as per the vendors Cx level 3 start-up/pre functional method statement approved by the CxA.
57.10.11 Verify Cx level 3 start-up/pre-functional testing has been carried out as per the Equinix approved checklist
57.10.12 Confirm all vendor Cx level 3 checks/tests are complete and all documentation has been uploaded to Equinix document control platform by the vendor and approved by the CxA.

### 57.11 Heat Trace L3 Documents Required:

(All documents **MUST** be available prior to commencing yellow tag)
Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 57.12 Heat Trace L3 Sign off:

All required documentation is uploaded to commissioning management platform by CxA. (refer to section XX documentation matrix)
57.12.1 CxA to sign off checklist as Approved on commissioning management platform.
57.12.2 Green tag applied to the equipment and signed by CxA.

## Heat Trace L4 Blue Tag

The following tests and checks to be undertaken contractor and verified by CxA prior to continuing to L5, with appropriate documentation provided

### 57.13 Heat Trace L4 Pre-requisites:

(All below documentation **MUST** be available prior to commencing blue tag)
57.13.1 Verify green tag has been applied to the applicable system and signed off by the CxA. (If Applicable)
57.13.2 Verify green tag has been applied to any associated DCOS/BMS panel/s if hard wired.
57.13.3 Verify all related P1 Cx issues are closed on the IRL
57.13.4 Confirm DCOS/BMS verifications are complete and alarm free

### 57.14 Heat Trace L4 Physical checks:

57.14.1 Status and alarm points with BMS (point to graphic) on ALL control modules
57.14.2 Verification of setpoints on ALL control modules

- Commissioning records to include a full parameter list, including but not limited to:
- Alarm thresholds
- Setpoints
- Control Loop Parameters (If Applicable)

57.14.3 Remove power and re-instate to verify that unit re-starts correctly and record unit restart / controller reboot time
57.14.4 Verify IBX network comms failure has no impact on operation of unit (If Applicable)
57.14.5 Verify group controls of AHU units
57.14.6 Verify redundancy of AHU units as per approved Sequence of Operations

### 57.15 Heat Trace L4 Documents Required:

(All documents **MUST** be available prior to commencing XXXXXX tag)
Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 57.16 Heat Trace L4 Sign off:

57.16.1 All required documentation is uploaded to commissioning management platform by CxA. (refer to section XX documentation matrix)
57.16.2 CxA to sign off checklist as Approved on commissioning management platform.
57.16.3 Blue tag applied to the equipment and signed by CxA.

# Life Safety Systems

## 58 Fire Alarm Systems

**Fire Alarm System L2A Red Tag**

The following tests and checks to be undertaken by Equipment Vendor / contractor and verified by CxA prior to continuing to Yellow Tag, with appropriate documentation provided

### 58.1 Fire Alarm L2A Pre-requisites:

(All below prerequisites **MUST** be available prior to commencing red tag)

58.1.1 Verify the technical submittals and as built drawings have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
58.1.2 Verify the cause-and-effect matrix and fire strategy has been uploaded to Equinix document control platform by the vendor and approved by the EOR.
58.1.3 Verify the shop drawings have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
58.1.4 Verify the cable schedules/cable interface schedules have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
58.1.5 Verify the DCOS/BMS points list have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
58.1.6 Verify the FAT/FWT documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA. Any issues raised in FAT/FWT have been addressed. (Routine FAT QAQC documentation acceptable where FWT testing has not been procured).
58.1.7 Verify the Cx level 2B static testing method statement and risk assessment (RAMS) have been uploaded to Equinix document control platform by the GC/vendor and approved by the CxA.
58.1.8 Verify the material delivery receipt has been uploaded to Equinix document control platform by the GC, GC to identify upon kerbside delivery any defects/damages during transit.
58.1.9 GC to compile a test pack in line with Equinix document matrix (refer to document matrix section XX). \

### 58.2 Fire Alarm L2A Physical checks:

58.2.1 Confirm all deficiencies/comments from FWT/FAT have been closed.
58.2.2 Confirm room/area condition is acceptable as per the Equinix room readiness checklist.
58.2.3 Confirm equipment has been installed/positioned as per approved design drawings, manufactures specifications and approved technical submittals
58.2.4 Confirm the unit is correct dimensionally, handed correctly and accessible for operation and maintenance as per local code.
58.2.5 Confirm the equipment has the correct ratings, components, protective devices as per approved design drawings, manufactures specifications and approved technical submittals
58.2.6 Confirm batteries are installed and comply to sizing calculations as per approved design drawings, manufactures specifications and approved technical submittals
58.2.7 Confirm all gland plates are correct as per the approved technical submittals
58.2.8 Confirm appropriate warning/safety labels are in place.
58.2.9 Confirm all device labelling is correct as per approved Equinix naming convention.
58.2.10 Confirm no damage has occurred in transit and all transit bolts, wedges etc. have been removed.
58.2.11 Carry out all external and internal quality checks of the equipment.
58.2.12 Confirm equipment IPXX ratings are correct as per the approved technical submittals
58.2.13 Confirm network interface card has been supplied as per the approved technical submittals
58.2.14 Confirm system and equipment grounding installation is as per the approved design drawings and the approved technical submittals
58.2.15 Record all equipment details as per the Equinix provided template on the equipment parameter list within commissioning management platform.
58.2.16 Verify Cx level 2A Installation and QAQC inspection checklist has been carried out as per the Equinix approved checklist.

### 58.3 Fire Alarm L2A Documents Required:

(All documents **MUST** be available prior to sign off red tag)

58.3.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 58.4 Fire Alarm L2A Sign Off:

58.4.1 All required documentation is uploaded to the Equinix document control platform by GC or Vendor.
58.4.2 All required documentation is uploaded to commissioning management platform by CxA.
58.4.3 CxA to sign off checklist as Approved on commissioning management platform.
58.4.4 Red tag applied to the equipment and signed by CxA.

**Fire Alarm System L2B Yellow Tag**

The following tests and checks to be undertaken contractor and verified by CxA prior to continuing to Level 3, with appropriate documentation provided

### 58.5 Fire Alarm L2B Pre-requisites:

(All below prerequisites **MUST** be available prior to commencing yellow tag)

58.5.1 Verify red tag has been applied to the equipment and signed off by the CxA.
58.5.2 Verify the Cx level 3 start-up/pre functional testing method statement and risk assessment (RAMS) have been uploaded to Equinix document control platform by the vendor and approved by the CxA.

58.5.3 Confirm As-Built documentation (if applicable) have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
58.5.4 Verify approved DCOS/BMS & automation points lists have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
58.5.5 GC to compile a test pack in line with Equinix document matrix (refer to document matrix section XX).

### 58.6 Fire Alarm L2B Physical checks:

58.6.1 Confirm earthing systems comply with Equinix Global Design Standards and/or design drawings.
58.6.2 Confirm AC cables have been dead tested (refer to cable section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
58.6.3 Confirm all fire alarm cables have been dead tested (refer to cable section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
58.6.4 Confirm all AC cables and fire alarm cabling identification are present as per approved cable schedule and cable interfacing schedule.
58.6.5 Confirm all cables are identified with permanent labels, soundly fixed (glands/cable ties/cleats) identifying source, load, size & type as per the project specification provided by the EOR.
58.6.6 Verify all cable connections pull test & tightness test is found satisfactory
58.6.7 Verify all connections are torqued correctly (if applicable) and double marked.
58.6.8 Confirm all trunking covers and equipment terminal/protection covers are in place and secured.
58.6.9 Confirm supply breaker/fuse has an equal or greater current capacity than the incoming breaker/fuse of the distribution board.
58.6.10 Confirm cable entry box (if applicable) is installed as per approved design drawings, manufactures specifications and approved technical submittals
58.6.11 Confirm PTW/LOTO procedures are implemented correctly by the GC's approved SAP/AP.
58.6.12 Confirm all equipment labelling and circuit identification is present and correct
58.6.13 Construction clean of room and of equipment.
58.6.14 Verification of mechanical operation.
58.6.15 Verify fire alarm devices are correctly installed and terminated in the field as per approved shop drawings.
58.6.16 Conduct a White Glove Inspection to ensure equipment is clean and free of debris or foreign materials and the appropriate protection is in place prior to energisation.
58.6.17 Verify vendor Cx level 2B static testing has been carried out as per the vendors Cx level 2B static testing method statement approved by the CxA.
58.6.18 Verify Cx level 2B static testing has been carried out as per the Equinix approved checklist
58.6.19 Confirm all vendor Cx level 2B checks/tests are complete and all documentation has been uploaded to Equinix document control platform by the vendor and approved by the CxA.

### 58.7 Fire Alarm L2B Documents Required:

(All documents **MUST** be available prior to sign off yellow tag)
58.7.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 58.8 Fire Alarm L2B Sign Off:

58.8.1 All required documentation is uploaded to the Equinix document control platform by GC or Vendor.
58.8.2 All required documentation is uploaded to commissioning management platform by CxA.
58.8.3 CxA to sign off checklist as Approved on commissioning management platform.
58.8.4 Yellow tag applied to the equipment and signed by CxA.

## Fire Alarm System L3 Green Tag

The following tests and checks to be undertaken and verified by contractor prior to continuing to L4, with appropriate documentation provided

### 58.9 Fire Alarm L3 Pre-requisites:

(All below prerequisites **MUST** be available prior to commencing green tag)
58.9.1 Verify yellow tag has been applied to the equipment and signed by the CxA.
58.9.2 Verify approved cause and effect matrix and fire strategy has been uploaded to Equinix document control platform by the vendor and approved by the EOR.
58.9.3 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
58.9.4 GC to compile a test pack in line with Equinix document matrix.

### 58.10 Fire Alarm L3 Physical Checks:

58.10.1 Confirm LOTO procedures are implemented correctly by the GC's approved SAP/AP.
58.10.2 Confirm AC cables have been live tested (refer to cable section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
58.10.3 Verify the fire alarm system programme is in line with approved cause and effect matrix and fire strategy.
58.10.4 Verify all fire alarm devices functionality, addressing and point to graphic testing.
58.10.5 Verify 100% functional test of all fire alarm devices.

58.10.6 Verify input/output modules to other systems (e.g. aspiration systems, fire suppression systems, lifts, mechanical plant, damper controls, security systems)
58.10.7 Verify battery discharge test to prove battery autonomy meets project specification, local code and/or global design standards.
58.10.8 Verify fire alarm beacons and sounders and measure sound pressure levels.
58.10.9 Verify voice evacuation speakers and measure sound pressure levels.
58.10.10 Confirm fire alarm graphic interface point to graphic testing is complete (if applicable), signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA
58.10.11 Confirm DCOS/BMS point to graphic testing is complete (if applicable), signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA
58.10.12 Verify vendor Cx level 3 start-up/pre-functional testing has been carried out as per the vendors Cx level 3 start-up/pre functional method statement approved by the CxA.
58.10.13 Verify Cx level 3 start-up/pre-functional testing has been carried out as per the Equinix approved checklist
58.10.14 Confirm all vendor Cx level 3 checks/tests are complete and all documentation has been uploaded to Equinix document control platform by the vendor and approved by the CxA
.

### 58.11 Fire Alarm L3 Documents Required:

(All documents **MUST** be available prior to sign off green tag)
58.11.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX)

### 58.12 Fire Alarm L3 Sign off:

58.12.1 All required documentation is uploaded to commissioning management platform by CxA. (refer to section XX documentation matrix)
58.12.2 CxA to sign off checklist as Approved on commissioning management platform.
58.12.3 Green tag applied to the equipment and signed by CxA.

## Fire Alarm System L4 Blue Tag

The following tests and checks to be undertaken contractor and verified by CxA prior to continuing to L5, with appropriate documentation provided

### 58.13 Fire Alarm L4 Pre-requisites:

(All below prerequisites **MUST** be available prior to commencing blue tag)
58.13.1 Verify green tag has been applied to the fire alarm system and signed off by the CxA.
58.13.2 Verify green tag has been applied to the equipment/systems interfaced with the fire alarm system and signed off by the CxA.
58.13.3 Verify all related P1 Cx issues are closed on the IRL
58.13.4 Confirm fire alarm graphics interface verifications are complete and all fire alarms panels are alarm free
58.13.5 Confirm DCOS/BMS verifications are complete and alarm free

### 58.14 Fire Alarm L4 Physical checks:

58.14.1 Perform cause and effect testing (test each type of cause in each fire zone, then verify the effect against the approved cause and effect matrix and fire strategy).

### 58.15 Fire Alarm L4 Documents Required:

(All documents **MUST** be available prior to sign off blue tag)
58.15.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 58.16 Fire Alarm L4 Sign off:

58.16.1 All required documentation is uploaded to commissioning management platform by CxA. (refer to section XX documentation matrix)
58.16.2 CxA to sign off checklist as Approved on commissioning management platform.
58.16.3 Blue tag applied to the equipment and signed by CxA.

## 59 Damper Controls

## Damper Controls L2A Red Tag

The following tests and checks to be undertaken by Equipment Vendor / contractor and verified by CxA prior to continuing to Yellow Tag, with appropriate documentation provided

### 59.1 Damper Control L2A Pre-requisites:

(All below prerequisites MUST be available prior to commencing red tag)
59.1.1 Verify the technical submittals and as built drawings have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
59.1.2 Verify the cause-and-effect matrix and fire strategy has been uploaded to Equinix document control platform by the vendor and approved by the EOR

59.1.3 Verify the shop drawings have been uploaded to Equinix document control platform by the vendor and approved by the EOR
59.1.4 Verify the cable schedules/cable interface schedules have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
59.1.5 Verify the DCOS/BMS points list have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
59.1.6 Verify the FAT/FWT documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA. Any issues raised in FAT/FWT have been addressed. (Routine FAT QAQC documentation acceptable where FWT testing has not been procured).
59.1.7 Verify the Cx level 2B static testing method statement and risk assessment (RAMS) have been uploaded to Equinix document control platform by the GC/vendor and approved by the CxA.
59.1.8 Verify the material delivery receipt has been uploaded to Equinix document control platform by the GC, GC to identify upon kerbside delivery any defects/damages during transit.
59.1.9 GC to compile a test pack in line with Equinix document matrix (refer to document matrix section XX).

### 59.2 Damper Control L2A Physical checks:

59.2.1 Confirm all deficiencies/comments from FWT/FAT have been closed.
59.2.2 Confirm room/area condition is acceptable as per the Equinix room readiness checklist.
59.2.3 Confirm equipment has been installed/positioned as per approved design drawings, manufactures specifications and approved technical submittals
59.2.4 Confirm the unit is correct dimensionally, handed correctly and accessible for operation and maintenance as per local code.
59.2.5 Confirm the equipment has the correct ratings, components, protective devices as per approved design drawings, manufactures specifications and approved technical submittals
59.2.6 Confirm the damper inspection caps are installed and damage free.
59.2.7 Confirm the damper motor is installed and damage free (if applicable)
59.2.8 Confirm permanent fire stopping is installed.
59.2.9 Confirm appropriate warning/safety labels are in place.
59.2.10 Confirm all device labelling is correct as per approved Equinix naming convention.
59.2.11 Confirm no damage has occurred in transit and all transit bolts, wedges etc. have been removed.
59.2.12 Carry out all external and internal quality checks of the equipment.
59.2.13 Confirm system and equipment grounding installation is as per the approved design drawings and the approved technical submittals
59.2.14 Record all equipment details as per the Equinix provided template on the equipment parameter list within commissioning management platform.
59.2.15 Verify Cx level 2A Installation and QAQC inspection checklist has been carried out as per the Equinix approved checklist
.

### 59.3 Damper Control L2A Documents Required:

(All documents MUST be available prior to sign off red tag)
59.3.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 59.4 Damper Control L2A Sign Off:

59.4.1 All required documentation is uploaded to the Equinix document control platform by GC or Vendor.
59.4.2 All required documentation is uploaded to commissioning management platform by CxA.
59.4.3 CxA to sign off checklist as Approved on commissioning management platform.
59.4.4 Red tag applied to the equipment and signed by CxA.

## Damper Controls L2B Yellow Tag

The following tests and checks to be undertaken contractor and verified by CxA prior to continuing to Level 3, with appropriate documentation provided

### 59.5 Damper Control L2B Pre-requisites:

(All below prerequisites MUST be available prior to commencing yellow tag)
59.5.1 Verify red tag has been applied to the equipment and signed off by the CxA.
59.5.2 Verify the Cx level 3 start-up/pre functional testing method statement and risk assessment (RAMS) have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
59.5.3 Confirm As-Built documentation (if applicable) have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
59.5.4 Verify approved DCOS/BMS & automation points lists have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
59.5.5 GC to compile a test pack in line with Equinix document matrix (refer to document matrix section XX).

### 59.6 Damper Control L2B Physical checks:

59.6.1 Confirm earthing systems comply with Equinix Global Design Standards and/or design drawings.
59.6.2 Confirm AC cables have been dead tested (refer to cable section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
59.6.3 Confirm all fire alarm cables have been dead tested (refer to cable section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
59.6.4 Confirm all AC cables and fire alarm cabling identification are present as per approved cable schedule and cable interfacing schedule.
59.6.5 Confirm all cables are identified with permanent labels, soundly fixed (glands/cable ties/cleats) identifying source, load, size & type as per the project specification provided by the EOR.
59.6.6 Verify all cable connections pull test & tightness test is found satisfactory
59.6.7 Verify all connections are torqued correctly (if applicable) and double marked.

59.6.8 Confirm all trunking covers and equipment terminal/protection covers are in place and secured.
59.6.9 Confirm supply breaker/fuse has an equal or greater current capacity than the incoming breaker/fuse of the distribution board.
59.6.10 Confirm cable entry box (if applicable) is installed as per approved design drawings, manufactures specifications and approved technical submittals
59.6.11 Confirm PTW/LOTO procedures are implemented correctly by the GC's approved SAP/AP.
59.6.12 Confirm all equipment labelling and circuit identification is present and correct
59.6.13 Construction clean of room and of equipment.
59.6.14 Verification of mechanical operation.
59.6.15 Verify fire alarm devices & input/output modules are correctly installed and terminated in the field as per approved shop drawings.
59.6.16 Conduct a cleaning inspection to ensure equipment is clean and free of debris or foreign materials and the appropriate protection is in place prior to energisation.
59.6.17 Verify vendor Cx level 2B static testing has been carried out as per the vendors Cx level 2B static testing method statement approved by the CxA.
59.6.18 Verify Cx level 2B static testing has been carried out as per the Equinix approved checklist
59.6.19 Confirm all vendor Cx level 2B checks/tests are complete and all documentation has been uploaded to Equinix document control platform by the vendor and approved by the CxA.

### 59.7 Damper Control L2B Documents Required:

(All documents MUST be available prior to sign off yellow tag)
59.7.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 59.8 Damper Control L2B Sign Off:

59.8.1 All required documentation is uploaded to the Equinix document control platform by GC or Vendor.
59.8.2 All required documentation is uploaded to commissioning management platform by CxA.
59.8.3 CxA to sign off checklist as Approved on commissioning management platform.
59.8.4 Yellow tag applied to the equipment and signed by CxA.

## Damper Controls L3 Green Tag

The following tests and checks to be undertaken and verified by contractor prior to continuing to L4, with appropriate documentation provided

### 59.9 Damper Control L3 Pre-requisites:

(All below prerequisites MUST be available prior to commencing green tag)
59.9.1 Verify yellow tag has been applied to the equipment and signed by the CxA.
59.9.2 Verify approved cause and effect matrix and fire strategy has been uploaded to Equinix document control platform by the vendor and approved by the EOR.
59.9.3 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
59.9.4 GC to compile a test pack in line with Equinix document matrix.

### 59.10 Damper Control L3 Physical Checks:

59.10.1 Confirm LOTO procedures are implemented correctly by the GC's approved SAP/AP.
59.10.2 Confirm AC cables have been live tested (refer to cable section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
59.10.3 Verify the fire alarm system programme is in line with approved cause and effect matrix and fire strategy.
59.10.4 Verify input/output modules to damper 3rd party interface
59.10.5 Verify 100% functional test of all dampers.
59.10.6 Verify 100% point to graphic of all dampers
59.10.7 Confirm DCOS/BMS point to graphic testing is complete (if applicable), signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA
59.10.8 Verify vendor Cx level 3 start-up/pre-functional testing has been carried out as per the vendors Cx level 3 start-up/pre functional method statement approved by the CxA.
59.10.9 Verify Cx level 3 start-up/pre-functional testing has been carried out as per the Equinix approved checklist
59.10.10 Confirm all vendor Cx level 3 checks/tests are complete and all documentation has been uploaded to Equinix document control platform by the vendor and approved by the CxA.

### 59.11 Damper Control L3 Documents Required:

(All documents MUST be available prior to sign off green tag)
59.11.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 59.12 Damper Control L3 Sign off:

59.12.1 All required documentation is uploaded to commissioning management platform by CxA. (refer to section XX documentation matrix)
59.12.2 CxA to sign off checklist as Approved on commissioning management platform.
59.12.3 Green tag applied to the equipment and signed by CxA.

**Damper Controls L4 Blue Tag**

(No tag required – tested as part of fire and life safety system cause and effect test)
The following tests and checks to be undertaken contractor and verified by CxA prior to continuing to L5, with appropriate documentation provided

### 59.13 Damper Control L4 Pre-requisites:

59.13.1 (All below prerequisites MUST be available prior to commencing blue tag Cause & Effect)
59.13.2 Verify green tag has been applied to the fire alarm system and signed off by the CxA.
59.13.3 Verify green tag has been applied to the dampers interfaced with the fire alarm system and signed off by the CxA.
59.13.4 Verify all related P1 Cx issues are closed on the IRL
59.13.5 Confirm fire alarm graphics interface verifications are complete and all fire alarms panels are alarm free
59.13.6 Confirm DCOS/BMS verifications are complete and alarm free

### 59.14 Damper Control L4 Physical checks:

59.14.1 Perform cause and effect testing (test each type of cause in each fire zone, then verify the effect against the approved cause and effect matrix and fire strategy). Refer to section Fire Alarm L4 XXXX)

### 59.15 Emergency Lighting Systems

**Emergency Lighting L2A Red Tag**

The following tests and checks to be undertaken by Equipment Vendor / contractor and verified by CxA prior to continuing to Yellow Tag, with appropriate documentation provided

### 59.16 Emergency Lighting L2A Prerequisites:

(All below prerequisites **MUST** be available prior to commencing red tag)
59.16.1 Verify the technical submittals and as built drawings have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
59.16.2 Verify the shop drawings have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
59.16.3 Verify the cable schedules/cable interface schedules have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
59.16.4 Verify the DCOS/BMS points list have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
59.16.5 Verify the FAT/FWT documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA. Any issues raised in FAT/FWT have been addressed. (Routine FAT QAQC documentation acceptable where FWT testing has not been procured).
59.16.6 Verify the electrical protection study is approved and have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
59.16.7 Verify the Cx level 2B static testing method statement and risk assessment (RAMS) have been uploaded to Equinix document control platform by the GC/vendor and approved by the CxA.
59.16.8 Verify the material delivery receipt has been uploaded to Equinix document control platform by the GC, GC to identify upon kerbside delivery any defects/damages during transit.
59.16.9 GC to compile a test pack in line with Equinix document matrix (refer to document matrix section XX).

### 59.17 Emergency Lighting L2A Physical checks:

59.17.1 Confirm all deficiencies/comments from FWT/FAT have been closed.
59.17.2 Confirm room/area condition is acceptable as per the Equinix room readiness checklist.
59.17.3 Confirm equipment has been installed/positioned as per approved design drawings, manufactures specifications and approved technical submittals
59.17.4 Confirm the unit is correct dimensionally, handed correctly and accessible for operation and maintenance as per local code.
59.17.5 Confirm the equipment has the correct ratings, components, protective devices as per approved design drawings, manufactures specifications and approved technical submittals
59.17.6 Confirm all gland plates are correct as per the approved technical submittals
59.17.7 Confirm appropriate warning/safety labels are in place.
59.17.8 Confirm all device labelling is correct as per approved Equinix naming convention.
59.17.9 Confirm no damage has occurred in transit and all transit bolts, wedges etc. have been removed.
59.17.10 Carry out all external and internal quality checks of the equipment.
59.17.11 Confirm equipment IPXX ratings are correct as per the approved technical submittals
59.17.12 Confirm network interface card has been supplied as per the approved technical submittals
59.17.13 Confirm system and equipment grounding installation is as per the approved design drawings and the approved technical submittals
59.17.14 Record all equipment details as per the Equinix provided template on the equipment parameter list within commissioning management platform.
59.17.15 Verify Cx level 2A Installation and QAQC inspection checklist has been carried out as per the Equinix approved checklist.

### 59.18 Emergency Lighting L2A Documents Required:

(All documents **MUST** be available prior to sign off red tag)
59.18.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 59.19 Emergency Lighting L2A Sign Off:

59.19.1 All required documentation is uploaded to the Equinix document control platform by GC or Vendor.
59.19.2 All required documentation is uploaded to commissioning management platform by CxA.
59.19.3 CxA to sign off checklist as Approved on commissioning management platform.
59.19.4 Red tag applied to the equipment and signed by CxA.

## Emergency Lighting L2B Yellow Tag

The following tests and checks to be undertaken contractor and verified by CxA prior to continuing to Level 3, with appropriate documentation provided

### 59.20 Emergency Lighting L2A Prerequisites:

(All below prerequisites **MUST** be available prior to commencing yellow tag)

59.20.1 Verify red tag has been applied to the equipment and signed off by the CxA.
59.20.2 Verify the Cx level 3 start-up/pre functional testing method statement and risk assessment (RAMS) have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
59.20.3 Verify electrical protection study is approved and uploaded to Equinix document control platform by the EOR and approved by the Equinix Design Manager.
59.20.4 Verify the ARC flash study is approved and uploaded to Equinix document control platform by the EOR and approved by the Equinix Design Manager.
59.20.5 Confirm As-Built documentation (if applicable) have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
59.20.6 Verify approved DCOS/BMS & automation points lists have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
59.20.7 GC to compile a test pack in line with Equinix document matrix (refer to document matrix section XX).

### 59.21 Emergency Lighting L2A Physical checks:

59.21.1 Confirm earthing systems comply with Equinix Global Design Standards and/or design drawings.
59.21.2 Confirm AC cables have been dead tested (refer to cable section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
59.21.3 Confirm control/monitoring cables have been dead tested (refer to cable section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
59.21.4 Confirm control/monitoring cables have been point to point tested, signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA
59.21.5 Confirm all AC cables and control/monitoring cabling identification are present as per approved cable schedule and cable interfacing schedule.
59.21.6 Confirm all cables are identified with permanent labels, soundly fixed (glands/cable ties/cleats) identifying source, load, size & type as per the project specification provided by the EOR.
59.21.7 Verify all cable connections pull test & tightness test is found satisfactory
59.21.8 Verify all connections are torqued correctly (if applicable) and double marked.
59.21.9 Confirm all trunking covers and equipment terminal/protection covers are in place and secured.
59.21.10 Confirm supply breaker/fuse has an equal or greater current capacity than the incoming breaker/fuse of the distribution board.
59.21.11 Confirm all protection settings are set for the equipment as per approved protection study.
59.21.12 Confirm cable entry box (if applicable) is installed as per approved design drawings, manufactures specifications and approved technical submittals
59.21.13 Confirm PTW/LOTO procedures are implemented correctly by the GC's approved SAP/AP.
59.21.14 Confirm all equipment labelling and circuit identification is present and correct
59.21.15 Construction clean of room and of equipment.
59.21.16 Cx level 2B equipment static testing **MUST** consist of as a minimum:

- Continuity & polarity test
- Insulation resistance test
- Verification of mechanical operation.

59.21.17 Verify control devices are correctly installed and terminated in the field as per approved shop drawings.
59.21.18 Confirm primary & secondary injection protection scheme testing of all breakers/relays (if applicable) and security seal along with protection settings label applied by CxA.
59.21.19 Conduct a White Glove Inspection to ensure equipment is clean and free of debris or foreign materials and the appropriate protection is in place prior to energisation.
59.21.20 Verify vendor Cx level 2B static testing has been carried out as per the vendors Cx level 2B static testing method statement approved by the CxA.
59.21.21 Verify Cx level 2B static testing has been carried out as per the Equinix approved checklist
59.21.22 Confirm all vendor Cx level 2B checks/tests are complete and all documentation has been uploaded to Equinix document control platform by the vendor and approved by the CxA.

### 59.22 Emergency Lighting L2A Documents Required:

(All documents **MUST** be available prior to sign off yellow tag)

59.22.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 59.23 Emergency Lighting L2A Sign Off:

59.23.1 All required documentation is uploaded to the Equinix document control platform by GC or Vendor.
59.23.2 All required documentation is uploaded to commissioning management platform by CxA.
59.23.3 CxA to sign off checklist as Approved on commissioning management platform.
59.23.4 Yellow tag applied to the equipment and signed by CxA.

## Emergency Lighting L3 Green Tag

The following tests and checks to be undertaken and verified by contractor prior to continuing to L4, with appropriate documentation provided

### 59.24 Emergency Lighting L2A Pre-requisites:

(All below prerequisites **MUST** be available prior to commencing green tag)

59.24.1 Verify yellow tag has been applied to the equipment and signed by the CxA.
59.24.2 Verify switching schedule and energisation plan is implemented by the GC's approved SAP/AP.
59.24.3 Verify approved SOO have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
59.24.4 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
59.24.5 GC to compile a test pack in line with Equinix document matrix.

### 59.25 Emergency Lighting L2A Physical Checks:

59.25.1 Confirm LOTO procedures are implemented correctly by the GC's approved SAP/AP.
59.25.2 Confirm AC cables have been live tested (refer to cable section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
59.25.3 Verify metering (if applicable).
59.25.4 Verify the emergency lighting system is in line with approved project lighting controls strategy.
59.25.5 Verify all emergency lighting devices are operating correctly.
59.25.6 Verify functional test of all emergency lighting devices.
59.25.7 Verify battery discharge test to prove battery autonomy meets project specification, local code and/or global design standards.
59.25.8 Verify emergency lighting Lux levels comply as per approved design drawings, manufactures specifications and approved technical submittals.
59.25.9 Confirm emergency lighting graphic interface point to graphic testing is complete (if applicable), signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA
59.25.10 Confirm DCOS/BMS point to graphic testing is complete (if applicable), signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA
59.25.11 Verify vendor Cx level 3 start-up/pre-functional testing has been carried out as per the vendors Cx level 3 start-up/pre functional method statement approved by the CxA.
59.25.12 Verify Cx level 3 start-up/pre-functional testing has been carried out as per the Equinix approved checklist
59.25.13 Confirm all vendor Cx level 3 checks/tests are complete and all documentation has been uploaded to Equinix document control platform by the vendor and approved by the CxA.

### 59.26 Emergency Lighting L2A Documents Required:

(All documents **MUST** be available prior to sign off green tag)

59.26.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 59.27 Emergency Lighting L2A Sign off:

59.27.1 All required documentation is uploaded to commissioning management platform by CxA. (refer to section XX documentation matrix)
59.27.2 CxA to sign off checklist as Approved on commissioning management platform.
59.27.3 Green tag applied to the equipment and signed by CxA.

## Monitoring, Network & Access Control

# 60 DCOS

The following sections are intended to be read in conjunction with the relevant asset sections throughout the Cx Playbook as well as the DCOS Delivery Process Flowchart.

## 60.1 General

(All below items to be taken into consideration during DCOS deployment)

60.1.1 DCOS platform development license to be used throughout Cx activities
60.1.2 DCOS platform permanent license to be activated prior to IST, but no earlier than 30 days before
60.1.3 Licensed engineering software for PLCs to be provided and installed on project development server prior to IST
60.1.4 DCOS workstations to be Equinix imaged machines in accordance with global design standard requirements
60.1.5 DCOS client software to be installed on workstations prior to IST
60.1.6 General Contractor and Systems Integrator must work with vendors to ensure that all equipment provided adheres with monitoring/control requirements as outlined in global design standard points list
60.1.7 DCOS platform to be configured in line with the applicable Equinix DCOS configuration guide

## 60.2 SFAT (Software FAT)

The following items need to be taken into consideration when planning and conducting the required SFAT for DCOS Delivery.

## 60.3 DCOS Pre-requisites:

(All below items must be completed prior to organising SFAT)

60.3.1 SFAT shall be coordinated by CxA and the test run by the GC/SI
60.3.2 Project SOO, P&IDs and related DCOS graphics must be reviewed and approved by EOR and uploaded to project document platform prior to SFAT being scheduled
60.3.3 SFAT Script to be reviewed and approved by CxA and uploaded to project document platform prior to SFAT being scheduled
60.3.4 A minimum of 2 weeks' notice must be provided to all attendees
60.3.5 Mandatory attendees to include.

- GC controls package manager
- SI
- EOR
- CxA
- Equinix DCOS Delivery Manager
- Equinix Design Delivery Manager

**Optional attendees to include.**

- Equinix Cx Manager
- Equinix Construction Manager
- Equinix Local/Regional Ops Controls Engineer

60.3.6 At a minimum, sufficient hardware shall be provided to verify all internal and inter-device logic as described in relevant SFAT script e.g. if PLC Hot/Standby changeover requires logic then sufficient hardware needs to be provided to demonstrate this.

## 60.4 DCOS SFAT Testing:

(All below items must be considered during SFAT)

60.4.1 PLC software to be tested as per approved SFAT script
60.4.2 DCOS graphic functionality to be verified
60.4.3 Unless otherwise agreed with Equinix DCOS Delivery Team, actual hardware to be used for project shall be utilised during SFAT and associated control panels not released for delivery until signed off
60.4.4 Integrated devices are not expected to be demonstrated during SFAT

## DCOS Considerations L3 Green Tag

The following DCOS related items need to be taken into consideration when planning and conducting L3 testing as detailed elsewhere in the Cx Paybook.

### 60.5 DCOS Prerequisites:

(Prior to **any L3 testing** being able to commence, the following items must be in place)

60.5.1 Equinix Laptop and Accounts
60.5.2 The SI will require an Equinix imaged machine to access the IBX network locally, to be issued by the DCOS Delivery team
60.5.3 The SI will require an Equinix account to use the free-issued Equinix imaged machine, to be arranged by DCOS Delivery team
60.5.4 Each engineer requiring access needs their own account, they cannot be shared and no exceptions will be made - in line with Equinix IT policy
60.5.5 From initial request to activation of accounts can take a significant amount of time depending on country and level of background check required, please allow at least 4 weeks for this process
60.5.6 IBX Network Readiness
60.5.7 External fibre connections must be completed
60.5.8 All IBX switches and IBX LAN cabling in place and complete
60.5.9 Server Room Readiness
60.5.10 Room readiness checklist shall be complete and signed off prior to rack fit-out
60.5.11 VM Deployment
60.5.12 Once server room fit-out is complete, allow approximately 1 week for VM request to be fulfilled
60.5.13 VM request to be raised by DCOS delivery team
60.5.14 DCOS software to be installed and configured on VMs – (**this needs to be validated by 3rd party)**

**Note**: Remote Access is not specifically required to commence with L3 testing, with the above in place testing can commence locally. However, it may be more practical to access the server over the internet at times, in which case the following additional prerequisites are required for remote access;

- Palo Alto Firewall
- This is deployed by the GEN team after the server room fit-out is complete and servers configured
- Allow approximately 1 week
- Guacamole Bastion
- This is the gateway with which the SI can access the server remotely
- Once the firewall is configured the DCOS Delivery team will raise a request, allow up to 1 week for this to be deployed
- User access to be configured by DCOS Delivery Team
- VPN
- In order to access Equinix accounts from a non-Equinix machine, a Global Protect VPN is required. This will be coordinated by the DCOS Delivery Team
- LAN/WAN Access
- In order to access the server remotely around the IBX, the IT LAN must be complete and sufficient wireless access points in place to provide coverage across the site during Cx

**Note**: Remote Access is not to be used as a primary method of commissioning, it is intended to provide additional support to on-site teams as well as additional convenience as described above. Equinix are not obligated to provide remote access in order to complete Cx activities and SI's should plan for on-site attendance.

## DCOS L3 Testing:

(The following should be considered in conjunction with L3 testing requirements for all assets as detailed elsewhere in the Cx Playbook)

60.5.15 Communications
60.5.16 Verify communications between server and devices
60.5.17 Verify communications between devices
60.5.18 Point To Graphics shall be verified against 100% of IO
60.5.19 Screenshots to be issued to CxA by SI in an organised format as evidence of verification
60.5.20 Point To Graphic testing shall be verified to the server, temporary supervisory platform should not be running locally on a Cx laptop
60.5.21 Verify graphics match actual project specific asset layouts
60.5.22 Alarm configuration and function
60.5.23 Verify that alarms function when tested and are correctly displayed on both the associated graphic and the alarm manager
60.5.24 Verify that hi/low thresholds are in line with those stated in GDS
60.5.25 Verify that the priorities are in line with those stated in GDS
60.5.26 Verify proper alarm inhibits are in place
60.5.27 Trend logging configuration and function
60.5.28 Verify that trend logs function correctly within the Historian and are displayed correctly on the associated graphics faceplate
60.5.29 Verify that trend logs are configured in line with parameters stated in GDS
60.5.30 Control logic
60.5.31 Verify that control logic functions as detailed within SOO
60.5.32 Field Device/Instrumentation

60.5.33 Where applicable, verify calibration of field devices
60.5.34 Verify scaling of devices
60.5.35 PLC Hot/Standby Changeover
60.5.36 Where applicable, verify function of PLC Hot/Stby changeover by removing link between PLCs
60.5.37 Device Level Redundancy
60.5.38 Verify PLC network redundancy by removing one side of network from PLC and confirm communications maintained at server
60.5.39 Verify RIO network redundancy by removing one side of network from RIO and confirm communications maintained at server
60.5.40 IBX Network Redundancy
60.5.41 Where applicable, verify IBX network redundancy by removing one side of network at IBX switch and confirm communications maintained at server

**Note:** The following should be considered specifically when integrating 3rd party devices via high level communications.

60.5.42 Integration of devices to IBX network to conform with GDS requirements
60.5.43 Point To Graphic testing should be 100% for first of a kind and 20% for subsequent devices of the same type, using the same template
60.5.44 Screenshots to be issued to CxA by SI in an organised format as evidence of verification
60.5.45 100% of integrated devices shall be checked against the approved project IP address schedule
60.5.46 Firmware of all 3rd party devices to be verified in line with approved product template

**DCOS L4 Testing:**

The following DCOS related items need to be taken into consideration when planning and conducting L4 testing as detailed elsewhere in the Cx Paybook.

### 60.6 DCOS L4 Prerequisites:

(Prior to **any L4 testing** being able to commence, the following items must be in place)

60.6.1 Completion and sign-off of all relevant L3 testing prior DCOS prior to starting L4

### 60.7 DCOS L4 Testing:

(The following should be considered in conjunction with L4 testing requirements for all assets as detailed elsewhere in the Cx Playbook)

60.7.1 SI to provide support to CxA throughout all L4 testing
60.7.2 SOO to be tested in accordance with CxA L4 test script
60.7.3 Verify that system operates in a stable manner throughout testing
60.7.4 SI to tune control loops to improve system operability – default parameters on any Equinix issued standard code blocks are not final and should be modified, as required as part of Cx
60.7.5 Screenshots to be issued to CxA by SI in an organised format as evidence of verification of completed test steps
60.7.6 Software revision control
60.7.7 Upon completion of L4 test, PLC backup to be taken by SI and issued to CxA as part of Cx documentation
60.7.8 PLC backup to be uploaded onto project document portal by GC/SI
60.7.9 PLC backup is then to be managed by DCOS Delivery Team until handover
60.7.10 Verify all default/initial values, as configured in PLC at time of L4 testing are correct
60.7.11 Checklist of all default/initial values to be recorded and issued by SI to CxA as part of Cx documentation
60.7.12 Verify all final parameters, such as setpoints, timers, deadbands, etc. as used at time of L4 testing are correct
60.7.13 Checklist of all final parameters to be recorded and issued by SI to CxA as part of Cx documentation

**DCOS L5 Testing:**

The following DCOS related items need to be taken into consideration when planning and conducting L5 testing as detailed elsewhere in the Cx Paybook.

### 60.8 DCOS L5 Prerequisites:

(Prior to any L5 testing being able to commence, the following items must be in place)

60.8.1 Verify that system is in an automatic state without any manual interventions
60.8.2 Verify that system is free of nuisance/erroneous alarms
60.8.3 Validate any genuine alarms against expected state of system e.g. if system is at low load prior to IST, some alarms would be expected
60.8.4 Verify that DCOS workstations have been configured and are operational

### 60.9 DCOS L5 Testing:

**(The following should be considered in conjunction with L5 testing requirements for all assets as detailed elsewhere in the Cx Playbook)**

60.9.1 SI to provide support to CxA throughout all L5 testing
60.9.2 Screenshots to be issued to CxA by SI in an organised format as evidence of verification of completed test steps
60.9.3 SI to provide trend log data as requested by CxA to support IST report

### 60.10 DCOS Handover/Training

The following DCOS related items need to be taken into consideration when planning and conducting Handover/Training with local operations team.

### 60.11 DCOS Handover/Training Prerequisites

(Prior to **handover/training** being able to commence, the following items must be in place)

60.11.1 Local Operations Team has undergone product specific training that will allow them to operate the DCOS
60.11.2 Local Operations Team to submit list of engineers requiring DCOS access and the level of access required to the DCOS Delivery Team
60.11.3 Local Operations Team to submit list of engineers requiring project-specific training

### 60.12 DCOS Handover/Training Actions:|

**(The following should be carried out to finalise handover/training of DCOS to local operations) Final as-built PLC backups to be left on Equinix DCOS development server by SI**

60.12.1 DCOS Delivery Team to configure Guacamole access as per details submitted by Operations
60.12.2 DCOS Delivery Team to configure server access as per details submitted by Operations
60.12.3 SI to conduct project-specific training with local operations team

### 60.13 DCOS Handover/Training Documents Required:

(All documents MUST be available prior to sign off red tag) Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 60.14 DCOS Sign Off:

All required documentation is uploaded to the Equinix document control platform by GC or Vendor.
All required documentation is uploaded to commissioning management platform by CxA.

## 61 SCADA Control System

**SCADA Control L2A Red Tag**

The following tests and checks to be undertaken by Equipment Vendor / contractor and verified by CxA prior to continuing to Yellow Tag, with appropriate documentation provided

### 61.1 SCADA Control L2A Prerequisites:

(All below prerequisites **MUST** be available prior to commencing red tag)

61.1.1 Verify the technical submittals and as built drawings have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
61.1.2 Verify the shop drawings have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
61.1.3 Verify the cable schedules/cable interface schedules have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
61.1.4 Verify the DCOS/BMS points list have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
61.1.5 Verify the SFAT documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA. Any issues raised in SFAT have been addressed.
61.1.6 Verify the Cx level 2B static testing method statement and risk assessment (RAMS) have been uploaded to Equinix document control platform by the GC/vendor and approved by the CxA.
61.1.7 Verify the material delivery receipt has been uploaded to Equinix document control platform by the GC, GC to identify upon kerbside delivery any defects/damages during transit.
61.1.8 GC to compile a test pack in line with Equinix document matrix (refer to document matrix section XX).

### 61.2 SCADA Control L2A Physical checks:

61.2.1 Confirm all deficiencies/comments from SFAT have been closed.
61.2.2 Confirm room/area condition is acceptable as per the Equinix room readiness checklist.
61.2.3 Confirm equipment has been installed/positioned as per approved design drawings, manufactures specifications and approved technical submittals
61.2.4 Confirm the unit is correct dimensionally, handed correctly and accessible for operation and maintenance as per local code.
61.2.5 Confirm the equipment has the correct ratings, components, protective devices, interlocks (if applicable) as per approved design drawings, manufactures specifications and approved technical submittals
61.2.6 Confirm all gland plates are correct as per the approved technical submittals
61.2.7 Confirm appropriate warning/safety labels are in place.
61.2.8 Confirm all device labelling is correct as per approved Equinix naming convention.
61.2.9 Confirm no damage has occurred in transit and all transit bolts, wedges etc. have been removed.
61.2.10 Carry out all external and internal quality checks of the equipment.
61.2.11 Confirm equipment IPXX ratings are correct as per the approved technical submittals
61.2.12 Confirm network interface card has been supplied as per the approved technical submittals
61.2.13 Confirm system and equipment grounding installation is as per the approved design drawings and the approved technical submittals
61.2.14 Record all equipment details as per the Equinix provided template on the equipment parameter list within commissioning management platform.
61.2.15 Verify Cx level 2A Installation and QAQC inspection checklist has been carried out as per the Equinix approved checklist.

### 61.3 SCADA Control L2A Documents Required:

(All documents **MUST** be available prior to commencing yellow tag)

61.3.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX

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### 61.4 SCADA Control L2A Sign Off:

61.4.1 All required documentation is uploaded to the Equinix document control platform by GC or Vendor.
61.4.2 All required documentation is uploaded to commissioning management platform by CxA.
61.4.3 CxA to sign off checklist as Approved on commissioning management platform.
61.4.4 Red tag applied to the equipment and signed by CxA.

**SCADA Control L2B Yellow Tag**

The following tests and checks to be undertaken contractor and verified by CxA prior to continuing to Level 3, with appropriate documentation provided

### 61.5 SCADA Control L2B Prerequisites:

(All below prerequisites **MUST** be available prior to commencing yellow tag)

61.5.1 Verify red tag has been applied to the equipment and signed off by the CxA.
61.5.2 Verify yellow tag has been applied to the BTU and signed off by the CxA.
61.5.3 Verify the Cx level 3 start-up/pre functional testing method statement and risk assessment (RAMS) have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
61.5.4 Confirm As-Built documentation (if applicable) have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
61.5.5 Verify approved DCOS/BMS & automation points lists have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
61.5.6 GC to compile a test pack in line with Equinix document matrix (refer to document matrix section XX).

### 61.6 SCADA Control L2B Physical checks:

61.6.1 Confirm earthing systems comply with Equinix Global Design Standards and/or design drawings.
61.6.2 Confirm power cables have been dead tested (refer to section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
61.6.3 Confirm control/monitoring cables have been dead tested (refer to section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
61.6.4 Confirm control/monitoring cables have been point to point tested, signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA
61.6.5 Confirm DCOS/BMS point to graphic testing is complete, signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA
61.6.6 Confirm all power cables and control/monitoring cabling identification are present as per approved cable schedule and cable interfacing schedule.
61.6.7 Confirm all cables are identified with permanent labels, soundly fixed (glands/cable ties/cleats) identifying source, load, size & type as per the project specification provided by the EOR.
61.6.8 Verify all cable connections pull test & tightness test is found satisfactory
61.6.9 Verify all connections are torqued correctly (if applicable) and double marked.
61.6.10 Confirm all trunking covers and equipment terminal/protection covers are in place and secured.
61.6.11 Confirm supply breaker/fuse has an equal or greater current capacity than the incoming breaker/fuse of the distribution board.
61.6.12 Confirm PTW/LOTO procedures are implemented correctly by the GC's approved SAP/AP.
61.6.13 Confirm all equipment labelling and circuit identification is present and correct
61.6.14 Conduct a White Glove Inspection to ensure equipment is clean and free of debris or foreign materials and the appropriate protection is in place prior to energisation.
61.6.15 Prove interfaces & safety interlocks EMS / Generator control / HV & LV switches pre- power on
61.6.16 Verify HMI mimic and operation
61.6.17 Verify firmware/software revisions meet Equinix global design standards
61.6.18 Confirm interface with DNO is complete (if applicable)
61.6.19 Verify vendor Cx level 2B static testing has been carried out as per the vendors Cx level 2B static testing method statement approved by the CxA.
61.6.20 Verify Cx level 2B static testing has been carried out as per the Equinix approved checklist
61.6.21 Confirm all vendor Cx level 2B checks/tests are complete and all documentation has been uploaded to Equinix document control platform by the vendor and approved by the CxA.

### 61.7 SCADA Control L2B Documents Required:

(All documents **MUST** be available prior to commencing yellow tag)
61.7.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 61.8 SCADA Control L2B Sign Off:

61.8.1 All required documentation is uploaded to the Equinix document control platform by GC or Vendor.
61.8.2 All required documentation is uploaded to commissioning management platform by CxA.
61.8.3 CxA to sign off checklist as Approved on commissioning management platform.
61.8.4 Yellow tag applied to the equipment and signed by CxA.

## SCADA Control L3 Green Tag

The following tests and checks to be undertaken and verified by contractor prior to continuing to L4, with appropriate documentation provided

### 61.9 SCADA Control L3 Prerequisites:

(All below prerequisites **MUST** be available prior to commencing green tag)
61.9.1 Verify yellow tag has been applied to the HV/MV equipment and signed by the CxA.
61.9.2 Verify the Cx level 4 functional & performance test script have been uploaded to Equinix commissioning management platform by CxA.
61.9.3 Verify switching schedule and energisation plan is implemented by the GC's approved SAP/AP.
61.9.4 Verify approved SOO have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
61.9.5 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
61.9.6 GC to compile a test pack in line with Equinix document matrix.

### 61.10 SCADA Control L3 Physical Checks:

61.10.1 Confirm LOTO procedures are implemented correctly by the GC's approved SAP/AP.
61.10.2 Verify HMI mimic readings
61.10.3 Verify 100% of automation graphics as per approved templates
61.10.4 Verify vendor Cx level 3 start-up/pre-functional testing has been carried out as per the vendors Cx level 3 start-up/pre functional method statement approved by the CxA.
61.10.5 Verify Cx level 3 start-up/pre-functional testing has been carried out as per the Equinix approved checklist
61.10.6 Confirm all vendor Cx level 3 checks/tests are complete and all documentation has been uploaded to Equinix document control platform by the vendor and approved by the CxA.

### 61.11 SCADA Control L3 Documents Required:

(All documents **MUST** be available prior to commencing yellow tag)

61.11.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 61.12 SCADA Control L3 Sign off:

61.12.1 All required documentation is uploaded to commissioning management platform by CxA. (refer to section XX documentation matrix)
61.12.2 CxA to sign off checklist as Approved on commissioning management platform.
61.12.3 Green tag applied to the equipment and signed by CxA.

**SCADA Control L4 Blue Tag**

The following tests and checks to be undertaken contractor and verified by CxA prior to continuing to L5, with appropriate documentation provided All testing carried out with max available load (load banks connected plus building load)

### 61.13 SCADA Control L4 Prerequisites:

(All below prerequisites **MUST** be available prior to commencing blue tag)

61.13.1 Verify green tag has been applied to the HV/MV equipment and signed off by the CxA.
61.13.2 Verify green tag has been applied to the BTU and signed off by the CxA.
61.13.3 Verify green tag has been applied to the automation system and signed off by the CxA.
61.13.4 Verify green tag has been applied to the generator and signed off by the CxA.
61.13.5 Verify all related P1 Cx issues are closed on the IRL
61.13.6 Confirm DCOS/BMS verifications are complete and alarm free

### 61.14 SCADA Control L4 Physical checks:

61.14.1 Verify 100% functional testing of automation/system controls as per SOO including all maintenance scenarios, load bank scenarios, failure scenarios and interlocking.
61.14.2 Verify full power block shutdowns and isolation scenarios including circuits earths.
61.14.3 Verify all automation/system controls redundancy by means of testing
61.14.4 Verify communication network redundancy failures

### 61.15 SCADA Control L4 Documents Required:

(All documents **MUST** be available prior to commencing yellow tag)

61.15.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 61.16 SCADA Control L4 Sign off:

61.16.1 All required documentation is uploaded to commissioning management platform by CxA. (refer to section XX documentation matrix)
61.16.2 CxA to sign off checklist as Approved on commissioning management platform.
61.16.3 Blue tag applied to the equipment and signed by CxA.

## 62 Access Control & Intercom System

**Access Control & Intercom System L2A Red Tag**

The following tests and checks to be undertaken by Equipment Vendor / contractor and verified by CxA prior to continuing to Yellow Tag, with appropriate documentation provided

### 62.1 Access Control L2A Prerequisites:

(All below prerequisites **MUST** be available prior to commencing red tag)

62.1.1 Verify the technical submittals and as built drawings have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
62.1.2 Verify the shop drawings have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
62.1.3 Verify the cable schedules/cable interface schedules have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
62.1.4 Verify the FAT/FWT documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA. Any issues raised in FAT/FWT have been addressed. (Routine FAT QAQC documentation acceptable where FWT testing has not been procured).
62.1.5 Verify the Cx level 2B static testing method statement and risk assessment (RAMS) have been uploaded to Equinix document control platform by the GC/vendor and approved by the CxA.
62.1.6 Verify the material delivery receipt has been uploaded to Equinix document control platform by the GC, GC to identify upon kerbside delivery any defects/damages during transit.
62.1.7 GC to compile a test pack in line with Equinix document matrix (Refer to document matrix section XX).

### 62.2 Access Control L2A Physical checks:

62.2.1 Confirm all deficiencies/comments from FWT/FAT have been closed.
62.2.2 Confirm room/area condition is acceptable as per the Equinix room readiness checklist.
62.2.3 Confirm equipment has been installed/positioned as per approved design drawings, manufactures specifications and approved technical submittals
62.2.4 Confirm the unit is correct dimensionally, handed correctly and accessible for operation and maintenance as per local code.
62.2.5 Confirm the equipment has the correct ratings, components, protective devices as per approved design drawings, manufactures specifications and approved technical submittals.
62.2.6 Confirm batteries are installed and comply to sizing calculations as per approved design drawings, manufactures specifications and approved technical submittals.
62.2.7 Confirm all gland plates are correct as per the approved technical submittals.
62.2.8 Confirm appropriate warning/safety labels are in place.
62.2.9 Confirm all device labelling is correct as per approved Equinix naming convention.
62.2.10 Confirm no damage has occurred in transit and all transit bolts, wedges etc. have been removed.
62.2.11 Check all equipment i.e. readers, magnetic locks, door contacts, request to exit and emergency break glass buttons, intercom devices are properly installed in correct locations.
62.2.12 Check the correct door hardware is installed for the location.
62.2.13 Carry out all external and internal quality checks of the equipment.
62.2.14 Confirm equipment IPXX ratings are correct as per the approved technical submittals
62.2.15 Confirm network interface card has been supplied as per the approved technical submittals.
62.2.16 Confirm system and equipment grounding installation is as per the approved design drawings and the approved technical submittals.
62.2.17 Record all equipment details as per the Equinix provided template on the equipment parameter list within commissioning management platform.
62.2.18 Verify Cx level 2A Installation and QAQC inspection checklist has been carried out as per the Equinix approved checklist.

### 62.3 Access Control L2A Documents Required:

(All documents **MUST** be available prior to sign off red tag)
62.3.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 62.4 Access Control L2A Sign Off:

62.4.1 All required documentation is uploaded to the Equinix document control platform by GC or Vendor.
62.4.2 All required documentation is uploaded to commissioning management platform by CxA.
62.4.3 CxA to sign off checklist as Approved on commissioning management platform.
62.4.4 Red tag applied to the equipment and signed by CxA.

## Access Control & Intercom System L2B Yellow Tag

The following tests and checks to be undertaken contractor and verified by CxA prior to continuing to Level 3, with appropriate documentation provided

### 62.5 Access Control L2B Prerequisites:

(All below prerequisites **MUST** be available prior to commencing yellow tag)
62.5.1 Verify red tag has been applied to the equipment and signed off by the CxA.
62.5.2 Verify the Cx level 3 start-up/pre functional testing method statement and risk assessment (RAMS) have been prepared by an Equinix approved system integrator, agreed upon with Equinix security team, and uploaded to Equinix document control platform by the vendor and approved by the CxA.
62.5.3 Confirm As-Built documentation (if applicable) have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
62.5.4 GC to compile a test pack in line with Equinix document matrix (refer to document matrix section XX).

### 62.6 Access Control L2B Physical checks:

62.6.1 Confirm earthing systems comply with Equinix Global Design Standards and/or design drawings.
62.6.2 Confirm AC cables have been dead tested (refer to cable section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
62.6.3 Confirm all Access Control & intercom system cables have been dead tested including network and fire alarm interface cables (refer to cable section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
62.6.4 Confirm all AC cables and Access Control & intercom system cabling identification are present as per approved cable schedule and cable interfacing schedule.
62.6.5 Confirm all cables are identified with permanent labels, soundly fixed (glands/cable ties/cleats) identifying source, load, size & type as per the project specification provided by the EOR.
62.6.6 Verify all cable connections pull test & tightness test is found satisfactory.
62.6.7 Verify all connections are torqued correctly (if applicable) and double marked.
62.6.8 Confirm all trunking covers and equipment terminal/protection covers are in place and secured.
62.6.9 Confirm supply breaker/fuse has an equal or greater current capacity than the incoming breaker/fuse of the distribution board.
62.6.10 Confirm cable entry box (if applicable) is installed as per approved design drawings, manufactures specifications and approved technical submittals.

62.6.11 Confirm PTW/LOTO procedures are implemented correctly by the GC's approved SAP/AP.
62.6.12 Confirm all equipment labelling and circuit identification is present and correct.
62.6.13 Construction clean of room and of equipment.
62.6.14 Verify access control & intercom devices are correctly installed and terminated in the field as per approved shop drawings.
62.6.15 Conduct a cleaning inspection for the Access Control panels to ensure equipment is clean and free of debris or foreign materials and the appropriate protection is in place prior to energisation.
62.6.16 Verify vendor Cx level 2B static testing has been carried out as per the vendors Cx level 2B static testing method statement approved by the CxA.
62.6.17 Verify Cx level 2B static testing has been carried out as per the Equinix approved checklist.
62.6.18 Confirm all vendor Cx level 2B checks/tests are complete and all documentation has been uploaded to Equinix document control platform by the vendor and approved by the CxA.

### 62.7 Access Control L2B Documents Required:

(All documents **MUST** be available prior to sign off yellow tag)
62.7.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (Refer to document matrix section XX).

### 62.8 Access Control L2B Sign Off:

62.8.1 All required documentation is uploaded to the Equinix document control platform by GC or Vendor.
62.8.2 All required documentation is uploaded to commissioning management platform by CxA.
62.8.3 CxA to sign off checklist as Approved on commissioning management platform.
62.8.4 Yellow tag applied to the equipment and signed by CxA.

## Access Control & Intercom System L3 Green Tag

The following tests and checks to be undertaken and verified by contractor prior to continuing to L4, with appropriate documentation provided

### 62.9 Access Control L3 Prerequisites:

(All below prerequisites **MUST** be available prior to commencing green tag)
62.9.1 Verify yellow tag has been applied to the equipment and signed by the CxA.
62.9.2 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
62.9.3 Confirm that the IP addresses for the access control panels are obtained from Equinix.
62.9.4 GC to compile a test pack in line with Equinix document matrix.

### 62.10 Access Control L3 Physical Checks:

62.10.1 Confirm LOTO procedures are implemented correctly by the GC's approved SAP/AP.
62.10.2 Confirm AC cables have been live tested (refer to cable section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
62.10.3 Verify the mechanical operation of the door by ensuring it opens and closes properly.
62.10.4 Verify all device naming is correct on software.
62.10.5 Verify access control & intercom panel alarms are monitored from software.
62.10.6 Verify 100% functional test of all access control & intercom devices.
62.10.7 Verify all alarms e.g. access granted, unknown card, door held, door forced, REX pressed are received by software.
62.10.8 Fail the incoming power supply to access control panel and confirm the proper operation of the doors and access control devices meets project specification, local code and/or global design standards.
62.10.9 Verify the CCTV camera pop-up (if applicable) function by triggering an alarm.
62.10.10 Simulate a fire alarm and confirm that doors open/lock as per the approved Cause & Effect document.
62.10.11 Verify vendor Cx level 3 start-up/pre-functional testing has been carried out as per the vendors Cx level 3 start-up/pre functional method statement approved by the CxA.
62.10.12 Verify Cx level 3 start-up/pre-functional testing has been carried out as per the Equinix approved checklist.
62.10.13 Confirm all vendor Cx level 3 checks/tests are complete and all documentation has been uploaded to Equinix document control platform by the vendor and approved by the CxA.

### 62.11 Access Control L3 Documents Required:

(All documents **MUST** be available prior to sign off green tag)
62.11.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (Refer to document matrix section XX).

### 62.12 Access Control L3 Sign off:

62.12.1 All required documentation is uploaded to commissioning management platform by CxA. (Refer to section XX documentation matrix)
62.12.2 CxA to sign off checklist as Approved on commissioning management platform.
62.12.3 Green tag applied to the equipment and signed by CxA.

## Access Control & Intercom System L4 Blue Tag

L4 Testing is part of the Cause and Effect testing

## 63 CCTV System

### CCTV L2A Red Tag

The following tests and checks to be undertaken by Equipment Vendor / contractor and verified by CxA prior to continuing to Yellow Tag, with appropriate documentation provided

### 63.1 CCTV L2A Prerequisites:

(All below prerequisites **MUST** be available prior to commencing red tag)

63.1.1 Verify the technical submittals and as built drawings have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
63.1.2 Verify the shop drawings have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
63.1.3 Verify the cable schedules/cable interface schedules have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
63.1.4 Verify the FAT/FWT documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA. Any issues raised in FAT/FWT have been addressed. (Routine FAT QAQC documentation acceptable where FWT testing has not been procured).
63.1.5 Verify the Cx level 2B static testing method statement and risk assessment (RAMS) have been uploaded to Equinix document control platform by the GC/vendor and approved by the CxA.
63.1.6 Verify the material delivery receipt has been uploaded to Equinix document control platform by the GC, GC to identify upon kerbside delivery any defects/damages during transit.
63.1.7 GC to compile a test pack in line with Equinix document matrix (refer to document matrix section XX)

### 63.2 CCTV L2A Physical checks:

63.2.1 Confirm all deficiencies/comments from FWT/FAT have been closed.
63.2.2 Confirm room/area condition is acceptable as per the Equinix room readiness checklist.
63.2.3 Confirm equipment has been installed/positioned as per approved design drawings, manufactures specifications, and approved technical submittals.
63.2.4 Confirm the unit is correct dimensionally, handed correctly and accessible for operation and maintenance as per local code.
63.2.5 Confirm the equipment has the correct ratings, components, protective devices as per approved design drawings, manufactures specifications and approved technical submittals.
63.2.6 Confirm appropriate warning/safety labels are in place.
63.2.7 Confirm all device labelling is correct as per approved Equinix naming convention.
63.2.8 Confirm no damage has occurred in transit and all transit bolts, wedges etc. have been removed.
63.2.9 Check that the camera mounting bracket is fixed with appropriate anchors according to the approved detail.
63.2.10 Check the cameras are installed and secured properly.
63.2.11 Check the alignment of the camera and confirm the view is not obstructed.
63.2.12 Carry out all external and internal quality checks of the equipment.
63.2.13 Confirm equipment IPXX ratings are correct as per the approved technical submittals.
63.2.14 Confirm system and equipment grounding installation is as per the approved design drawings and the approved technical submittals.
63.2.15 Record all equipment details as per the Equinix provided template on the equipment parameter list within commissioning management platform.
63.2.16 Verify Cx level 2A Installation and QA/QC inspection checklist has been carried out as per the Equinix approved checklist.

### 63.3 CCTV L2A Documents Required:

(All documents **MUST** be available prior to sign off red tag)

63.3.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (Refer to document matrix section XX).

### 63.4 CCTV L2A Sign Off:

63.4.1 All required documentation is uploaded to the Equinix document control platform by GC or Vendor.
63.4.2 All required documentation is uploaded to commissioning management platform by CxA.
63.4.3 CxA to sign off checklist as Approved on commissioning management platform.
63.4.4 Red tag applied to the equipment and signed by CxA.

### CCTV L2B Yellow Tag

The following tests and checks to be undertaken contractor and verified by CxA prior to continuing to Level 3, with appropriate documentation provided

### 63.5 CCTV L2B Prerequisites:

(All below prerequisites **MUST** be available prior to commencing yellow tag)

63.5.1 Verify red tag has been applied to the equipment and signed off by the CxA.
63.5.2 Verify the Cx level 3 start-up/pre functional testing method statement and risk assessment (RAMS) have been prepared by an Equinix approved system integrator, agreed upon with Equinix security team, and uploaded to Equinix document control platform by the vendor and approved by the CxA.
63.5.3 Confirm As-Built documentation (if applicable) have been uploaded to Equinix document control platform by the vendor and approved by the EOR.
63.5.4 GC to compile a test pack in line with Equinix document matrix (Refer to document matrix section XX).

### 63.6 CCTV L2B Physical checks:

63.6.1 Confirm earthing systems comply with Equinix Global Design Standards and/or design drawings.
63.6.2 Confirm AC cables have been dead tested (refer to cable section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
63.6.3 Confirm all CCTV system cables have been dead tested as per approved communication system RAMS (refer to cable section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
63.6.4 Confirm all AC cables and CCTV system cabling identification are present as per approved cable schedule and cable interfacing schedule.
63.6.5 Confirm all cables are identified with permanent labels, soundly fixed (glands/cable ties/cleats) identifying source, load, size & type as per the project specification provided by the EOR.
63.6.6 Verify all cable connections pull test & tightness test is found satisfactory.
63.6.7 Confirm all trunking covers and equipment terminal/protection covers are in place and secured.
63.6.8 Confirm supply breaker/fuse has an equal or greater current capacity than the incoming breaker/fuse of the distribution board.
63.6.9 Confirm cable entry box (if applicable) is installed as per approved design drawings, manufactures specifications, and approved technical submittals.
63.6.10 Confirm PTW/LOTO procedures are implemented correctly by the GC's approved SAP/AP.
63.6.11 Confirm all equipment labelling and circuit identification is present and correct.
63.6.12 Construction clean of room and of equipment.
63.6.13 Verify cameras are correctly installed and field of view is correct as per approved shop drawings.
63.6.14 Confirm all communication cabling is supplied till camera data outlet, terminated, tested.
63.6.15 Confirm patch cord is installed between camera and data outlet.
63.6.16 Verify vendor Cx level 2B static testing has been carried out as per the vendors Cx level 2B static testing method statement approved by the CxA.
63.6.17 Verify Cx level 2B static testing has been carried out as per the Equinix approved checklist.
63.6.18 Confirm all vendor Cx level 2B checks/tests are complete and all documentation has been uploaded to Equinix document control platform by the vendor and approved by the CxA.

### 63.7 CCTV L2B Documents Required:

(All documents **MUST** be available prior to sign off yellow tag)
63.7.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (Refer to document matrix section XX).

### 63.8 CCTV L2B Sign Off:

63.8.1 All required documentation is uploaded to the Equinix document control platform by GC or Vendor.
63.8.2 All required documentation is uploaded to commissioning management platform by CxA.
63.8.3 CxA to sign off checklist as Approved on commissioning management platform.
63.8.4 Yellow tag applied to the equipment and signed by CxA.

## CCTV L2 Green Tag

The following tests and checks to be undertaken and verified by contractor prior to continuing to L4, with appropriate documentation provided

### 63.9 CCTV L3 Prerequisites:

(All below prerequisites **MUST** be available prior to commencing green tag)
63.9.1 Verify yellow tag has been applied to the equipment and signed by the CxA.
63.9.2 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
63.9.3 Confirm that the IP addresses for the cameras are obtained from Equinix.
63.9.4 GC to compile a test pack in line with Equinix document matrix.

### 63.10 CCTV L3 Physical Checks:

63.10.1 Confirm LOTO procedures are implemented correctly by the GC's approved SAP/AP.
63.10.2 Confirm AC cables have been live tested (refer to cable section XX) signed off and documentation have been uploaded to Equinix document control platform by the vendor and approved by the CxA.
63.10.3 Verify that all camera names are correct on software.
63.10.4 Verify all cameras are set as per agreed Equinix settings.
63.10.5 Verify the cameras are programmed for recording, storage capacity and recording has started on NVR.
63.10.6 Verify 100% functional test of all cameras.
63.10.7 Verify the camera overlays are set correctly with camera name, date, and time.
63.10.8 Verify the camera pop-ups (if applicable) function by triggering an alarm from access control system.
63.10.9 Verify that cameras provide complete and correct coverage of the area specified, without any obstructions.
63.10.10 Verify vendor Cx level 3 start-up/pre-functional testing has been carried out as per the vendors Cx level 3 start-up/pre functional method statement approved by the CxA.
63.10.11 Verify Cx level 3 start-up/pre-functional testing has been carried out as per the Equinix approved checklist
63.10.12 Confirm all vendor Cx level 3 checks/tests are complete and all documentation has been uploaded to Equinix document control platform by the vendor and approved by the CxA.

### 63.11 CCTV L3 Documents Required:

(All documents **MUST** be available prior to sign off green tag)
63.11.1 Verify all related test reports are complete, signed and have been uploaded to Equinix document control platform by the vendor and approved by the CxA. (refer to document matrix section XX).

### 63.12 CCTV L3 Sign off:

63.12.1 All required documentation is uploaded to commissioning management platform by CxA. (refer to section XX documentation matrix)
63.12.2 CxA to sign off checklist as Approved on commissioning management platform.
63.12.3 Green tag applied to the equipment and signed by CxA.

## 64 Leak Detection System

**Leak Detection L2A Red Tag**

The following tests and checks to be undertaken and verified by contractor prior to continuing to L2, with appropriate paperwork provided

### 64.1 Leak Detection L2A Physical Checks:

64.1.1 Confirm the correct equipment has been delivered per design specification has been delivered and record nameplate information (check serial numbers, other identification, appropriate warning labels are in place, any loose items)
64.1.2 Confirm no damage has occurred in transit and all transit bolts, wedges etc. have been removed
64.1.3 Confirm installation location is available and correctly prepared – Level floor, no ongoing works, etc
64.1.4 Confirm equipment has been installed within the correct position
64.1.5 Confirm no damage occurred between the loading bay and installation
64.1.6 Check adequate maintenance access has been provided for equipment
64.1.7 Check no debris or foreign materials have entered the equipment
64.1.8 Confirm all lifting eyes have been removed (if applicable)
64.1.9 Confirm all necessary cabling is correctly glanded to ensure the characteristics of the enclosure (e.g. IP56) which the cable enters can be maintained adequately.
64.1.10 Confirm all cabling has appropriate strain relief in place.
64.1.11 Confirm all device labelling is correct as per site labelling schedule.
64.1.12 Confirm the correct BMS interface card has been supplied.
64.1.13 Verify system and equipment grounding installation is per approved Equinix grounding installation drawing
64.1.14 Red tag applied to the equipment and signed, recorded accordingly
64.1.15 Installation is complete
64.1.16 Detection maps are installed in/near panel

**Leak Detection L2B Yellow Tag**

### 64.2 Leak Detection L2B Physical Checks:

64.2.1 The following tests and checks to be undertaken and verified by contractor prior to continuing to L3, with appropriate paperwork provided
64.2.2 Confirm equipment has been installed within the correct position
64.2.3 Confirm no damage occurred between the loading bay and installation
64.2.4 Confirm all associated equipment electrical testing have completed with test results documentation
64.2.5 Confirm that the relevant devices hard-wired signals are installed as per site specification
64.2.6 Confirm that the relevant BMS communication has been installed as per site specification
64.2.7 Verify that the leak sensing cables are installed and labelled as per approved drawings
64.2.8 Verify that the leak sensing cables are properly secured and undamaged
64.2.9 Confirming all earthing is completed and recorded
64.2.10 Confirm all insulation resistance testing of cable is as per specification and requirements.
64.2.11 Confirm all electrical torque terminal records have been completed
64.2.12 Confirm that the battery has been installed as per approved drawings
64.2.13 Yellow tag applied to the equipment and signed, recorded accordingly
64.2.14 Drawings of tape locations mounted next to panel
64.2.15 Tape clipped or secured correctly and undamaged

**Leak Detection L3 Green Tag**

### 64.3 Leak Detection L3 Physical Checks:

64.3.1 The following tests and checks to be undertaken and verified by contractor prior to continuing to L4, with appropriate paperwork provided
64.3.2 Verify communication with the BMS has been establish and there are no active alarms
64.3.3 Verify BMS graphics matches site installation and approved schematics / graphics
64.3.4 Verify individual zone mapping on the panel and BMS is as per approved drawings
64.3.5 Record firmware version (If applicable)
64.3.6 Green tag applied to the equipment and signed, recorded accordingly
64.3.7 Alarm is activated on panel and meterage is shown and in-line with expected results
64.3.8 Simulate cable break and verify alarm is activated and shows
64.3.9 Record firmware version (If applicable)

**Leak Detection L4 Blue Tag**

The following tests and checks to be undertaken and verified by contractor prior to continuing to L5, with appropriate paperwork provided

### 64.4 Leak Detection L4 Physical Checks:

64.4.1 Simulate a leak alarm. Ensure that the alarm and correct distance is reflected on the panel and BMS
64.4.2 Simulate a cable break. Ensure that the alarm and correct distance is reflected on the panel and BMS
64.4.3 Carry out multiple leak alarms. Ensure that the alarm and correct distance is reflected on the panel and BMS
64.4.4 Carry out communication failure between the system and BMS
64.4.5 Verify that system restarts correctly after power loss
64.4.6 Verify that the battery backup is operational autonomy is within specification
64.4.7 Simulate leak and ensure reporting of leak to BMS and length along tape is correct
64.4.8 Verify & record Firmware version and ensure Equinix Approval Global settings
64.4.9 Verify That correct signals and alarms are being picked up on the BMS screen
64.4.10 Verify layout matches drawing
64.4.11 Verify that system restarts correctly after power loss
64.4.12 Verify that the battery backup is operational autonomy is within specification
64.4.13 Blue tag applied to the equipment and signed, recorded accordingly

## 65 Water Mist Fire Suppression System

**Water Mist L2A Red Tag**

The following tests and checks to be undertaken and verified by contractor prior to continuing to L2, with appropriate paperwork provided

### 65.1 Water Mist L2A Physical Checks

65.1.1 Labels as per specification
65.1.2 As Built/installed drawings issued.
65.1.3 Install is free from issues.
65.1.4 Confirm the correct equipment has been delivered per design specification has been delivered and record nameplate information (check serial numbers, other identification, appropriate warning labels are in place, integral pump packages, any loose items)
65.1.5 Confirm no damage has occurred in transit and all transit bolts, wedges etc. have been removed
65.1.6 Confirm the unit is correct dimensionally
65.1.7 Confirm the unit is handed correctly
65.1.8 Confirm installation location is available and correctly prepared – Level floor, no ongoing works, etc
65.1.9 Confirm equipment has been installed within the correct position
65.1.10 Confirm no damage occurred between the loading bay and installation
65.1.11 Check adequate maintenance access has been provided for equipment
65.1.12 Check equipment is properly mounted as per manufacturer's recommendations, for example, anti-vibration mounts where required
65.1.13 Confirm all external accessories supplied, such as baffle plates / sensors / tubing, are securely mounted in appropriate containment
65.1.14 Check no debris or foreign materials have entered the equipment
65.1.15 Confirm all lifting eyes have been removed (if applicable)
65.1.16 Confirm all necessary cabling is correctly glanded to ensure the characteristics of the enclosure (e.g. IP56) which the cable enters can be maintained adequately.
65.1.17 Confirm all cabling has appropriate strain relief in place.
65.1.18 Confirm all device labelling is correct as per site labelling schedule.
65.1.19 Confirm piping materials / components are fully in accordance with the relevant project piping specification for the piping specification
65.1.20 Confirm the correct BMS interface card has been supplied.
65.1.21 Verify system and equipment grounding installation is per approved Equinix grounding installation drawing
65.1.22 Red tag applied to the equipment and signed, recorded accordingly

**Water Mist L2B Yellow Tag**

The following tests and checks to be undertaken and verified by contractor prior to continuing to L3, with appropriate paperwork provided

### 65.2 Water Mist L2B Physical Checks

65.2.1 Pressure Test and report issued.
65.2.2 Check distribution system pressure ahead of start up to ensure piping is not filled and discharge through a bulb broken during installation
65.2.3 Confirming all earthing is completed and recorded
65.2.4 Confirm all insulation resistance testing of cable is as per specification and requirements.
65.2.5 Confirm all electrical torque terminal records have been completed.
65.2.6 Confirm piping support are in accordance with the piping specification
65.2.7 Check levelling and alignment of units are correct and acceptable
65.2.8 Confirm that the in-line piping components are mounted in the correct orientation and with regard to flow direction.
65.2.9 Confirm the correct pipework orifice plate has been installed according to the project pipe specification.
65.2.10 Confirm that the necessary binder points, temperature pockets, filters (if applicable), flush bypass leg, drain points have been installed as per design specification.
65.2.11 Check all sprinkler heads are properly installed and are of the correct ratings
65.2.12 Check all smoke / flame / heat detectors are properly installed and are of the correct ratings
65.2.13 Check all control valves are properly installed and are in accordance with design specification
65.2.14 Confirm pipe pressure test have been completed in accordance to international standards or statutory requirements
65.2.15 Confirm that the electrical bonding joints are completed according to the project pipe specification

65.2.16 Confirm continuity and insulation resistance test control cable for Dry / Wet system components including, Smoke Detectors, Manual Operation Button, Compressor Control Panel, Pump Control Panel, Solenoid Valve and Pressure Switches are completed
65.2.17 Confirm that all uninsulated pipework is painted in accordance with the piping specification.
65.2.18 Confirm pump alignment test have been carried out.
65.2.19 Confirm Motor/pump lubrication has been carried out as per manufacturer recommendations
65.2.20 Confirm batteries are installed for all panels as per approved design drawing
65.2.21 Yellow tag applied to the equipment and signed, recorded accordingly

**Water Mist L3 Green Tag**

The following tests and checks to be undertaken and verified by contractor prior to continuing to L4, with appropriate paperwork provided

### 65.3 Water Mist L3 Physical Checks

65.3.1 Verify Pump failover – redundancy
65.3.2 Verify Tank leak detection
65.3.3 Verify Pump Control
65.3.4 Confirm AC and DC power is available at the correct voltage for the equipment installed.
65.3.5 Confirm panel is in service to charge batteries for 24 hours before proceeding with tests
65.3.6 Carry out battery autonomy test to rated duration followed by simulation of an alarm to verify that the battery can still support the system (Battery voltage to be recorded before and after test)
65.3.7 Sound levels measurements and/or voice intelligibility meets specification and standards.
65.3.8 Visual indicators correct allocation (xenon beacons and indicator lights)
65.3.9 Inputs/outputs from other systems (e.g. Aspiration systems, fire protection systems, Lifts, Mechanical plant, BMS, Damper controls, security systems)
65.3.10 Point to graphic checks (detection or manual device operation)
65.3.11 Text and indication at fire main and mimic panels (detection or manual device operation)
65.3.12 Confirm all smoke / flame / heat detectors point to point test (alarm & fault) have been tested and test results documented
65.3.13 Confirm all manual release / break glass have been tested and test results documented
65.3.14 Confirm all sensors have been calibrated in their final position with the relevant calibration certificates (If applicable)
65.3.15 Verify and record ATS switch, if available, under-voltage and phase monitor relay settings per Equinix approved settings
65.3.16 Confirm 100% BMS point to point to graphic and all alarms has been completed (This include Fire Monitoring System Graphics)
65.3.17 Green tag applied to the equipment and signed, recorded accordingly

**Water Mist L4 Blue Tag**

The following tests and checks to be undertaken and verified by contractor prior to continuing to L5, with appropriate paperwork provided

### 65.4 Water Mist L4 Physical Checks

65.4.1 Confirm 100% equipment / devices point to point (High & Low Level Interface) to graphic and all alarms has been completed
65.4.2 Verify Pump auto Start on PD
65.4.3 Verify & record Firmware version and ensure Equinix Approval Global settings
65.4.4 Verify alarm and points to BMS
65.4.5 Verify that the volume meets 100% of design at the end of line
65.4.6 Verify ATS functionality on Pump Control Panel
65.4.7 Verify ATS source seek functions
65.4.8 Verify Control from Fire Alarm C&E
65.4.9 Perform Cause and Affect Testing against the approved Cause and Affect Matrix for every zone and every cause on the matrix
65.4.10 Verify equipment shutdown as per approved sequence of operations (If applicable)
65.4.11 Verify failsafe operations of solenoid valves (If applicable)
65.4.12 Confirm 100% equipment / devices point to point (High & Low Level Interface) to graphic and all alarms has been completed
65.4.13 Verify recovery form complete power failure
65.4.14 Verify devices and equipment redundancy
65.4.15 Verify failsafe operations of solenoid valves (If applicable)
65.4.16 Verify and record all system final settings
65.4.17 Graphics and point to point testing will need to be verified on both Master / Standby servers (If applicable) and to Fire Command Centre
65.4.18 Blue tag applied to the equipment and signed, recorded accordingly

## 66 Smoke extract fans

**Smoke Extract L2A Red Tag**

The following tests and checks to be undertaken and verified by contractor prior to continuing to L2, with appropriate paperwork provided

### 66.1 Smoke Extract L2A Physical Checks

66.1.1 Confirm the correct equipment has been delivered per design specification has been delivered and record nameplate information (check serial numbers, other identification, appropriate warning labels are in place, any loose items)
66.1.2 Confirm no damage has occurred in transit and all transit bolts, wedges etc. have been removed
66.1.3 Confirm the equipment is correct dimensionally
66.1.4 Confirm the equipment is handed correctly
66.1.5 Confirm installation location is available and correctly prepared – Level floor, no ongoing works, etc
66.1.6 Confirm equipment has been installed within the correct position

66.1.7 Confirm no damage occurred between the loading bay and installation
66.1.8 Check adequate maintenance access has been provided for equipment
66.1.9 Check equipment is properly mounted as per manufacturer's recommendations, for example, anti-vibration mounts where required
66.1.10 Confirm equipment has been installed within the correct position and orientation.
66.1.11 Check no debris or foreign materials have entered the equipment
66.1.12 Confirm all lifting eyes have been removed (if applicable)
66.1.13 Confirm all necessary cabling is correctly glanded to ensure the characteristics of the enclosure (e.g. IP56) which the cable enters can be maintained adequately.

66.1.14 Confirm all cabling has appropriate strain relief in place and free from any moving parts.
66.1.15 Confirming all earthing is completed and cable shielding is earthed (if using a cable without a separate PE conductor) accordingly at the required end and recorded.
66.1.16 Confirm all device labelling is correct as per site labelling schedule.
66.1.17 Confirm that the inlet damper is correctly fitted (if applicable)
66.1.18 Confirm that the VFD has been mounted vertically on a solid surface or frame (if applicable)
66.1.19 Confirm that the VFD if mounted on a solid service has the appropriate heatsink plate (if applicable)
66.1.20 Confirm that all VFD electrical cabled is shielded to manufacturer guidelines.
66.1.21 Confirm all control cabling is separate / segregated from any power cabling.
66.1.22 Confirm the correct BMS interface card has been supplied
66.1.23 Verify system and equipment grounding installation is per approved Equinix grounding installation drawing
66.1.24 Red tag applied to the equipment and signed, recorded accordingly.

**Smoke Extract L2B Yellow Tag**

The following tests and checks to be undertaken and verified by contractor prior to continuing to L3, with appropriate paperwork provided

### 66.2 Smoke Extract L2B Physical Checks

66.2.1 Confirm no damage to the electrical components
66.2.2 Electrical terminations are securely tightened
66.2.3 Confirming all earthing is completed and recorded
66.2.4 Confirm all insulation resistance testing of cable is as per specification and requirements.
66.2.5 Confirm all electrical torque terminal records have been completed.
66.2.6 Check levelling and alignment of units are correct and acceptable
66.2.7 Duct connected, clean and leakage tested (Leakage test applicable to medium and high-pressure ducts only)
66.2.8 Confirm that the electrical bonding joints are completed according to the project specification
66.2.9 Power and controls cabling connected and tested
66.2.10 Yellow tag applied to the equipment and signed, recorded accordingly

**Smoke Extract L3 Green Tag**

The following tests and checks to be undertaken and verified by contractor prior to continuing to L4, with appropriate paperwork provided

### 66.3 Smoke Extract L3 Physical Checks

Confirm the following information has been inputted into the inverter from the fan motor identification plate: voltage, nominal motor current, nominal frequency, nominal speed and nominal power.
Confirm fan direction of rotation.
Verify VFD settings are as per approved Equinix settings
Confirm fan volume & pressure readings, any pressure drops (if applicable)
Confirm the equipment air flow design measurement is carried out and is as per design specification
Inlet / outlet damper operating correctly
Operational checks completed as per sequence of operation
Measure motor running current on all phases
Confirm 100% BMS point to point to graphic and all alarms has been completed
Green tag applied to the equipment, signed and recorded accordingly

**Smoke Extract L4 Blue Tag**

The following tests and checks to be undertaken and verified by contractor prior to continuing to L5, with appropriate paperwork provided

### 66.4 Smoke Extract L4 Physical Checks

66.4.1 Confirm 100% equipment / devices point to point (High & Low Level Interface) to graphic and all alarms has been completed
66.4.2 Verify units operation via the correct start commands and that the require dampers open / close in accordance with unit start / stop
66.4.3 Check unit runs via the correct C&E BMS start command and the require damper opens prior to fan enabling.
66.4.4 Graphics and point to point testing will need to be verified on both Master / Standby servers (If applicable) and to Fire Command Centre
66.4.5 Blue tag applied to the equipment and signed, recorded accordingly

# 67 Handover – Ready for RFS

## 67.1 Go Live Process

- As part of the Testing and Commissioning and Operational Readiness, of all new IBX Data Centres, significant expansion to existing IBX Data Centres and standalone equipment replacement. All below points must be conducted;

- Review SAT/IST documentation prior to testing.

- Test scenarios are relevant to the equipment and systems being tested and includes testing based on Equinix's operational experiences. As well as lessons learnt from Physical Audits, are incorporated/tested in future projects from day one such as specific parameter settings, latest firmware revisions etc.

- Witness scenarios as part of SAT/IST to ensure systems works as expected in accordance with the original design specification and Global Design Standards.

- Review of Test and Commissioning documents/records, Operation & Maintenance Manuals and asset data base (format ready for upload into Maximo) is in accordance with the outputs from the project team.

- Work closely with local TFM teams as part of the go live/handover process. This will include phased expansion and standalone equipment replacement for existing IBX Data Centres to support the local
- teams to ensure existing operations is not compromised and maintain availability to customers.

- Commissioning/Project Close Out
- List below is the expected output in regard to project close out:

- Complete documentation turnover including;
- Final Commissioning Report from Commissioning Authority
- O&M Manuals
- Recommended spare parts lists
- Warranty information
- All drawings in "As Built" Revision, detailing previous phases so that drawings cover entirety of installed equipment (inclusive of previous phases, and any non Equinix controlled equipment, where relevant.
- Coordination study with breaker settings
- Test and Balance Reports
- All testing and inspections performed including procedures used
- Test results with supporting data
- Final deficiency list including all closed and remaining open items
- Data sheets verifying as left settings on all circuit breakers, UPS, ATS, STS, VFDs, etc.
- Carry out Lesson Learned workshop

- Operations Readiness
- Training – All facility team members trained on new equipment
- All equipment is properly labelled
- Safety procedures in place

- All assets uploaded into Share Point
- PMs created for all assets

- Please refer to Appendix 04 to find the Go-Live Checklist.

### 67.2 Example Agenda – Preparation for Go Live / Handover

- IST Testing and Witnessing, any concerns or issues in the operation of the plant to date?

- Resource and Training of Equinix Team on Critical Plant and systems in preparation for RFS
- Resource plan
- Review of training program
- Outstanding training requirements
- Identified Risks

- Remedial Actions and deficiency List – Review of list to date, any other items for inclusion before the agreed cut-off

- Placement of Maintenance Contracts for Critical Plant and Systems
- Contracts Signed and in place with PO issued
- Remaining Contracts (if any) requiring signature and PO to be issued.
- Identified risks at point of handover without Maintenance Contracts in place

- Placement of contracts for soft services:
- Security – Access badges in preparation for RFS how will these be issued and stored on site. Storage of keys and key control, how will this be done?
- Cleaning Contract – Waste Disposal, Recycling (e.g. Cardboard Compactor), Cleaning of General Areas (Front of House) and Offices, Sanitary Services and Pest Control (Rodents and Birds)
- External Maintenance – Gardening, Cleaning/Sweeping of Car Park Area
- Vending Machine/s
- Is there any leased office equipment? e.g. printers, fax, photocopiers, shredders, etc.
- Portable Fire Extinguishers

- Maximo – Assets database, setting up maintenance plans and Job Plans ready for handover
- Statutory Maintenance – Emergency Lighting, Water Systems (tap temperatures, chlorination of shower heads), fire detection, lightning protection, smoke extract Fans, log books and maintenance records.

- Corporate branding and marketing

- H&S
- Signage (Statutory)
- AOB under H&S

- AOB
- Appendix 03 - Soft Handover Pre-Requisites Check List

### 67.3 Go Live White Space Power Checklist

| | Power Path 'X' |
|---|---|
| 1. Check and verify labelling of all cables from Incoming Transformers / Generators, to Main Switchgear to UPS/DC rectifier to SMDB's to PDU's (AC/DC). | |
| 2. DC Rectifier operation and distribution checked and verified. | |
| 3. Visual inspection and thermo graphic survey of all customer connected final distribution boards (PDU-AC/DC) | |
| 4. Visual inspection and thermo graphic survey of all Sub Main Distribution Boards (SMDB) feeding item 1 | |
| 5. Isolation and physical check and clean of all UPS's & STS's (to be completed by Emerson). | |
| 6. Isolation and physical check and clean of all ATS's. | |
| 7. Isolation, physical check and clean of all Main Switchgear, thermo graphic survey under load to be carried out. | |
| 8. Generator and fuel system functional operation (Needs to be proven with generator under full load to prove the fuel system can maintain the demand for each generator). | |
| 9. All critical deficiency's and SOR related items to be resolved (See section I for definition of deficiency's). | |
| 10. Mains failure test to be carried out for each electrical system/generator to prove the automatic and safe transfer to generator during a utility failure and automatic recovery when mains supply is restored. Expectation would be a minimum of 60 minutes proving time to ensure the utility supply is stable (Hz & V are within normal limits) before reverting back to utility. | |

| | | |
|---|---|---|
| 11. On completion of the individual utility tests, a building utility test is to be carried out to prove the site in its entirety during a power failure to transfer automatically to generators but all critical systems such as chillers, pumps, CRACs etc. will restart. UPS Systems should unaffected and capable to maintain load during the safe transfer to generator and, after the 60-minute proving time, back to utility. | | |
| 12. All generators before being run-up or tested shall have the alternator termination section visually inspected to check for foreign objects, swarf, cable terminations etc. | | |
| 13. Where breakers have been identified as being under specified for the rated fault current of the electrical system, these must be replaced with breakers of the correct rating. The existing breakers in operation (live) are a H&S Risk and need to be replaced with the correct rating for the system to ensure they can operate safely in accordance with their design and to ensure compliance with Statutory Regulations and Equinix's Duty of Care (DC PDU breakers issue to be resolved with replacement). | | |
| 14. Electrical Installation Certificates to be provided for all Distribution Boards and Electrical Systems. NB – Earth Loop Impedance needs to be checked and verified on the certificates with the physical readings on site to prove the integrity of the earthing system. Previous certificates issued in the past have not had this information. Similarly, cabling to the earth rods were not mechanically protected prior to being buried and we have provided records of earth cabling being physically damaged during construction. | | |
| 15. Internal visual inspection and Installation Test Certificates to be provided of the MV Switchgear and Transformers. | | |
| 16. SAT approval from ENGINEER OF RECORD for all above (to include signed-off test sheets for each SAT- signatures from M+W and ENGINEER OF RECORD along with dates). | | |

### 67.4 Go Live Cooling Systems Power Checklist

| | | |
|---|---|---|
| 1. SAT approval from ENGINEER OF RECORD for 2 of the Chillers and associated pump sets /controls. | | |
| 2. Network CRAC control to be removed and interdependencies (No CRAC controls to affect other CRAC's operations). | | |
| 3. Chilled Water Flow Rates to all CRAC' s and chillers to be verified and signed off by ENGINEER OF RECORD | | |
| 4. All critical deficiency's and SOR related items to be resolved (See section I for definition of deficiency's ). | | |
| 5. SAT approval from ENGINEER OF RECORD for FAHU and fresh Air systems including humidifiers. | | |
| 6. SAT approval from ENGINEER OF RECORD for CRAC systems (white space and plant room areas). | | |
| 7. Prove one chiller can maintain cooling with the current building load for 48hrs. | | |
| 8. All chillers and pumps supporting the agreed critical areas must be tested to ensure auto change-over of standby pumps, or pumps ramp-up to maintain duty of the affected system. | | |
| 9. Leak Detection for operational areas to be put into service and tested to ensure alarms are back onto the BMS. | | |
| 10. Handover documents required for the Cooling Towers and closed loop systems under our control. Please see attached e-mail of expected requirement (NB- No information has been provided to date on the current condition of the system), we will also need to setup an immediate regime for the regular monitoring and management of the cooling towers (under ACOP L8 for guidance). | | |

### 67.5 Go Live Fire Safety/Security Checklist

| | |
|---|---|
| 1. SAT approval for all Fire Detection system from ENGINEER OF RECORD. | |
| 2. SAT approval for Fire Suppression systems from ENGINEER OF RECORD. | |
| 3. Air Integrity Test Certificate for rooms with Gas Suppression. | |
| 4. Pressure test certificate for testing the integrity of the pipework for water suppression systems. | |
| 5. Cause and effect test and sign-off from ENGINEER OF RECORD. | |
| 6. All critical deficiency's and SOR related items to be resolved (See section I for definition of deficiency's). | |
| 7. SAT approval for Security system from ENGINEER OF RECORD. | |

BMS/CMS/EMS

| | |
|---|---|
| 1. For systems coming under the remit for early handover we will require accurate visibility of all readings, set points and their operation proven to be monitored/controlled via the BMS/CMS/EMS. | |
| 2. Alarming on the BMS plus Remote Alarming is a requirement to ensure the site team have a fighting chance to proactively react to the early signs of a failure or fault. | |

Testing

| | |
|---|---|
| 1. Successful Blackout test of all Transformers feeding IT services. | |
| 2. Successful Blackout test of all Transformers feeding Mechanical services. | |
| 3. Testing and signoff from ENGINEER OF RECORD for CMS/BMS/EMS systems relating to above. | |
| 4. ISAT completed for all above systems. | |

Training

| | |
|---|---|
| 1. Prior to early handover of the expected areas, the site team will need to have appropriate training of each system | |
| 2. Training should cover;<br><br>First level fault investigation and diagnosis<br>Immediate actions to recover a system or piece of equipment in the event of a failure<br>Sequence required to make equipment available for maintenance and the maintenance activities to be carried out. | |
| 3. Prior to training below documentation should be issue to each trainee;<br><br>A detailed schematic of the overall system<br>Detailed schematic of the section of the system being trained on<br>Description covering the method of operation under normal conditions as well as under various failure scenarios | |

Water Analysis

| | |
|---|---|
| We would expect for each of the closed and open water systems on site to ensure these systems are within normal operating parameters prior to taking ownership. Water samples should be taken at least 1 week prior to handover to allow time for test results to be returned in time for the Soft Launch dates. | |
| Conditions for sampling:<br><br>Each sample must be collected in a sterile container. Samples must be stored at a temperature between 6-8˚C and must be tested within 24 hours of being removed from the system. Tests should be performed by an accredited laboratory. Test results must be interpreted making allowance for the accuracy of test procedures. Any variation in results from samples taken at different points around the system should be investigated and, if necessary, further samples taken. | |