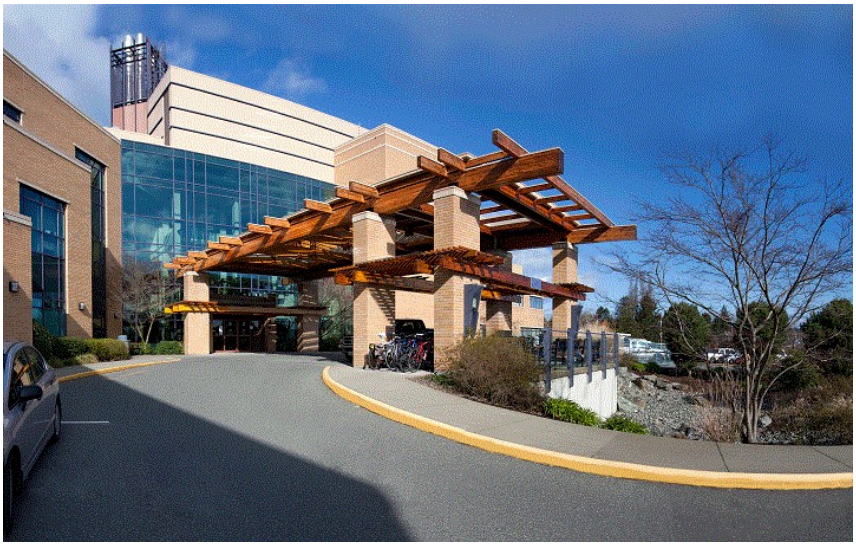
Provincial Health Services Authority
Province-wide solutions. Better health.

Victoria Cancer Centre



Building Management System Upgrade

Victoria, British Columbia

ISSUED FOR TENDER

FOR

Level 1 and Level 2 NCM-1 Controls Replacement

BES Ref. 26-B374-000

30 October 2026

DRAWINGS:

Drawing Number	Drawing Title
M0.1	Cover Page, Project Notes & Mechanical Legend
M2.1	Existing Level 1 North Floor Plan - Mechanical
M2.2	Existing Level 1 South Floor Plan - Mechanical
M2.3	Existing Level 2 North Floor Plan - Mechanical
M2.4	Existing Level 2 South Floor Plan - Mechanical
M3.1	Mechanical Points List - 1 of 4
M3.2	Mechanical Points List - 2 of 4
M3.3	Mechanical Points List - 3 of 4
M3.4	Mechanical Points List - 4 of 4

SPECIFICATIONS:

Section Number	Section Title	No. of Pages
Division 01 - General Requirements		
01 11 00	Summary of Work	4
01 31 19	Project Meetings	1
01 32 16	Construction Progress Schedule	1
01 33 00	Submittal Procedures	2
01 35 13	Special Project Procedures	2
01 35 30	Health and Safety Requirements	1
01 41 00	Regulatory Requirements	1
01 45 00	Quality Control	1
01 61 00	Common Product Requirements	1
01 74 11	Cleaning	1
01 74 21	Construction and Demolition Waste Management	1
01 78 00	Closeout Submittals	1
01 79 00	Demonstration and Training	1
01 91 13	General Commissioning Requirements	3
01 91 33	Commissioning Forms	1
Division 23 - Heating, Ventilating and Air Conditioning		
23 05 00	Common Work Results for HVAC	3
23 05 05	Selective Demolition for HVAC	3
Division 25 - Integrated Automation		
25 01 11	EMCS Start-up, Verification and Commissioning	4
25 05 00	Common Work Results for Integrated Automation	9
25 05 53	Identification for Integrated Automation	3
25 17 00	Operational Technology Networks for Integrated Automation	4
25 24 00	Integrated Automation System Architecture Requirements	4
25 30 00	Integrated Automation Instrumentation and Terminal Devices	3
25 35 13	Integrated Automation Actuators and Operators	3
25 41 00	Building Automation Controllers	5
25 45 00	Centralized Building Management System	4
25 70 00	Integrated Automation Building Systems Integration	4
25 90 00	Integrated Automation Control Sequences	5
Appendices: • Infection Control Guidance Document 2 – Cleaning and Transporting Tools and Equipment. • Infection Control Standard Operating Procedure 9 – Electrical or Data Pulling within Ceiling Spaces		

END OF SECTION

1 GENERAL

1.01 WORK COVERED BY CONTRACT DOCUMENTS

.1 The intent of this project is to replace the failed components of the existing legacy Johnson Controls proprietary building automation system associated with the failed NCM-1 supervisory controller, and to restore control, monitoring, alarming and trending for the affected systems and zones through a new BACnet/IP-based control system integrated with the Owner's existing building management system (Siemens).

.2 The work is limited to the affected controllers, equipment, devices and points identified in the Contract Documents. Retain functional legacy Johnson Controls systems, the circa-2016 Johnson Controls BACnet system, NC-2, Level 3 controls and other unaffected systems, except for the interfaces expressly identified. NCM-1 is also identified as NC-1 in existing records.

1.02 SCOPE OF WORKS

The following scope of works is recommended as a minimum and is not limited to:

.1 All systems included in the work shall include:

.1 First and second floor HVAC zone controls associated with the legacy Johnson Controls system.

.2 Associated terminal unit, plant and equipment control and monitoring points identified on the Drawings.

.3 Medical gas system alarm and monitoring points.

.4 Six (6) LINAC cabinets and associated BAS monitoring, alarm and status points.

.5 Other legacy Johnson Controls proprietary points identified on the Drawings and points lists.

.2 Provide all labour, materials, equipment, software, programming and services required for the complete BAS cutover, including:

.1 Removal of redundant legacy controllers, supervisory controllers, panels and associated components where required.

.2 Installation of new BACnet/IP-compatible DDC controllers, panels and network components.

.3 Modification or extension of control wiring, communication cabling and BAS network infrastructure as required.

.4 Replacement of room temperature, differential pressure, static pressure and other field sensors where indicated.

.5 Reuse and reconnection of existing field devices and wiring where confirmed functional and compatible.

.6 Programming of required sequences, graphics, alarms, trends, schedules and operator commands.

.3 Provide BAS interface for the existing medical gas alarm and monitoring points identified on the Contract Documents. Existing medical gas safety and primary alarm functions shall remain independent of the BAS unless specifically noted otherwise.

.4 Provide BAS interface for the six (6) existing LINAC cabinets, including monitoring, status, alarming and trending of the points identified on the Contract Documents. Existing LINAC safeties and local control functions shall remain independent of the BAS unless specifically noted otherwise.

.5 Provide BAS monitoring and alarm annunciation for the existing generator alarm points associated with the affected system. Verify the existing alarm contacts, point definitions, controller connections and notification routing before cutover. Retain independent generator controls, safeties and local alarms.

.6 Verify existing controller locations, BAS points, field devices, wiring, network connections and equipment interfaces prior to commencing work. Report discrepancies to the Consultant prior to proceeding.

.7 Test all existing field devices and wiring intended for reuse. Report failed, damaged or incompatible devices prior to replacement.

.8 Prior to cutover, verify the existing points, sequences, setpoints, alarms and system operation. Following cutover, restore each affected system to automatic operation in accordance with the design intent.

.9 Provide complete integration of all new and migrated points into the Owner's existing BMS, including applicable graphics, status, values, setpoints, commands, alarms, trends and schedules.

.10 The building will remain occupied during construction. Coordinate all shutdowns and cutovers with the Owner. Shutdowns affecting clinical, pharmacy, medical gas, LINAC or other critical systems shall not proceed without Owner approval.

.11 Maintain existing HVAC and critical environmental control during construction to the greatest extent practicable. Provide temporary control or monitoring where required by the Contract Documents or approved cutover plan.

.12 Submit a cutover and shutdown plan for Owner review prior to commencing work on affected systems.

.13 Provide complete point-to-point verification and functional testing of all new and modified BAS points, including associated safeties, interlocks, alarms, commands, setpoints and control sequences. Correct all deficiencies prior to system acceptance.

.14 Make good all building finishes and penetrations disturbed by the work and provide firestopping and smoke seals at fire-rated assemblies as required.

.15 Provide final record documentation including updated BAS network architecture, control schematics, controller schedules, points lists, sequences of operation, as-built Drawings, software and database backups, O&M information and Owner training.

.16 Provide a one-year comprehensive warranty and a separate five-year service and support period from the same acceptance date. Include annual on-site inspections and year-round 24/7 emergency service. Refer to the warranty and service notes and section 25 05 00.

1.03 RELATED REQUIREMENTS

.1 Section 01 35 13 – Special Project Procedures.

.2 Section 01 33 00 – Submittal Procedures.

.3 Section 01 91 33 – Commissioning Forms.

.4 Division 25 – Integrated Automation.

1.04 OWNER OCCUPANCY AND WORK SEQUENCE

.1 The facility will remain occupied and clinical services will continue during the Work. Coordinate access, impacts, mitigation and communication through the project MDT and the site-specific work plan under Section 01 35 13. Include Island Health FMO, IPAC, Clinical Operations, Centre Services and other affected stakeholders.

.2 Sequence work to maintain required environmental control and alarm notification, particularly in Pharmacy and other identified critical spaces. Do not retire a functioning control or monitoring path until the replacement is tested and the planned cutover is accepted.

.3 Provide a documented rollback procedure for each stage and coordinate restoration after failed tests or unplanned conditions. Preserve independent equipment safeties and life-safety interfaces.

.4 Submit the construction and cutover schedule under Section 01 32 16. Obtain the required PHSA authorizations for service interruptions, infection prevention and control, IT connections and after-hours access.

1.05 EXISTING SERVICES AND CONDITIONS

.1 Locate, identify and protect existing controls, mechanical equipment, electrical power, communications, fire separations and clinical monitoring systems affected by the Work.

.2 Report discrepancies between available records and installed conditions before making changes. Record the disposition of existing devices, wiring, software and points.

.3 Maintain services outside the Work. Provide temporary arrangements where approved outages would interrupt critical environmental control or monitoring.

2 PRODUCTS

2.01 NOT USED

.1 Not used.

3 EXECUTION

3.01 SITE CONTROL AND RECORDS

.1 Use only PHSA-approved access routes, work areas, storage locations and service windows. Protect occupied areas and restore affected finishes, barriers and services.

.2 Maintain current Contract Documents, approved submittals, change records, inspection and test reports, and marked-up record drawings at the site for review during the Work.

END OF SECTION

1 GENERAL

1.01 ADMINISTRATIVE REQUIREMENTS

.1 Schedule and administer project meetings and coordinate formation of the project MDT with the Owner before applicable site work. Provide agendas and record decisions, action owners, required releases and due dates. Maintain Contractor responsibility for implementing the preventive measures and performing the Work.

.2 Distribute minutes promptly to attendees and affected parties. Identify technical questions and decisions that remain open; minutes do not modify the Contract unless the change is authorized under the applicable procedure.

.3 Include Island Health FMO, IPAC, Clinical Operations and Centre Services in the MDT. Include PHSA FMO, PHSA IT, the Consultant, affected contractors, equipment suppliers and other stakeholders as their work or operations require. Coordinate authorized existing-BMS personnel for integration and cutovers.

1.02 PRECONSTRUCTION MEETING

.1 Hold a preconstruction meeting before applicable site work to review the site-specific work plan, PMA including infection-control risk assessment, IPAC plan, worker training, preventive measures, access, clinical communications, network approvals, shutdowns, recovery and return-to-service responsibilities.

.2 Review temporary control and monitoring, staged decommissioning of the affected NCM-1 legacy controls, protection of retained controls, testing and witness points, rollback criteria, commissioning and handover.

1.03 PROGRESS AND CUTOVER MEETINGS

.1 Hold progress meetings at the interval accepted by PHSA. Review schedule, completed work, submittals, field discrepancies, quality, deficiencies, procurement, upcoming access and outages.

.2 Hold a focused MDT/cutover meeting before each planned interruption affecting HVAC or clinical monitoring. Confirm affected areas, IPAC requirements, staff contacts, temporary measures, environmental limits, test sequence, escalation, recovery, decision authority and clinical return-to-service process.

.3 Record completion of each stage and unresolved items before proceeding to the next stage.

2 PRODUCTS

2.01 NOT USED

.1 Not used.

3 EXECUTION

3.01 NOT USED

.1 Not used.

END OF SECTION

1 GENERAL

1.01 SCHEDULE SUBMITTALS

.1 Submit a baseline schedule before field work showing submittals, MDT/PMA/IPAC-plan review, worker training, establishment of preventive measures, clinical notices, authorized ceiling access, procurement, installation, testing, cutovers, recovery, Owner terminal cleaning, training and closeout.

.2 Identify the work sequence by affected system and area, dependencies, long-lead items, critical path, proposed outage windows and periods requiring temporary environmental control or monitoring.

.3 Coordinate the schedule with PHSA operations and the permitted access and infection prevention and control arrangements. Identify proposed after-hours work and the staff or vendor support required.

1.02 SCHEDULE UPDATES

.1 Update the schedule at the interval agreed with PHSA and whenever activities, location, phasing or site conditions change. Reassess the PMA/IPAC measures through the MDT before implementing a change that may alter infection-control risk. Show actual progress, forecast dates, constraints and corrective measures.

.2 Provide a short narrative identifying constraints, decisions needed from others and the effect on critical environmental systems and completion.

.3 Circulate an accepted schedule revision to affected subcontractors, suppliers, PHSA FMO and IT, clinical representatives and authorized legacy BMS service personnel as applicable.

.4 Do not implement a revised outage or clinical changeover solely on the basis of a schedule update; obtain the required site authorization.

2 PRODUCTS

2.01 NOT USED

.1 Not used.

3 EXECUTION

3.01 NOT USED

.1 Not used.

END OF SECTION

1 GENERAL

1.01 ADMINISTRATIVE REQUIREMENTS

.1 Prepare a submittal register showing each required item, responsible supplier, planned submission date, affected system and need date for review. Coordinate with the construction schedule.

.2 Include the site-specific work plan, PMA/ICRA, IPAC plan, MDT coordination records, worker-training evidence and required access, shutdown and recovery procedures. Obtain applicable reviews and establish preventive measures before the related work.

.3 Include manufacturer authorization, platform and healthcare experience, named personnel, local service and 24/7 response plan, one-year comprehensive warranty, separate five-year service and annual inspection plan, lifecycle/parts information, Owner-access and licence matrix, capacity calculations, BACnet interoperability evidence and PHSA IT compliance submission. Identify annual fixed service fees, included services and non-warranty repair rates under Section 25 05 00. Provide qualification evidence at the procurement stage required by the Owner; post-award submittals do not replace RFPQ requirements.

.4 Review and coordinate each submittal before submission. Identify deviations from the Contract Documents, field assumptions and any effect on existing equipment, operation or PHSA infrastructure.

.5 Do not order or install work that depends on a pending technical submittal until the applicable review is complete. Review does not relieve the Contractor of responsibility for dimensions, compatibility and performance.

1.02 SHOP DRAWINGS AND PRODUCT DATA

.1 Submit controller and panel layouts, wiring and network diagrams, points lists, device and actuator schedules, equipment interfaces, power loads, product data and installation details for affected systems.

.2 Submit proposed sequences, setpoints, alarm matrix, graphics, trend and schedule configuration, integration matrix, licences and staged cutover and rollback procedures.

.3 Show existing-to-remain, new, modified and removed components distinctly. Confirm field dimensions, power, communication ports, signal types and access before fabrication.

.4 Provide manufacturer documentation and evidence of required certification or engineering review where indicated by the Contract Documents or applicable authority.

.5 Submit shop drawings within seven days of Contract award in accordance with M0.1 General Note 29. Include the coordinated submittal schedule and existing-conditions verification for the submitted work. Allow at least five business days for each review cycle and time for corrections and resubmission before fabrication and installation. Following completion of the applicable review, execute purchase orders within two days as required by M0.1 General Note 30, unless otherwise directed by the Owner. Identify unresolved conditions and affected items before releasing procurement.

1.03 TEST AND CLOSEOUT SUBMITTALS

.1 Submit inspection, calibration, point-to-point, functional and integrated test procedures before testing; submit completed records and deficiency corrections afterward.

.2 Submit record drawings, editable programs and sequences, database and configuration backups, graphics, manuals, licences, passwords through an approved secure method, training records and warranties under Section 01 78 00.

1.04 SUBMITTAL IDENTIFICATION

.1 Identify each submission by project, section, equipment or system, revision and date. Maintain a revision log and clearly identify changes on resubmission.

.2 Provide searchable electronic files in PHSA-approved formats. Include native editable files where required for continued Owner maintenance.

END OF SECTION

1 GENERAL

1.01 OCCUPIED HEALTHCARE FACILITY

.1 Maintain Victoria Cancer Centre operations during the Work. Coordinate occupied clinical and support-area access through the project MDT under Section 01 31 19, including Island Health FMO, IPAC, Clinical Operations and Centre Services, with PHSA FMO/IT and other affected stakeholders as required.

.2 Submit a site-specific work plan identifying every clinical and support area requiring access, work activities and phasing, anticipated impacts, preventive measures, noise and dust controls, barriers, material/waste routes, working hours, temporary arrangements, daily restoration, communication, responsible contacts and recovery/return-to-service procedures. Coordinate review through the Owner/project MDT before applicable work.

1.02 INFECTION PREVENTION AND CONTROL

.1 Comply with CSA Z317.13:22, Infection control during construction, renovation, and maintenance of health care facilities, including applicable amendments, and the Owner/PHSA and Island Health site procedures.

.2 The lead Contractor shall develop the project-specific PMA, including the infection-control risk assessment, and IPAC plan and coordinate review through the project MDT with IPAC participation before applicable work. Identify the preventive measures, inspections, monitoring, responsibilities, communication and release hold points for each work area and stage.

.3 The Contractor shall implement, maintain and verify all preventive measures established by the reviewed PMA and IPAC plan for the duration of applicable work. Provide role-appropriate IPAC training and site briefings for supervisors, subcontractors and other workers; maintain evidence of training and communicate plan changes.

.4 Do not commence ceiling access, above-ceiling work or other activities that may release contamination until the applicable PMA/IPAC plan has been reviewed through the MDT process and all required preventive measures and authorizations are in place. Comply with the appended Island Health ceiling-space procedure.

.5 Reassess preventive measures through the MDT when work activities, location, phasing or site conditions change in a way that may alter infection-control risk. Establish revised measures and communicate them to affected workers before proceeding.

.6 Protect occupied clinical areas, patients, equipment, supplies, materials and HVAC openings/systems from construction dust and contamination in accordance with the PMA/IPAC plan. Coordinate air-system isolation and effects on ventilation, airflow and required room-pressure relationships with the Owner/project MDT and IPAC as applicable.

.7 Stop affected work and promptly notify the Owner/project MDT when required preventive measures fail, dust migrates outside the controlled area, or unexpected conditions may have infection-control implications. Secure the area, implement agreed interim measures and coordinate risk assessment with IPAC and relevant subject-matter experts. Restore required measures and obtain the required MDT review and Owner authorization before resuming affected work.

.8 Comply with the appended Island Health Infection Control Guidance Document 2 and Standard Operating Procedure 9 together with the project PMA/IPAC plan. Resolve conflicting requirements through the Owner/project MDT before affected work. Use the project-specific risk assessment to determine detailed preventive measures.

1.03 SHUTDOWNS AND CRITICAL ENVIRONMENT

.1 Submit a shutdown, cutover and recovery plan for each affected system identifying duration, clinical/support areas, ventilation and pressure impacts, temporary operation/monitoring, alarm paths, staff and IPAC communication, independent readings, test/release criteria, rollback and failure escalation. Coordinate review through the Owner/project MDT before implementation.

.2 Obtain PHSA authorization before changing automatic controls, disconnecting points, altering network services or interrupting equipment. Coordinate after-hours work and vendor attendance as required.

.3 Maintain required temperature, humidity, ventilation, airflow and pressure relationships in all affected clinical areas within Owner-confirmed criteria. Provide approved temporary controls/monitoring and notification where a control or alarm path is interrupted. Coordinate clinical impacts and preventive measures with the MDT/IPAC.

.4 Coordinate ventilation, airflow and room-pressure impacts in all affected clinical areas with the Owner and project MDT, including IPAC as applicable. Follow the reviewed recovery protocol, record independent environmental readings and restore required control and alarm functions before return to service. Following a failure, obtain the MDT/IPAC risk review and required Owner authorization before resuming affected work or releasing the space.

.5 Complete Contractor construction cleaning and the required inspections before turnover for terminal cleaning. The Owner's team will perform terminal cleaning. Coordinate access and timing with the Owner/MDT/IPAC, maintain protective measures until authorized removal, and obtain Owner clinical return-to-service authorization before reoccupation. Contractor construction cleaning is specified in Section 01 74 11.

1.04 PROTECTION AND RESTORATION

.1 Protect existing finishes, furnishings, equipment, cable pathways and fire separations. Reinstate penetrations, insulation, vapour barriers and access panels disturbed by the Work.

.2 Use the Owner permit procedure for hot work and fire system isolation. Coordinate temporary impairment and reinstatement with the responsible fire and life-safety personnel.

END OF SECTION

1 GENERAL

1.01 HEALTH AND SAFETY PLAN

.1 Prepare and implement a site-specific health and safety plan before field work. Address electrical and control-panel work, lockout, working at height, ceiling access, material handling, hot work, occupied-area separation and emergency response.

.2 Assess hazards for each stage and brief personnel and subcontractors. Provide documented, role-appropriate infection-control training and site orientation under CSA Z317.13, the PMA/IPAC plan and Section 01 35 13. Maintain training, supervision, inspection and safety records; do not rely on a general reference to CSA certification as evidence of a particular personal credential.

.3 Coordinate the plan with PHSA site rules, infection prevention and control measures and the access and shutdown procedures in Section 01 35 13.

1.02 ELECTRICAL AND CONTROL SYSTEM SAFETY

.1 Identify power sources and stored energy before work on panels, actuators or equipment. Apply the approved lockout and verification procedure and coordinate with PHSA FMO.

.2 Protect independent equipment safeties, fire alarm and smoke control interfaces. Do not leave a clinical system in an unapproved manual or bypassed condition.

1.03 HAZARDOUS MATERIALS AND INCIDENTS

.1 If suspect hazardous material or an unanticipated unsafe condition is encountered, stop affected work, secure the area and notify the designated PHSA representative for direction.

.2 Report incidents, near misses and damage under the Owner procedure and applicable requirements. Maintain access for emergency responders and provide contact information for each work shift.

2 PRODUCTS

2.01 NOT USED

.1 Not used.

3 EXECUTION

3.01 NOT USED

.1 Not used.

END OF SECTION

1 GENERAL

1.01 APPLICABLE REQUIREMENTS

.1 Perform the Work in accordance with the laws, adopted building and electrical codes, safety requirements, permits and authority directions applicable to the installation at the time of construction.

.2 Comply with CSA Z317.13:22, Infection control during construction, renovation, and maintenance of health care facilities, including applicable amendments, and the Owner/PHSA and Island Health site procedures. Coordinate BMS/mechanical work with applicable healthcare ventilation, fire/life-safety, electrical and communications requirements. Apply the project PMA and IPAC plan under Section 01 35 13.

.3 Where requirements conflict, notify the Consultant and PHSA before proceeding with the affected work. Do not alter a listed or regulated assembly without the required authorization.

1.02 PERMITS AND INSPECTIONS

.1 Obtain permits and arrange inspections assigned to the Contractor by the Contract Documents. Provide records of approvals and test certificates at closeout.

.2 Coordinate shutdowns, fire system impairments, electrical connections and network access with PHSA and the responsible authorities or service providers.

2 PRODUCTS

2.01 NOT USED

.1 Not used.

3 EXECUTION

3.01 NOT USED

.1 Not used.

END OF SECTION

1 GENERAL

1.01 QUALITY CONTROL PLAN

.1 Submit a quality-control plan identifying responsible personnel, installation inspections, calibration instruments, testing, records and hold points. Include the preventive-measure checks, inspections, monitoring, deficiencies, corrective action and releases required by the PMA/IPAC plan under Section 01 35 13.

.2 Verify materials and installations against approved submittals, manufacturer instructions and the Contract Documents. Record field discrepancies and proposed corrections before concealing or energizing affected work.

1.02 INSPECTION AND TESTING

.1 Inspect panel fabrication, labelling, terminations, grounding, device mounting, firestopping and network cabling before operation.

.2 Perform point-to-point checks, calibration, controller I/O verification, sequence tests, alarms, trends, graphics and interfaces to existing systems designated to remain for every transferred system.

.3 Coordinate functional tests and interruption simulations with Owner FMO, clinical staff and the MDT/IPAC as applicable. Verify required preventive measures and environmental conditions, record actual results and observe the approved recovery and return-to-service hold points.

.4 Provide testing instruments with suitable accuracy and current calibration evidence. Record actual readings and outcomes; correct deficiencies and repeat failed tests.

1.03 DEFICIENCIES AND ACCEPTANCE

.1 Maintain a deficiency log with owner, corrective action and retest result. Do not treat temporary operation or incomplete alarm delivery as final acceptance.

.2 Submit completed test and commissioning forms under Section 01 91 33 and final records under Section 01 78 00.

2 PRODUCTS

2.01 NOT USED

.1 Not used.

3 EXECUTION

3.01 NOT USED

.1 Not used.

END OF SECTION

1 GENERAL

1.01 PRODUCT SELECTION

.1 Provide new, current, manufacturer-supported products suitable for the application and supported throughout the five-year service and support period. Submit lifecycle, update, parts and migration information under Section 25 05 00.

.2 Verify compatibility among the new BACnet/IP controllers, the Owner's existing BMS, retained controls, mechanical equipment, field-device signals, power supplies and communication networks.

.3 Provide all licences, drivers, accessories, mounting hardware, power components and software required for the functions shown in the Contract Documents.

.4 Submit a compliance comparison covering performance, existing 2021 Siemens BMS integration, BACnet interoperability, expansion, cybersecurity, licences, Owner access, lifecycle and service. New products/installers are not restricted to a named manufacturer; demonstrate compliance and provide required integration. Follow Owner procurement documents for RFPQ eligibility, acceptance and substitutions.

.5 Include the one-year comprehensive warranty and five-year service fees in the Contract price. Itemize annual fees and non-warranty repair rates under Section 25 05 00.

1.02 EXISTING PRODUCTS AND REUSE

.1 Retain HVAC equipment. Replace sensors designated for replacement on the Drawings and sensors within the Work that are incompatible or unsuitable for the new controls. Test actuators, retained sensors, wiring and enclosures proposed for reuse and record condition, signal, accuracy, capacity and accessibility.

.2 Do not rely on unavailable spare controller capacity, Owner licences, network ports or proprietary access without verification and PHSA approval.

1.03 DELIVERY STORAGE AND HANDLING

.1 Deliver products in protective packaging with labels and instructions. Store in secure, dry conditions within manufacturer limits and Owner-approved areas.

.2 Protect electronic components against moisture, dust, impact and electrostatic damage. Replace damaged products before installation.

2 PRODUCTS

2.01 NOT USED

.1 Not used.

3 EXECUTION

3.01 NOT USED

.1 Not used.

END OF SECTION

1 GENERAL

1.01 CLEANING DURING CONSTRUCTION

.1 Control construction dust/debris and keep work areas, routes, equipment rooms and affected clinical spaces clean under CSA Z317.13, the PMA/IPAC plan, Section 01 35 13 and applicable Owner/site procedures. Implement the construction cleaning and contamination-control measures established for each work stage.

.2 Protect open panels, ducts, sensors, network equipment, furnishings and clinical equipment from dust and construction materials. Remove waste by approved routes and at agreed times.

.3 Clean at the end of each work shift and before removing temporary barriers. Do not release dust into occupied areas or use building air systems for construction cleanup.

1.02 FINAL CLEANING

.1 Remove temporary labels, packaging, surplus materials and construction debris from affected areas. Clean exposed new equipment and restore access and finishes.

.2 Complete Contractor construction cleaning, removal of construction residue and required inspections before turnover to the Owner's team for terminal cleaning. The Owner's team performs terminal cleaning. Coordinate timing and access with the Owner/MDT/IPAC, maintain preventive measures until authorized removal and obtain Owner clinical return-to-service authorization before reoccupation.

2 PRODUCTS

2.01 NOT USED

.1 Not used.

3 EXECUTION

3.01 NOT USED

.1 Not used.

END OF SECTION

1 GENERAL

1.01 WASTE MANAGEMENT PLAN

.1 Submit a plan for segregating, storing, transporting and disposing of waste generated by the BMS upgrade. Identify expected electronic controls, panels, cable, metal, packaging, batteries and any regulated material.

.2 Use licensed facilities and keep required manifests or receipts. Follow applicable requirements for electronic waste and batteries.

.3 Coordinate contained waste handling, storage, approved routes, collection timing and cleaning with PHSA and the PMA/IPAC plan under Section 01 35 13. Maintain clinical access, exits and preventive measures; comply with applicable appended Island Health guidance.

1.02 EXISTING EQUIPMENT AND DATA

.1 Identify removed controllers, workstations, drives and media that may contain configuration, credentials, historical data or network information. Obtain PHSA direction for return, secure erasure or disposal before removal from site.

.2 Return equipment designated for Owner retention with an inventory and condition record. Dispose of remaining materials through the approved waste stream.

2 PRODUCTS

2.01 NOT USED

.1 Not used.

3 EXECUTION

3.01 SITE HANDLING AND RECORDS

.1 Keep waste contained and remove it regularly. Do not use Owner disposal containers unless authorized.

.2 Submit a final inventory of removed equipment and available disposal and recycling records at closeout.

END OF SECTION

1 GENERAL

1.01 RECORD DOCUMENTS

.1 Maintain current marked-up drawings and point schedules during the Work. Submit final record plans, control schematics, panel and terminal diagrams, network topology, device locations and cable and port schedules.

.2 Identify new, removed and reused components, retained controls and the Owner BMS, final interface boundaries and evidence that the transferred functions operate without the failed NCM-1 or the legacy controllers replaced under this Contract.

.3 Provide Owner/FMO and its authorized service provider with native editable controller applications, graphics and databases, complete recoverable backups, administrative and engineering credentials, and the programming, diagnostic, download and restoration tools and licences required to maintain and modify the delivered Work. Disclose licence duration, renewal charges, transfer restrictions and vendor dependencies before product acceptance; licence terms shall not defeat the specified access. Transfer credentials through the Owner-approved secure method.

1.02 OPERATING AND MAINTENANCE INFORMATION

.1 Provide equipment manuals, product data, software and firmware versions, licence entitlements, support contacts, maintenance and calibration instructions and replacement procedures for installed components.

.2 Include approved test and commissioning records, deficiencies and resolutions, training materials and an inventory of spare parts and special tools supplied.

.3 Document routine operation, alarm response, point override, backup and restoration of the delivered controller and BMS integration work and its interfaces to retained systems.

1.03 CREDENTIALS WARRANTIES AND HANDOVER

.1 Demonstrate that Owner/FMO or its authorized service provider can use the delivered tools and licences to diagnose, edit, download, back up and restore representative controller and management-level Work. Deliver all native source files, credentials, software versions and restoration instructions required for this demonstration.

.2 Provide the one-year comprehensive warranty and separate five-year service and support commitment required by Section 25 05 00. Identify commencement/expiry dates, warranty coverage, annual inspection schedule, included updates/licences and fixed-fee services, 24/7 contacts, 30-minute response and requested 60-minute on-site attendance, escalation, named service lead/alternate, parts sources and service records. Include the tendered annual fees, non-warranty repair rates and post-service-term charges. Deliver required Owner licences, credentials, source files and engineering/backup tools at handover; do not defer access until the service term ends.

.3 Complete demonstrations under Section 01 79 00 and deliver final records before requesting acceptance, subject to any PHSA-approved outstanding items.

END OF SECTION

1 GENERAL

1.01 TRAINING PLAN

.1 Submit a role-based training agenda and schedule for Island Health FMO, PHSA FMO/IT and designated operators and maintainers. Include operator, engineering/programming and administrator instruction using the installed system, delivered tools, licences, native applications and closeout manuals.

.2 Coordinate sessions after successful functional testing and before handover, with access to the affected graphics, controllers and interfaces.

1.02 OPERATOR INSTRUCTION

.1 Demonstrate navigation, point status and commands, schedules, overrides, alarm acknowledgment and escalation, trend review, reports and procedures for responding to communication or sensor faults.

.2 Explain the affected NCM-1 replacement architecture, integration into the Owner’s existing BMS, retirement of the replaced legacy functions, boundaries with retained controls and independent clinical monitoring.

.3 Demonstrate the approved start, stop, seasonal changeover and fallback procedures for each affected system without disturbing critical environmental conditions.

1.03 MAINTENANCE AND IT INSTRUCTION

.1 Demonstrate diagnostics, engineering access, editing/download of representative delivered applications, calibration, complete backups/restoration, licence/credential administration, interface recovery and support escalation. Demonstrate how to maintain and extend the delivered Work through the existing 2021 Siemens front end without altering unaffected systems.

.2 Provide training materials, attendance and a record of questions and follow-up actions. Update manuals to reflect clarified procedures.

2 PRODUCTS

2.01 NOT USED

.1 Not used.

3 EXECUTION

3.01 NOT USED

.1 Not used.

END OF SECTION

1 GENERAL

1.01 SUMMARY

.1 Provide coordinated commissioning for the affected NCM-1 legacy control replacement and the interfaces indicated on the Drawings. Verify all transferred components, sequences, alarms, graphics, trends and interfaces against the Contract Documents.

.2 Apply this Section to the defined replacement work and its required HVAC, existing BMS, retained-control and independent clinical monitoring interfaces.

.3 Section 25 01 11 specifies the BMS start-up and functional tests. This Section establishes responsibilities, scheduling, records, witnessing, deficiencies and completion requirements without repeating the detailed test procedures.

1.02 RELATED REQUIREMENTS

.1 Section 01 32 16 – Construction Progress Schedule.

.2 Section 01 35 13 – Special Project Procedures.

.3 Section 01 45 00 – Quality Control.

.4 Section 01 91 33 – Commissioning Forms.

.5 Section 01 78 00 – Closeout Submittals.

.6 Section 01 79 00 – Demonstration and Training.

.7 Section 25 01 11 – EMCS Start-up, Verification and Commissioning.

.8 Drawing requirements for airflow verification and any separately specified testing, adjusting and balancing work.

1.03 RESPONSIBILITIES AND COORDINATION

.1 The Contractor shall manage and perform its start-up, prefunctional checks, point verification, functional tests, integration tests, deficiency correction and records through qualified personnel and the responsible equipment suppliers.

.2 Designate a commissioning lead to coordinate the mechanical, automation, electrical, network and equipment vendor work. Maintain one current schedule, test register and deficiency log for the affected systems.

.3 PHSA FMO, PHSA IT, affected clinical departments, the Consultant and any PHSA-appointed commissioning representative may review plans and witness designated tests. Coordinate their involvement under the approved procedures; Contractor testing responsibilities remain with the Contractor. Include Island Health FMO and the project MDT/IPAC for affected clinical work under Section 01 35 13.

.4 Arrange any authority or manufacturer witnessing required for regulated equipment or life-safety interfaces under the applicable separate procedures. Do not change independent equipment safeties or fire and smoke functions as part of an unapproved BMS test.

1.04 PLAN SCHEDULE AND SUBMITTALS

.1 Submit a commissioning plan and schedule before site cutover. List affected systems and rooms, test stages and dependencies, prerequisites, responsible personnel, proposed outage windows, temporary control and monitoring, environmental limits, witness points, rollback actions and completion records.

.2 Coordinate the schedule with construction, access, infection prevention and control measures, Pharmacy operations, seasonal changeover, network changes, equipment vendors and the testing and balancing work, where applicable. Allow time for correction and retesting.

.3 Submit test scripts with expected results and acceptance criteria for review before testing. Provide a point and sequence traceability matrix, calibrated instrument list and the forms required by Section 01 91 33.

.4 Provide notice of tests in accordance with the PHSA-approved schedule and site procedures. Obtain authorization before interrupting control, monitoring, alarms, network services or HVAC equipment serving occupied areas.

2 PRODUCTS

2.01 NOT USED

.1 Not used.

3 EXECUTION

3.01 PRECOMMISSIONING REVIEW

.1 Before a system test, verify approved drawings, point schedules and sequences, installation completion, manufacturer start-up, power and network readiness, device calibration, equipment safeties, record backups and proposed temporary arrangements.

.2 Record baseline operation and independent environmental conditions for designated critical spaces. Resolve defects that could prevent safe and repeatable testing before proceeding.

.3 Use instruments with current calibration and accuracy suited to the acceptance limits. Document instrument identification and actual readings; do not rely solely on an unverified BMS displayed value for critical-space performance.

3.02 TESTING AND PERFORMANCE VERIFICATION

.1 Perform start-up, point-to-point, functional and integrated tests under Section 25 01 11 for every transferred system. Test interactions with retained controls and clinical alarm paths; demonstrate independence of the transferred functions from the failed NCM-1 and replaced legacy controllers.

.2 Use actual conditions where safely achievable. Where a seasonal mode, fault or critical-space event cannot be produced without unacceptable disruption, use an approved simulation and record the method and limitations. Complete deferred seasonal verification at the time agreed with PHSA.

.3 Verify control of temperature, humidity, pressure and airflow in designated spaces against PHSA-confirmed criteria. Coordinate targeted testing and balancing where the Work alters mechanical performance.

.4 Document tests on approved forms with the preconditions, commands, expected and actual results, instrument readings, witness names, deficiencies and retests. Provide trend records as supporting evidence where appropriate.

3.03 DEFICIENCIES AND REVERIFICATION

.1 Maintain a deficiency log identifying the affected system and space, impact on clinical operation, corrective action, responsible party and retest result. Notify PHSA promptly of any issue affecting environmental control or alarm delivery.

.2 Correct deficiencies and repeat the failed tests and related integrated tests affected by a programming, wiring, device or interface change. Update test forms and the configuration change log after each correction.

.3 If a test places a critical condition outside the approved limit, stop the affected activity, apply the agreed temporary or rollback arrangement and coordinate resumption with PHSA FMO and affected staff. Coordinate ventilation, airflow and room-pressure impacts in all affected clinical areas with the Owner and project MDT, including IPAC as applicable. Follow the reviewed recovery protocol, record independent environmental readings and restore required control and alarm functions before return to service. Following a failure, obtain the MDT/IPAC risk review and required Owner authorization before resuming affected work or releasing the space.

3.04 COMPLETION AND HANDOVER

.1 Leave tested systems in the approved normal operating mode with temporary bypasses removed or expressly documented and accepted by PHSA. Verify that alarms, trends, schedules and the designated operator interface remain operational.

.2 Submit signed commissioning forms, a summary of results and unresolved items, final settings, calibration and trend records, approved seasonal test arrangements, updated programs and backups, and record documents under Section 01 78 00.

.3 Complete demonstrations and training under Section 01 79 00. Request review of completion when the specified tests have passed, required records are delivered and remaining items, if any, are identified for PHSA consideration under the Contract.

.4 Verify delivery of the one-year comprehensive warranty, separate five-year service and support commitment, annual inspection plan, 24/7 contacts and documented response/mobilization arrangements before handover. Verify the included service scope and non-warranty repair rates under Section 25 05 00. Coordinate environmental release and Owner terminal cleaning under Section 01 35 13. Do not create a clinical emergency to test a service-response commitment.

END OF SECTION

1 GENERAL

1.01 FORM REGISTER AND CONTENT

.1 Submit a register of installation, start-up, point-to-point and functional verification forms for each affected NCM-1 replacement system, controller and required interface.

.2 Identify equipment and point IDs, test date, technician, reference instruments, preconditions, command, expected result, actual measured result, status, deficiency and retest.

.3 Use manufacturer checklists where suitable and supplement them with project-specific requirements for the installed equipment and control sequences.

1.02 INSTALLATION AND POINT VERIFICATION

.1 Record panel and device installation checks, power and network tests, sensor calibration, actuator stroke, I/O terminals, scaling, engineering units, alarms and graphic display.

.2 Verify every affected physical point from field device through controller to the designated operator interface. Record evidence for reused devices as well as new devices.

1.03 FUNCTIONAL AND INTEGRATED VERIFICATION

.1 Prepare forms for modes, schedules, interlocks, safeties, sensor and network faults, power restoration, critical-space alarms, trends, interfaces to retained systems and decommissioning of the replaced legacy controls.

.2 Document approved temporary monitoring, permitted test conditions and environmental readings before and after each cutover stage.

.3 Record the MDT/IPAC prerequisites and preventive-measure/environmental checks applicable to the test, failure/recovery actions and required Owner release. Include documented interoperability, capacity, Owner engineering-access and representative edit/download/backup/restore results at the existing 2021 Siemens BMS.

.4 Record deficiencies, corrective action and successful retest. Provide completed signed forms to PHSA and include them in the closeout package.

2 PRODUCTS

2.01 NOT USED

.1 Not used.

3 EXECUTION

3.01 NOT USED

.1 Not used.

END OF SECTION

1 GENERAL

1.01 SUMMARY

.1 Provide HVAC interface work required for replacement of the affected NCM-1 legacy controls. Include mechanical connections, access, selective removal, restoration and verification for the systems and equipment indicated on the Drawings and points schedules. Retain all HVAC equipment.

.2 Coordinate the defined control and field-interface modifications with the retained HVAC equipment and the drawings. Identify the responsible trade for each affected connection and preserve independent equipment safeties.

1.02 RELATED REQUIREMENTS

.1 Section 01 91 13 – General Commissioning Requirements.

.2 Section 25 05 00 – Common Work Results for Integrated Automation.

.3 Section 25 05 53 – Identification for Integrated Automation.

.4 Section 25 30 00 – Integrated Automation Instrumentation and Terminal Devices.

.5 Section 25 41 00 – Building Automation Controllers.

.6 Drawing and Contract requirements for power supplies, electrical interfaces and equipment connections.

.7 Island Health Infection Control Guidance Document 2 – Cleaning and Transporting Tools and Equipment

.8 Island Health Infection Control Standard Operating Procedure 9 – Electrical or Data Pulling within Ceiling Spaces

1.03 EXISTING CONDITIONS AND COORDINATION

.1 Verify each HVAC system within the defined Work, including controls, safeties, sensors, valves, dampers, actuators, starters, wiring and access, against available records and installed conditions before modification.

.2 Document equipment and components to remain, to be reused, to be disconnected, and to be replaced. Report discrepancies that affect operation, scope or access to the Consultant and Owner before proceeding.

.3 Coordinate HVAC work with Division 25, the electrical work, PHSA FMO, Owner IT and affected departments. Maintain independent equipment protection and life-safety functions.

.4 Coordinate access, permits, infection prevention and control, noise and dust restrictions, and work in occupied clinical spaces with the Owner. Comply with the site-specific work plan, Preventive Measures Analysis (PMA), IPAC plan and multidisciplinary team (MDT) coordination requirements in Section 01 35 13. Establish the required preventive measures before applicable work, including ceiling access and above-ceiling work.

1.04 CONTINUITY OF HVAC SERVICE

.1 Plan work so that HVAC equipment and environmental monitoring remain operational during each stage. Do not interrupt a system without an Owner-approved shutdown and changeover plan.

.2 Identify the equipment and spaces affected by each interruption, planned duration, temporary control and monitoring provisions, communications to staff, restoration criteria and fallback procedure.

.3 Protect required environmental conditions in Pharmacy and other critical areas during installation, testing and seasonal changeover. Coordinate any temporary control, alarm or independent monitoring arrangement with PHSA FMO.

1.05 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit product data for replacement HVAC interface components and field devices within this Work, including performance, signal, power, fail position and compatibility with the controlled equipment.

.2 Submit coordinated control and mechanical interface drawings identifying existing and new devices, location and access, valve and damper arrangements where affected, safeties, interlocks and required restoration.

.3 Submit an existing-condition and proposed-reuse schedule for affected field devices. Include test results and proposed correction for devices that are failed, unsuitable or inaccessible.

.4 Submit system-by-system shutdown, temporary operation and restoration plans before work affecting clinical service.

.5 Submit procedures for targeted verification and any testing, adjusting and balancing required because a mechanical component or control function has changed.

1.06 CLOSEOUT SUBMITTALS

.1 Provide record drawings and schedules for mechanical and control interface changes, including final device locations, connection details, control schematics and equipment designations.

.2 Provide product information, maintenance requirements, final settings, calibration and functional test reports for the components installed or modified under this Section.

.3 Document deficiencies, corrective actions and any temporary operation arrangements remaining at handover.

1.07 QUALITY ASSURANCE

.1 Use personnel qualified for the equipment and work involved. Coordinate required manufacturer start-up or service work with the controls integrator and PHSA FMO.

.2 Protect existing equipment and finishes. Verify that proposed reuse does not impair safe operation or the specified control sequence.

2 PRODUCTS

2.01 MATERIALS AND COMPONENTS

.1 Provide new mechanical interface materials and replacement devices suitable for the existing service, operating range, environment and control signal, unless specific existing components are approved for reuse.

.2 Match required actuator torque, valve close-off pressure, damper fail position and other application parameters to the installed equipment and approved control sequence.

.3 Maintain access to components requiring inspection, calibration, maintenance or replacement. Provide identification in accordance with Section 25 05 53.

3 EXECUTION

3.01 INSTALLATION AND RESTORATION

.1 Isolate affected equipment and verify safe conditions before removal or connection. Label and protect existing devices and connections that are to remain.

.2 Install or reconnect devices without impairing equipment safeties, smoke and fire control functions, service clearances, duct integrity or pipe insulation.

.3 Restore insulation, vapour barriers, finishes, firestopping and access provisions disturbed by the Work to their prior function and rating. Clean the affected work areas and equipment surfaces.

.4 Remove redundant components only where shown or approved. Preserve records and components needed for the approved fallback during changeover.

3.02 STARTUP AND VERIFICATION

.1 Verify mechanical operation before and after BMS changeover, including valve and damper stroke, fail action, fan and pump operation, safeties, interlocks and the response of affected field devices.

.2 Coordinate point-to-point and functional testing with Division 25. Demonstrate normal, alarm, failure and restart operation of affected systems under the approved sequences.

.3 Perform targeted testing and balancing where the Work alters airflow, water flow or pressure relationships. Record final values and obtain Owner review of critical space conditions before handover. Coordinate ventilation, airflow and room-pressure impacts in all affected clinical areas with the Owner and project MDT, including IPAC as applicable. Follow the reviewed recovery protocol, record independent environmental readings and restore required control and alarm functions before return to service. Following a failure, obtain the MDT/IPAC risk review and required Owner authorization before resuming affected work or releasing the space.

3.03 AIRFLOW VERIFICATION

.1 Verify and document minimum and maximum airflow, damper travel and associated pressure readings at every terminal affected by the controls replacement, including new flow-sensor calibration and controller scaling. Use calibrated instruments and personnel experienced in terminal airflow measurement and balancing. Compare results with the issued terminal airflow schedule, identify discrepancies and repeat checks after corrections. Alter retained mechanical balancing only with Owner authorization; provide final readings for each affected terminal.

END OF SECTION

1 GENERAL

1.01 SUMMARY

.1 Selectively disconnect and remove the affected NCM-1 legacy control components and associated interfaces identified on the Drawings. Coordinate the demolition schedule with Division 25; retain HVAC equipment and field devices designated to remain. Replace sensors as indicated or required for compatibility within the defined Work.

.2 Protect HVAC equipment, independent clinical monitoring, life-safety functions, the Owner's existing BMS and controls outside the replacement scope. Do not remove an active control component within the Work until its functions have been transferred and verified or an approved temporary arrangement is operating.

.3 Coordinate removal of control wiring, power, network components and panels with Division 25 and the electrical work. Do not duplicate removal or leave disconnected services without an identified responsible trade.

1.02 RELATED REQUIREMENTS

.1 Section 23 05 00 – Common Work Results for HVAC.

.2 Section 01 35 13 – Special Project Procedures.

.3 Section 01 74 21 – Construction and Demolition Waste Management.

.4 Section 25 05 00 – Common Work Results for Integrated Automation.

.5 Section 25 41 00 – Building Automation Controllers.

.6 Drawing and Contract requirements for electrical demolition and disconnections.

1.03 SUBMITTALS AND COORDINATION

.1 Survey the affected NCM-1 control systems before removal. Submit marked-up plans and panel and device schedules showing items to remove, reuse, reinstall or turn over to PHSA and all retained equipment. Identify the system served, location, terminal or point ID, function and responsible trade.

.2 Submit a staged demolition and cutover plan for the defined Work showing isolation points, outage duration, affected areas, clinical constraints, temporary control and alarm monitoring, protection of retained systems, rollback steps and restoration tests.

.3 Record available Johnson Controls programs, point mappings, graphics, settings and relevant device data before disconnection. Arrange authorized access or service support needed for safe migration and decommissioning.

.4 Coordinate access, work hours, infection prevention and control measures, permits, shutdown approval and witness points with PHSA Facilities Maintenance and Operations (FMO) and affected departments before starting disruptive work. Comply with the site-specific work plan, Preventive Measures Analysis (PMA), IPAC plan and multidisciplinary team (MDT) coordination requirements in Section 01 35 13. Establish the required preventive measures before applicable work, including ceiling access and above-ceiling work.

1.04 EXISTING CONDITIONS

.1 Verify installed conditions and the status of temporary repairs or controls. Report discrepancies from the drawings and any unidentified connection affecting occupied areas before disconnection.

.2 If suspect hazardous material or another unanticipated condition is encountered, stop the affected work, protect the area and notify PHSA for direction under the applicable project procedures.

2 PRODUCTS

2.01 REPAIR MATERIALS

.1 Provide compatible materials needed to cap, make safe, support and restore affected mechanical connections and assemblies. Match the performance and appearance of adjacent construction designated to remain.

.2 Use approved materials and methods to reinstate insulation, vapour barriers and fire-rated penetrations disturbed by the Work. Coordinate electrical and communications repairs with the responsible trade.

3 EXECUTION

3.01 PREPARATION AND PROTECTION

.1 Confirm the approved cutover stage and affected equipment with PHSA FMO. Identify power and control sources, apply the required isolation and verification procedures, and record baseline operation and environmental readings in critical spaces.

.2 Maintain required HVAC service, room conditions and alarm notification in Pharmacy and other designated critical areas. Provide approved temporary arrangements before removing a function needed for occupied operation.

.3 Protect existing equipment, controls, sensors, ducts, piping, ceilings, finishes, fire separations and clinical areas. Maintain approved egress and access routes and implement infection prevention and control containment.

3.02 SELECTIVE REMOVAL

.1 Label and document cables, tubing, terminals, devices and connections before disconnection. Remove the Johnson Controls components identified in the verified demolition schedule after their functions are transferred; make remaining equipment and circuits safe and functional at each work stage.

.2 Disconnect affected actuators, sensors, relays and control interfaces without damaging reusable devices or changing the operation of equipment to remain. Cap and support abandoned mechanical connections as approved; do not leave open or unsecured ports.

.3 Coordinate controller, wiring, communication and power removals with Division 25 and the electrical work. Preserve independent equipment safeties, fire and smoke interfaces and all retained controls.

.4 Protect items designated for reuse or PHSA retention. Inventory, label and deliver retained items to the PHSA-approved location with available configuration data and a condition record.

3.03 RESTORATION AND VERIFICATION

.1 Repair damage caused by selective removal and restore insulation, vapour barriers, firestopping, access panels and finishes. Remove obsolete labels associated with demolished components and update the affected identification and record drawings.

.2 Before ending each outage, verify with PHSA FMO that the transferred HVAC equipment, safeties, controls and alarm paths operate as intended. Record environmental readings, unresolved deviations and temporary arrangements. Coordinate ventilation, airflow and room-pressure impacts in all affected clinical areas with the Owner and project MDT, including IPAC as applicable. Follow the reviewed recovery protocol, record independent environmental readings and restore required control and alarm functions before return to service. Following a failure, obtain the MDT/IPAC risk review and required Owner authorization before resuming affected work or releasing the space.

.3 Remove waste by PHSA-approved routes and manage electronic equipment, batteries and data-bearing components under Section 01 74 21. Leave work areas clean and suitable for continued clinical operation.

END OF SECTION

1 GENERAL

1.01 SUMMARY

.1 Provide start-up, point verification, functional testing and integrated commissioning for replacement of the affected NCM-1 legacy controls and the required interfaces to retained systems. Demonstrate automatic control, operator monitoring, alarms, trends and schedules at the Owner's existing BMS.

.2 Commission the Work system by system during the approved staged cutover. Maintain required environmental control and notification in designated critical spaces. Verify every function within the replacement scope has transferred before decommissioning its legacy equipment.

.3 Coordinate testing with PHSA FMO, PHSA IT, affected clinical departments, authorized existing-system service personnel and equipment vendors as required by the approved test plan. Include Island Health FMO and the project MDT/IPAC for affected clinical work under Section 01 35 13.

1.02 RELATED REQUIREMENTS

.1 Section 01 35 13 – Special Project Procedures.

.2 Section 01 45 00 – Quality Control.

.3 Section 01 91 13 – General Commissioning Requirements.

.4 Section 01 91 33 – Commissioning Forms.

.5 Section 01 78 00 – Closeout Submittals.

.6 Section 25 05 00 – Common Work Results for Integrated Automation.

.7 Sections 25 17 00, 25 24 00, 25 41 00, 25 45 00 and 25 70 00 – Networks, architecture, controllers, management system and integration.

.8 Section 25 90 00 – Integrated Automation Control Sequences.

1.03 COMMISSIONING PLAN AND SUBMITTALS

.1 Before testing, submit a system-by-system plan identifying equipment and points, test sequence, preconditions, responsible personnel, proposed dates and outage windows, PHSA witness points, safe operating limits, temporary controls and monitoring, rollback steps, and required records.

.2 Submit point-to-point checklists, functional and integrated test scripts with expected results, and a matrix tracing each approved sequence, alarm, trend, schedule and interface requirement to its test. Identify any tests that require simulation rather than a physical interruption.

.3 Submit an instrument list with identification, ranges, accuracy and current calibration evidence appropriate to the measured parameter. Propose independent instruments for verification of critical temperature, humidity, pressure and airflow conditions.

.4 Give PHSA and the Consultant notice for review and witnessing in accordance with the approved schedule and site procedures. Obtain authorization before any test that could interrupt HVAC operation, clinical monitoring, network services or alarm delivery.

.5 Submit signed test records showing the actual results, instrument used, deficiencies, corrective actions and retests. Provide a final report summarizing tested functions, outstanding items, accepted settings and observed operating trends.

2 PRODUCTS

2.01 TEST EQUIPMENT

.1 Provide suitable calibrated test instruments, signal sources and communication tools to verify field-device accuracy, I/O, power, network operation and environmental conditions. Use instruments with accuracy sufficient to resolve the specified acceptance limits.

.2 Provide temporary recording or notification equipment approved by PHSA where an existing alarm or monitoring path is unavailable during cutover. Do not treat temporary instruments as permanent BMS points unless specifically included in the Work.

3 EXECUTION

3.01 PRECONDITIONS AND START-UP

.1 Verify approved submittals, drawing point schedules, sequences, network and power arrangements, manufacturer start-up requirements, field-device compatibility and interfaces to retained systems before energizing replacement controls.

.2 Back up accessible affected programs, graphics, databases and settings before modification. Identify records unavailable because of the NCM-1 failure and document current automatic, temporary or manual operation. Notify the Consultant/Owner of missing information affecting the issued sequence; do not treat operation of a failed controller or recovery of inaccessible data as an available baseline. Use the issued sequences and resolved design information for migration. Confirm the authorized outage, temporary measures and rollback procedure with FMO.

.3 Confirm independent equipment safeties and fire or smoke interfaces remain intact. Test regulated or life-safety functions only under the separately approved procedure with the responsible authority and system representative.

.4 Start up panels, controllers, power supplies, networks and software in accordance with manufacturer instructions. Resolve wiring, addressing, configuration and communication faults before functional testing.

3.02 POINT AND COMPONENT VERIFICATION

.1 Verify each affected physical input and output from the field device and terminal through the controller to the designated operator interface. Record point ID, location, signal and range, engineering units, scaling, command direction, normal state, alarm state and actual result.

.2 Calibrate or verify sensors against suitable independent instruments at representative operating values. Stroke actuators and verify end positions, fail action and equipment proof. Test reused devices and wiring to the same functional criteria as new components.

.3 Verify command and proof independently where both are scheduled. Check safety and interlock inputs without defeating the underlying protective function. Correct point naming, graphics, database mapping and discrepancies before proceeding.

3.03 FUNCTIONAL AND INTEGRATED TESTS

.1 Demonstrate approved sequences for each affected system under representative normal, occupied, unoccupied, manual and seasonal operating conditions, as applicable. Verify starts, stops, resets, setpoints, PID response, safeties, interlocks and recovery without introducing instability.

.2 Test critical alarms from field condition through controller, designated operator display and approved notification route. Verify alarm limits, priority, time stamp, acknowledgment and recovery; resolve repeated nuisance alarms before handover.

.3 Demonstrate schedules, trends, reports and graphics with correct equipment and room designations, units, status and historical records. Verify required retention and time synchronization under the approved architecture.

.4 Test the Owner BMS integration and retained-system interfaces for point mapping, read and write permissions, command priority, alarm ownership, schedules and loss or restoration of communications. Demonstrate that transferred functions do not require the failed NCM-1 or the legacy controllers replaced under this Contract.

.5 Verify the approved BACnet object/service matrix, command priorities and relinquish, alarm/event and schedule ownership, trends, time synchronization, stale-data response and recovery at the existing 2021 Siemens BMS. Record installed/used/unallocated capacity and demonstrate Owner/FMO engineering-tool access and representative application editing/download and complete backup/restoration under an approved non-disruptive procedure.

.6 Simulate representative sensor, controller, power, network and supervisory faults under an approved method. Verify the specified local fallback, independent safeties, alarms, controlled restart and restoration. Do not impose an unapproved failure condition on clinical spaces or equipment.

3.04 SPECIAL INTERFACE VERIFICATION

.1 Test every medical gas input, its assigned operator alarm and each corresponding EN-6 relay output, including the approved power/communication-loss response and nitrogen notification. Coordinate simulated alarms with the responsible primary alarm vendor and FMO.

.2 For each of the six LINAC cabinets, test temperature input, both fan commands and proofs, lead/lag changeover, high-temperature response, fan-failure changeover, pit-water alarm and operator notification. Confirm the actual cabinet and fan-pair mapping on the records.

.3 Verify every additional deck static-pressure input and each Phoenix interface at its source and final destination. Verify the existing generator alarm contacts, point definitions, controller connections, BMS annunciation and notification routing included by M0.1. Record the preserved action of retained controls and independent protective functions.

3.05 CLINICAL ENVIRONMENT AND CUTOVER

.1 Record independent environmental readings before and after each changeover stage in Pharmacy and other designated spaces. Demonstrate that the approved control and alarm functions are restored before removing temporary arrangements.

.2 Coordinate targeted airflow, water-flow or pressure verification with Division 23 where the Work changes control functions or mechanical components. Record actual values and compare them with PHSA-confirmed criteria; resolve discrepancies with PHSA before final setting.

.3 If a test result or environmental condition is unacceptable, stop the affected test, implement the approved fallback or rollback, notify PHSA FMO and document the event. Resume only after the cause and revised test conditions have been reviewed. Coordinate ventilation, airflow and room-pressure impacts in all affected clinical areas with the Owner and project MDT, including IPAC as applicable. Follow the reviewed recovery protocol, record independent environmental readings and restore required control and alarm functions before return to service. Following a failure, obtain the MDT/IPAC risk review and required Owner authorization before resuming affected work or releasing the space.

3.06 DEFICIENCIES AND COMPLETION

.1 Maintain a deficiency log by system, point and test. Correct faults, update programs and records, and repeat the affected tests, including related integrated functions where a change could alter their operation.

.2 Provide completed signed forms and the final commissioning report under Section 01 91 33 and final configuration, calibration, record drawings and backups under Section 01 78 00. Demonstrate operation and recovery to PHSA personnel under Section 01 79 00.

.3 Demonstrate stable automatic operation during functional and integrated testing through completion of commissioning. Verify the issued sequences, final accepted settings, alarm delivery and trend capture; document outages, environmental excursions and corrective actions. Correct deficiencies and repeat affected tests. Temporary operation, bypassed functions and incomplete alarm delivery do not constitute acceptance.

END OF SECTION

1 GENERAL

1.01 SUMMARY

.1 This Section establishes common requirements for replacement of the legacy Johnson Controls 2000 proprietary controls served by the failed NCM-1 at the Victoria Cancer Centre. Provide the control, monitoring, alarms, schedules, trends and operator functions for the equipment and points identified on the Drawings.

.2 Provide BACnet/IP controls integrated into the Owner's existing BMS for the affected Level 1 and Level 2 systems, medical gas and six LINAC cabinet interfaces, and existing generator alarm monitoring identified on the Drawings. Include verification, staged removal, required sensors and interfaces, wiring, programming, graphics, testing, commissioning, training and closeout.

.3 Maintain HVAC service and environmental monitoring during staged work. Retain HVAC equipment, the 2016 BACnet installation, NC-2 and Level 3 controls, unaffected controls, the existing Owner BMS and independent monitoring. Restrict changes to retained systems to the interfaces expressly identified on the Drawings.

.4 Coordinate the Work with the other Division 25 sections, mechanical and electrical work, Owner Facilities Maintenance and Operations (FMO), PHSA information technology (IT), Pharmacy and other affected clinical departments.

1.02 RELATED REQUIREMENTS

.1 Section 25 05 53 – Identification for Integrated Automation.

.2 Section 25 24 00 – Integrated Automation System Architecture Requirements.

.3 Section 25 30 00 – Integrated Automation Instrumentation and Terminal Devices.

.4 Section 25 41 00 – Building Automation Controllers.

.5 Section 25 45 00 – Centralized Building Management System.

.6 Section 25 70 00 – Integrated Automation Building Systems Integration.

.7 Island Health Infection Control Guidance Document 2 – Cleaning and Transporting Tools and Equipment

.8 Island Health Infection Control Standard Operating Procedure 9 – Electrical or Data Pulling within Ceiling Spaces

.9 The included Division 01 requirements for submittals, occupied-facility construction, commissioning, training, closeout and warranty apply to the Work. Coordinate with the Owner’s tender and contract documents.

1.03 DEFINITIONS AND LIMITS OF WORK

.1 BAS, BMS and EMCS refer to the building automation/management functions within the defined Work. Owner BMS, existing BMS and management platform mean the Siemens system installed in 2021, retained as the long-term management front end. New controller products remain subject to the manufacturer-neutral requirements of this specification. FMO includes the Owner-designated PHSA and Island Health maintaining organizations, as applicable to the affected location.

.2 Affected NCM-1 cutover system: A legacy Johnson Controls 2000 control function served by the failed NCM-1 and identified for replacement on the Drawings. This definition excludes other Johnson Controls installations and unlisted equipment.

.3 Existing-to-remain: HVAC equipment, the Owner's existing BMS, 2016 BACnet controls, NC-2 and Level 3 controls, other unaffected controls and independent monitoring. Protect their operation except at documented interfaces during an authorized changeover.

.4 BMS integrator: The Division 25 contractor or its designated specialist responsible for coordinated operation, interfaces, programming, graphics and testing of the installed BMS work. The Contractor remains responsible for this scope.

.5 Do not assume existing drawings, point lists, wiring or device conditions are complete or accurate. Verify connections and functions before disconnection, procurement and programming. Record discrepancies and seek direction where they affect the scope or clinical operation.

1.04 DESIGN BASIS AND PLATFORM REQUIREMENTS

.1 Provide current, manufacturer-supported replacement controllers and integration components meeting the specified functional, interoperability, cybersecurity, lifecycle and Owner-access requirements. Demonstrate full scheduled functionality at the existing 2021 Siemens BMS. New controllers may be from any manufacturer meeting these requirements; the named Siemens system identifies the retained integration target.

.2 Submit a migration plan for every point and operator function within the defined Work. Retain temporary control and monitoring during cutover. At completion, transferred functions shall operate without the failed NCM-1 or the legacy controllers replaced under this Contract; retain other existing BMS functions.

.3 The tender drawing basis is the nine-sheet mechanical set M0.1, M2.1-M2.4 and M3.1-M3.4, revision 2, issued for tender 30 October 2026. Use its point schedules, equipment details and schedule general notes to define the inventory and count each physical point once. Field verification confirms connections, compatibility and installed conditions; it does not authorize building-wide replacement. Submit discrepancies for written direction before affected procurement or demolition.

.4 Provide BAS monitoring and alarm annunciation for the existing generator alarm points associated with the affected system, as required by M0.1. Verify existing alarm contacts, point definitions, controller connections and notification routing before cutover. Retain independent generator controls, safeties and local alarms; generator plant replacement and changes to primary controls are not included.

1.05 ADMINISTRATIVE AND COORDINATION REQUIREMENTS

.1 Designate one BMS integrator and one site lead as points of contact for control interfaces, submittals, shutdowns, testing and deficiencies. Coordinate work by other trades needed to complete the BMS interfaces.

.2 Review available records, sequences, service reports, installed equipment and graphics with PHSA FMO. Survey panels, connected systems, power sources, networks, field devices and wiring within the defined Work before finalizing shop drawings. Report discrepancies without expanding the replacement boundary.

.3 Identify work, equipment or software already completed, supplied or programmed by PHSA or others. Document its status and incorporation in the Work without assuming that preliminary supplier recommendations define the tender scope.

.4 Coordinate BAS network addressing, communications, account privileges, time synchronization, remote access, backups and security settings with PHSA IT. Do not connect devices or enable remote access on a PHSA network before obtaining the required approvals.

.5 Coordinate access, infection prevention and control, dust and noise management, work permits, temporary controls and clinical constraints with the Owner. Submit proposed access and shutdown requirements sufficiently in advance for Owner review.

.6 Coordinate with mechanical and electrical contractors for safeties, interlocks, power, starters, equipment factory controls, control wiring and commissioning. Preserve independent life-safety and equipment-protection functions.

1.06 PHASING AND CONTINUITY OF OPERATION

.1 Submit a system-by-system phasing and cutover plan before disturbing existing controls. Identify affected equipment and spaces, expected duration, temporary control and monitoring arrangements, fallback procedure, staff notification, testing sequence and restoration criteria.

.2 Maintain required HVAC service and environmental conditions in occupied and clinically sensitive spaces during the Work. Coordinate temporary operation and monitoring with PHSA FMO and affected departments; do not rely on unmonitored manual operation where critical conditions could be missed.

.3 Do not interrupt equipment, alarms or monitoring without written Owner authorization for the particular shutdown. Perform work outside normal hours where directed by the approved shutdown plan.

.4 Provide a return-to-service check after each changeover, including control response, safeties, commands, local and remote indications, alarm delivery and trend collection. Restore the previous arrangement or implement the approved fallback if acceptance criteria are not met.

1.07 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit a coordinated submittal register and schedule before procurement. Submit equipment and software information, installation requirements and deviations from the Contract Documents for review.

.2 Submit an existing-conditions verification report for the defined Work identifying existing controllers, panels, equipment, physical and logical points, wiring, links, supplies and field devices, together with retained systems and interface boundaries. Distinguish observations from assumptions and discrepancies.

.3 Submit architecture showing new controllers, links, network components and integration into the existing Siemens BMS installed in 2021. Show retained systems, protocols, command/alarm ownership, security boundaries, verified existing capacity and required project licence/capacity additions. Retain existing front-end hosting and workstations; no new whole-building front end or replacement server is included.

.4 Submit floor plans and panel layouts showing controller locations, panel space, power source and circuit, network connection, existing devices to remain, devices to be replaced, demolition limits and new cable routes.

.5 Submit controller and points schedules for every affected NCM-1 cutover system and drawing interface. Identify point ID, equipment, physical or logical type, signal and range, alarms, trends, controller assignment, existing/new/reused status and spare capacity. Reconcile drawing and room schedules with field verification.

.6 Submit control schematics, wiring and interface details, safeties and interlocks, point-to-point termination schedules, network topology and product data for controllers, I/O modules, power supplies and proposed field devices.

.7 Submit edited sequences of operation for each affected system, coordinated with the points schedules and graphics. Define normal operation, occupied/unoccupied modes, setpoints, limits, alarms, restart, loss of communications, power failure and failure of critical sensors or controllers.

.8 Submit proposed graphics, alarm matrix, notification routing, trend schedule, user roles, naming convention and integration mapping for Owner review before bulk programming.

.9 Submit the phasing and cutover plan, prefunctional checklists, functional test scripts and acceptance criteria before site changeover and testing.

.10 Identify proposed deviations or products that require proprietary licences or services, and state the implications for Owner operation, maintenance and future modification.

1.08 CLOSEOUT SUBMITTALS

.1 Submit editable record drawings and native source files showing installed architecture, panels, network topology, wiring and terminations, points, equipment interfaces and device locations. Record revisions made during commissioning.

.2 Submit final points lists, sequences, control schematics, graphics, alarm matrix and recipients, trend configuration, schedules, user roles, setpoints, calibration records and functional test results. Include an unresolved-items list, if applicable.

.3 Provide complete backups of commissioned controller applications and management-level database/graphics, with the associated restoration procedure, software and firmware versions, licences and required engineering tools.

.4 Provide Owner/FMO and its authorized service provider with native editable controller applications, graphics and databases, complete recoverable backups, administrative and engineering credentials, and the programming, diagnostic, download and restoration tools and licences required to maintain and modify the delivered Work. Disclose licence duration, renewal charges, transfer restrictions and vendor dependencies before product acceptance; licence terms shall not defeat the specified access. Transfer credentials through the Owner-approved secure method.

.5 Provide O&M manuals, product data, record panel schedules, warranty contacts, maintenance and recovery procedures, and records of final interfaces with existing systems designated to remain.

.6 Submit a witnessed handover demonstration showing Owner/FMO operation, maintenance, representative application editing/download, graphics/commands, alarms/trends/schedules, engineering-tool/licence access and backup/restoration. Correct missing rights, source files or tools before acceptance.

1.09 QUALITY ASSURANCE

.1 Use a manufacturer-authorized delivery and service organization for the proposed platform. Submit current written authorization and evidence that named programming, integration, commissioning, training and service personnel are trained and experienced on that platform and occupied healthcare projects. Provide relevant healthcare references and a named service lead and alternate. Arrange appropriately authorized personnel and lawful access for all required modifications to the existing Siemens BMS.

.2 Submit evidence of established local service capability meeting the response requirements, including service location, available trained personnel, year-round out-of-hours coverage, mobilization, escalation, critical spares and replacement-part sources/lead times. An authorized service partner may provide the capability where its responsibilities and commitments are documented.

.3 Provide the platform/healthcare qualifications, authorization, service plan and infection-control training evidence at the stage required by the Owner procurement documents. Maintain the delivery/service commitments applicable to the Work throughout the five-year service and support period and notify the Owner of proposed personnel or support changes before implementation.

.4 Use compatible components suitable for the application and recognized by the authority having jurisdiction where applicable. Install and configure in accordance with applicable codes, manufacturer instructions and the Owner-approved network and security requirements.

.5 Maintain a current change log for programs, database, graphics and setpoints. Obtain Owner authorization before changing existing system settings or modifying controls outside the defined limits of work.

1.10 WARRANTY AND FIVE YEAR SERVICE AND SUPPORT

.1 Provide a one-year comprehensive warranty from acceptance for the new equipment, wiring, software, programming, graphics, integration and Work provided under this Contract. Include labour, parts, travel, troubleshooting, correction of defects and retesting. The warranty does not extend to unrelated existing equipment; rectify defects in the delivered Work and its modifications/interfaces. Pass through longer manufacturer warranties where supplied. The separate five-year service and support period starts on the same acceptance date and does not extend this comprehensive warranty.

.2 Include required software/firmware support, licence/support renewals and corrective/security updates for the delivered Work throughout the five-year service and support period. Include labour to apply approved corrective updates to the delivered software/programming. Coordinate updates with Owner IT/FMO, verify compatibility, back up before deployment, test affected functions and update records. Disclose existing-platform subscriptions or upgrades required specifically for the Work; do not assume unrelated existing support costs are included. Required Owner access and delivered source files, credentials and tools shall not be withheld or revoked at expiry of the service term.

.3 Provide at least one scheduled on-site inspection in each of the five service years, with a minimum of five inspections included in the Contract price. Submit the annual schedule for Owner review. Include inspection labour, travel, reporting and the software/support activities specified in this Article. Inspections supplement emergency response and do not limit warranty defect correction.

.4 Provide emergency service 24 hours per day, seven days per week, throughout every calendar year including weekends and statutory holidays, for the five-year service and support period. A qualified technician shall respond within 30 minutes of the Owner emergency request by callback or PHSA-approved remote BAS/DOC access and shall attend site within 60 minutes when on-site emergency technical support is requested by the Owner. Measure both periods from receipt of the request at the designated 24/7 service contact; remote response does not restart the attendance period. Response and attendance times are not repair-completion times.

.5 Maintain one designated 24/7 service number, a named service lead and alternate, escalation contacts and sufficient staffing to meet the stated times. Record request, callback/remote connection, attendance, findings, action and restoration times. Advise Owner FMO promptly of unresolved critical faults and implement only Owner-approved temporary arrangements.

.6 Annual inspections shall include review of alarms, trends, overrides, schedules, controller/network diagnostics, communication and integration health, backups and restoration readiness, software/firmware/licence status, security-update needs, accessible panels and critical spare availability. Coordinate representative field-device checks and safe functional tests with FMO; do not interrupt clinical operation without approval. Submit findings, readings, defects, corrective actions and updated backups after each inspection.

.7 Submit manufacturer lifecycle information, known end-of-sale/support dates, replacement-part stock locations and lead times, update/security-support arrangements and a migration path. Provide a written service commitment covering the specified five years. Notify Owner FMO of announced lifecycle changes affecting delivered products and propose compatible support or replacement arrangements without reducing the Contract obligations.

.8 Include the five-year fixed service fees in the Contract price and itemize each service year separately in the tender pricing submission, identifying overlap with the first-year warranty. Fixed fees include scheduled inspections, 24/7 availability, emergency callback/remote response, requested initial emergency attendance, fault-diagnosis labour and associated travel, reports, and required software/licence support and corrective updates specified above. Do not charge these included services again as repair work. Submit rates applicable to non-warranty repairs for each service year, including regular/overtime labour, subsequent travel/callout charges and replacement-parts pricing or markups. After the one-year comprehensive warranty expires, hardware replacement parts and subsequent repair labour are payable only where outside any continuing manufacturer warranty and authorized by the Owner at the tendered rates; submit the diagnosis and quotation before repair. Identify optional services and charges after the five-year service term separately. No optional agreement or additional annual fee may be a condition of receiving the included warranty or service obligations.

2 PRODUCTS

2.01 GENERAL SYSTEM REQUIREMENTS

.1 Provide new components, software, licences, tools and accessories required for the defined NCM-1 replacement and drawing interfaces to retained systems, including integration into the Owner’s existing BMS.

.2 New controllers shall continue essential local control functions on loss of the supervisory network, to the extent defined in the equipment sequences. Do not place life-safety or equipment-protection functions solely in software or the operator workstation.

.3 Provide capacity for all scheduled points/functions and any spare capacity expressly stated in the Contract Documents. Submit installed/used/unallocated I/O by type, panel space, network ports/loading, supervisory capacity, licences and trend/storage calculations, together with the supported modular expansion path. Do not assume Owner licences or network resources are available without verification.

.4 Use native BACnet/IP for new controllers with the model/firmware-specific BTL listing/certification and PICS required by Section 25 41 00. Submit an object/service compliance matrix and demonstrate scheduled read/write functions, command priorities/relinquish, alarms, schedules, trends and recovery at the existing 2021 Siemens BMS. Document retained-equipment gateway exceptions and any vendor dependency before product acceptance.

2.02 REUSE OF EXISTING COMPONENTS

.1 Replace sensors indicated for replacement and any sensors within the Work that are incompatible or unsuitable for the new controls. Reuse retained sensors, actuators, relays, raceways, wiring and panels only where designated to remain and verified functional, compatible and suitable. Record the tests.

.2 Report failed, inaccessible, incompatible or undocumented existing items promptly, with the proposed correction and effect on the scope. Do not conceal deficiencies or treat uncertain existing equipment as an accepted new installation.

.3 Protect existing-to-remain components and data. Back up available Johnson Controls programs and databases before demolition and preserve records needed for migration and approved rollback.

.4 Remove only the redundant legacy controls within the defined Work after verified transfer of their functions. Return or dispose of them in accordance with PHSA direction and the Contract Documents.

2.03 ELECTRICAL AND COMMUNICATIONS

.1 Provide required control power, transformers, supplies, overcurrent protection, enclosures, grounding, conduits, cables and terminations for the Work. Coordinate line-voltage work with the electrical requirements of the Drawings and Contract Documents.

.2 Separate power and communications wiring as required by applicable codes and equipment instructions. Provide cable ratings suitable for the installation location and preserve existing firestopping.

.3 Identify control panels, devices, cables, ports and terminations consistently with the approved points and network schedules.

.4 Coordinate normal, emergency and uninterruptible power sources with the Drawings and Owner. Do not assume existing spare circuits or UPS capacity without verification.

3 EXECUTION

3.01 EXAMINATION AND INSTALLATION

.1 Verify site dimensions, equipment access, panel space, utilities, network connections and existing conditions before installation. Notify the Consultant and Owner of conflicts that affect performance or continuity of service.

.2 Install devices and panels so that maintenance access, identification and safe operation are maintained. Protect occupied spaces and restore affected surfaces and fire separations after installation.

.3 Make all changes to existing wiring, controllers and databases traceable in the record documents. Confirm interfaces to systems designated to remain are functional after modification.

3.02 PROGRAMMING AND CONFIGURATION

.1 Program approved sequences and consistent equipment names, point IDs, graphics, alarms, schedules and trends for all affected NCM-1 cutover systems. Coordinate display conventions with PHSA FMO.

.2 Configure operator access according to Owner-approved roles. Record changes to alarm thresholds, trend intervals and setpoints during commissioning and obtain approval for final values.

.3 On restoration of power or communications, return equipment to a safe and defined operating mode and recover operator visibility without manual database reconstruction.

3.03 TESTING AND COMMISSIONING

.1 Perform point-to-point verification of each installed and reused point, including input simulation or measured response, output action, command/status agreement, safeties, fail positions and displayed engineering units.

.2 Calibrate field devices as required for the specified accuracy. Perform functional tests for each sequence and operating mode, including startup, shutdown, alarm and fault responses, network loss and recovery, and power restoration where practicable.

.3 Verify every transferred graphic, command, alarm destination, trend, schedule and interface at the operator level. Demonstrate representative end-to-end operation with PHSA FMO and record results.

.4 Correct deficiencies and repeat affected tests. Submit test records, issue logs, final settings and evidence of restoration of all affected functions before requesting acceptance.

.5 Coordinate environmental performance verification in Pharmacy and other critical spaces with the Owner and the project commissioning requirements. Do not substitute BMS display values for any separately required clinical or balancing verification.

3.04 TRAINING AND HANDOVER

.1 Train Owner FMO and designated operators on the installed architecture, normal operation, graphics, alarms, trends, schedules, overrides, fault diagnosis, backup and restoration, and the changeover from existing controls.

.2 Provide project-specific training materials and a recording or attendance record where permitted by the Owner. Demonstrate routine operator tasks and the location of delivered source files and O&M records.

END OF SECTION

1 GENERAL

1.01 SUMMARY

.1 Provide identification for new and modified panels, controllers, field devices, wiring, communications and interfaces within the defined NCM-1 replacement work.

.2 Update identification of existing components affected by the Work so that the installed labels, operator graphics, panel schedules, points lists and record drawings use the same equipment and point designations.

1.02 RELATED REQUIREMENTS

.1 Section 25 05 00 – Common Work Results for Integrated Automation.

.2 Drawing and Contract requirements for electrical identification.

1.03 COORDINATION AND SUBMITTALS

.1 Review existing Owner FMO and facility identification conventions before finalizing labels. Coordinate panel, equipment and point names with the approved BMS architecture, points schedules, graphics and record documents.

.2 Submit a proposed naming and label schedule identifying each panel, controller, network device, cable group, field device and controlled equipment in the Work. Indicate existing designations to remain and any proposed changes.

.3 Submit samples or product data for panel nameplates, field-device labels, wire markers, cable tags and warning signs. Submit proposed colours and wording for Owner review.

.4 Do not relabel existing-to-remain equipment outside the defined Work unless shown or approved. Record any discrepancy between site labels and project documents for resolution before changing an existing designation.

2 PRODUCTS

2.01 GENERAL IDENTIFICATION

.1 Provide permanent, legible labels suitable for the installed environment. Use English text and the approved equipment and point identifiers. Do not rely solely on colour to convey an identification or warning.

.2 Use consistent terminology, capitalization and abbreviations across physical labels, BMS graphics, I/O schedules and record documents.

2.02 PANEL NAMEPLATES

.1 Provide engraved plastic laminate nameplates for BMS panels and cabinets, minimum 3 mm thick and 25 mm by 67 mm, with minimum 7 mm high contrasting lettering, unless a larger size is needed for legibility.

.2 Identify the panel designation and system served on the exterior. Identify the normal, emergency or UPS power source and originating distribution panel and circuit on the interior.

.3 Identify controllers, power supplies, relays, network equipment and terminal strips within each panel with durable labels coordinated with the panel layout.

2.03 PANEL INPUT OUTPUT SCHEDULES

.1 Provide a printed, dated I/O and termination schedule in a protective holder inside each new or modified BMS panel.

.2 Show panel and controller identifiers, point ID and description, I/O address, signal type, field-device designation, terminal numbers, cable identification and revision date. Match the installed wiring and the electronic record schedule.

2.04 FIELD DEVICE IDENTIFICATION

.1 Label each new or modified field device with its approved point or device identifier and the equipment served. Use a durable tag or label visible at the point of maintenance without impairing the device.

.2 Provide a durable label for devices inside panels or above accessible ceilings. Where a device is concealed, identify the access point or nearby visible surface as approved by the Owner.

.3 Coordinate room sensor labels with Owner FMO and the affected department. Keep labels discreet and accessible for maintenance; do not obscure displays, adjustment points or manufacturer information.

2.05 WIRING AND COMMUNICATIONS IDENTIFICATION

.1 Identify new and modified conductors at both ends and at intermediate terminations with permanent numbered markers matching the wiring diagrams and panel schedules.

.2 Identify communications cables and ports with source, destination, network or segment designation and cable ID. Identify each patch cord at both ends where its route is not immediately apparent.

.3 Identify new conduits, junction boxes and cable pathways at access points and changes of direction using the approved project convention. Do not paint existing conduits solely to establish a new colour scheme without Owner direction.

.4 Maintain existing colour and circuit conventions for power wiring. Coordinate controls cable jacket colours with the electrical work and Owner IT.

2.06 WARNING SIGNS

.1 Provide durable warning labels at equipment capable of automatic or remote start where existing identification is absent or affected by the Work. Use wording reviewed by the Owner and place labels at points of service and isolation.

.2 Do not cover or replace existing safety, electrical or manufacturer warning labels.

3 EXECUTION

3.01 INSTALLATION

.1 Install nameplates and labels parallel to equipment lines and in locations visible during normal maintenance. Do not obstruct controls, ventilation openings, access, inspection labels or equipment operation.

.2 Secure labels by a method appropriate to the substrate and environment. Clean surfaces before applying adhesive labels and use mechanical fastening where adhesion is unsuitable.

.3 Verify every installed label against the final points list, panel schedule, controller database, graphic and record drawing. Correct inconsistent or missing identification before handover.

3.02 EXISTING PANELS AND RECORDS

.1 Revise existing panel nameplates, I/O schedules and field labels where connections or functions are changed by the Work. Preserve clearly documented existing identifiers where practical.

.2 Submit an identification schedule with the record documents showing old and new designations where a change was approved.

END OF SECTION

1 GENERAL

1.01 SUMMARY

.1 Provide the operational technology network required for the affected NCM-1 replacement and drawing interfaces, including BACnet/IP controller communications and connections to the Owner's existing BMS.

.2 Maintain retained network and control functions during staged cutover. Disconnect replaced NCM-1 legacy links only after transferred functions are verified; connect to Owner IT infrastructure only with authorization.

.3 Coordinate the new BACnet/IP controls with retained systems and the Owner's existing BMS operator interface. Support documented integration and cutover.

1.02 RELATED REQUIREMENTS

.1 Section 25 05 00 – Common Work Results for Integrated Automation.

.2 Section 25 05 53 – Identification for Integrated Automation.

.3 Section 25 70 00 – Integrated Automation Building Systems Integration.

.4 Drawing and Contract requirements for electrical power, pathways, cabling, bonding and firestopping.

1.03 EXISTING CONDITIONS AND COORDINATION

.1 Survey BMS communications within the defined Work and at its retained-system interfaces. Verify ports, media, paths, power, space, addressing, protocols and ownership before procurement.

.2 Record existing Johnson Controls connections and temporary arrangements. Identify failed or unsupported links and their effect on staged replacement.

.3 Coordinate all network work with Owner IT, Owner Facilities Maintenance and Operations (FMO), the BMS integrator, communications contractor and affected equipment suppliers. Use Owner-approved network services and security settings.

.4 Do not connect equipment, modify network configuration, scan the Owner network, enable remote access or disable retained services without the applicable Owner authorization and an approved method of procedure.

1.04 NETWORK DESIGN AND SUBMITTALS

.1 Submit an existing-conditions report and architecture showing legacy components within the Work to be removed, new controllers and network equipment, the existing Owner BMS connection and retained-system interfaces.

.2 Provide a port and device schedule listing equipment ID, location, manufacturer/model, connection type, cable ID, switch port, IP address or address reservation, protocol, power source and network owner. Mark items to remain, be reused, be added or be removed.

.3 Submit product data for proposed switches, transceivers, cabling, patch panels, power supplies and enclosures. Demonstrate compatibility with the approved topology, equipment environment and Owner IT requirements.

.4 Submit cabling and pathway drawings showing routing, lengths, termination points, fire separations, mechanical protection and separation from power wiring. Coordinate access and installation in occupied clinical spaces.

.5 Submit a configuration and cybersecurity compliance plan for PHSA IT review showing equipment/firmware support, network boundaries, required services/ports, segmentation/routing, authentication/privileges, secure management and remote support, time synchronization, logs, backups, patching/certificate management and responsibility for ongoing maintenance. Identify requirements for Owner infrastructure separately.

.6 Submit a phased cutover and fallback plan. Identify affected systems and spaces, outage windows, temporary controls and monitoring, backup of existing configuration, test points, acceptance criteria and restoration steps.

.7 Submit factory or field certification results for installed cabling and end-to-end communication test records. Maintain a list of deficiencies and corrective actions.

1.05 CLOSEOUT SUBMITTALS

.1 Submit record architecture, floor plans, cable routes, port and device schedules, approved IP assignments, switch configuration, interface mappings and final network settings in Owner-approved electronic formats.

.2 Provide configuration backups, firmware and software versions, licences, support contacts, equipment manuals, test results, and documented procedures for backup, restoration and replacement of network equipment.

.3 Transfer administrative information and credentials through an Owner-approved secure method. Deliver the access and documentation needed for PHSA or its authorized service provider to maintain the installed network components.

2 PRODUCTS

2.01 NETWORK ARCHITECTURE AND PERFORMANCE

.1 Provide Ethernet and BACnet/IP connectivity for the replacement controls in accordance with the Drawings. Segmentation, routing and use of existing switches shall follow Owner IT requirements.

.2 Provide BACnet/IP communication to the Owner’s existing BMS and demonstrate all scheduled points, commands, alarms, schedules and trends. Document any required interface conversion for retained equipment.

.3 Size new links and ports for all connected project devices and spare capacity expressly shown in the Contract Documents. Document used/unallocated ports, link loading and the supported future expansion path; verify existing network resources before relying on them. Maintain local controller functions during supervisory network loss.

.4 Provide any network redundancy, alternate communication path or uninterruptible power source shown in the approved architecture. Coordinate loss-of-network alarms and recovery behaviour with the BMS sequences.

2.02 NETWORK EQUIPMENT

.1 Provide managed switches and accessories suitable for the location, number of ports, media, network speed, temperature and power supply defined by the approved architecture. Locate equipment in secured Owner-approved spaces or lockable enclosures.

.2 Provide only the management, authentication, logging, VLAN and monitoring functions required by Owner IT. Disable unused ports and unneeded services; change default credentials before connection to the Owner network.

.3 Select equipment that can be supported and backed up by the Owner or its authorized service provider. Coordinate firmware and security maintenance requirements with Owner IT.

.4 Where network equipment uses power over Ethernet, verify the connected load and total power budget. Where normal, emergency or UPS power is required, verify source and capacity before installation.

2.03 CABLING AND PATHWAYS

.1 Provide copper or fibre cabling and terminations suitable for the approved link length, performance, location and equipment interfaces. Use listed cable with the flame and smoke rating required for the installed space.

.2 Provide compatible jacks, patch panels, patch cords, fibre transceivers and connectors as required for complete links. Use the Owner-approved termination and patching convention.

.3 Use existing pathways only where capacity, access, condition and permission for reuse are verified. Provide new supports and raceways where needed; maintain separation from power wiring and protect cables from damage.

.4 Identify cables, ports, patch panels and network devices in accordance with Section 25 05 53 and the approved device schedule.

3 EXECUTION

3.01 EXAMINATION AND INSTALLATION

.1 Verify proposed equipment and cable locations, available power, pathway capacity, network connection points and environmental conditions before installation. Report conflicts before disturbing existing service.

.2 Install cables to the manufacturer’s limits for bend radius, pulling tension and support. Do not compress cables or support them from ductwork, piping or other services. Restore firestopping and finishes disturbed by the Work.

.3 Secure switches, patch panels and enclosures, maintain service clearances and provide grounding and bonding in accordance with the applicable electrical and communications requirements.

.4 Keep required existing network and BMS links operating until each approved cutover. Record and label disconnected links and retain the documented fallback capability during the transition.

3.02 CONFIGURATION AND CYBERSECURITY

.1 Coordinate IP assignments, DNS, time sources, VLANs, firewall rules, routing and certificates with Owner IT. Apply the approved settings before placing equipment in service.

.2 Use unique administrative credentials and Owner-approved accounts. Restrict management access, disable unused services and ports, and use encrypted management methods where supported and required by Owner IT.

.3 Implement remote service access only through the PHSA IT-approved route, accounts and controls. Coordinate authorization, authentication, encryption and any required MFA, certificates, logging and session termination with PHSA IT before connection. Meet the specified emergency response using approved remote access or callback; do not establish direct internet or persistent vendor access to satisfy response times.

.4 Back up final configurations and record approved changes. Assign patching, security-support, certificate and account responsibilities with Owner IT/FMO and include required support for delivered network components throughout the five-year service and support period under Section 25 05 00. Submit compliance/test evidence before connection and handover.

3.03 TESTING AND ACCEPTANCE

.1 Certify each new copper or fibre link using test methods appropriate to its specified performance and provide the results, including identification of both ends and correction of failed tests.

.2 Verify end-to-end communication from each new controller and interface to the approved management system. Confirm transferred points, commands, alarms, trends, time synchronization and recovery.

.3 Test loss and restoration of network connectivity under an approved procedure. Verify local equipment control, alarm indication, reconnection and restoration of operator visibility without loss of the required environmental function.

.4 Demonstrate the cutover and fallback procedure with Owner FMO and IT as required. Correct deficiencies and repeat affected tests before requesting acceptance.

END OF SECTION

1 GENERAL

1.01 SUMMARY

.1 Provide architecture for replacement of the affected NCM-1 legacy controls with BACnet/IP controllers integrated into the Owner's existing BMS. Coordinate terminal controllers, drawing interfaces, network equipment, software configuration and licences with retained systems.

.2 Transfer all functions identified within the defined Work. At final acceptance these functions shall not depend on the failed NCM-1 or the legacy controllers replaced under this Contract. Retain the 2016 BACnet installation, NC-2 and Level 3 controls and other unaffected installations.

.3 Integrate the Work into the existing Siemens management system installed in 2021, retained as the long-term front end. Provide a documented phased architecture supporting future replacement of remaining controls without a separate standalone management platform. Retain existing hosting/workstations; future building-wide migration and a replacement server/front end are excluded from this Contract.

1.02 RELATED REQUIREMENTS

.1 Section 25 05 00 – Common Work Results for Integrated Automation.

.2 Section 25 17 00 – Operational Technology Networks for Integrated Automation.

.3 Section 25 41 00 – Building Automation Controllers.

.4 Section 25 45 00 – Centralized Building Management System.

.5 Section 25 70 00 – Integrated Automation Building Systems Integration.

1.03 ARCHITECTURE DESIGN BASIS

.1 Use field controllers for local control, the approved network for supervisory data and the management platform for graphics, alarms, trends, schedules, reports and access to all transferred systems.

.2 Maintain local control and equipment safeties during loss of the server, workstation or supervisory network, as defined in the equipment sequences. Restore supervisory visibility and historical collection after communications recover.

.3 Define the boundary between replacement controls, the Owner's existing BMS and retained systems. Show source, destination and command authority for every interface and identify only the legacy components within the defined Work for removal.

.4 Preserve operator access and environmental monitoring for Pharmacy and other critical spaces during staged cutover. Retain existing alarms and schedules until replacement functions are demonstrated.

1.04 COORDINATION

.1 Review available existing architecture, controller and panel records, points lists, graphics, operator workstation, licences, server arrangement, database, network links and support status with PHSA Facilities Maintenance and Operations (FMO) and PHSA IT.

.2 Verify the existing BMS connection, compatible software versions, licensed point capacity, operator access, network addressing and backup arrangements with Owner IT before procurement. Do not assume available spare capacity. Submit any required capacity or licence additions for review.

.3 Identify equipment, licences, software or work already supplied or installed by PHSA or others and show its incorporation without duplicate scope.

.4 Coordinate third-party interfaces with the relevant equipment suppliers and Section 25 70 00. Do not rely on an unverified proprietary gateway, licence or protocol.

1.05 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit an assessment and architecture identifying new, temporary and removed components within the Work, the existing Owner BMS connection, retained systems and all interface boundaries.

.2 Submit a component responsibility matrix identifying supplier, installer, owner, location, power source, network owner and maintenance responsibility for each server, virtual machine, workstation, controller, gateway, database and interface.

.3 Submit calculations showing project and available capacity for I/O by type, panels, network ports/loading, supervisory devices, licensed points, graphics, alarms/events, processing/memory and trend/storage retention. Identify required project additions, unallocated capacity and the modular expansion path. Show any spare capacity specified in the Contract Documents; do not assume unverified Owner resources.

.4 Submit software and licence schedules identifying products, versions, permitted users or clients, point and integration capacity, subscription or renewal requirements, engineering tools and Owner entitlement.

.5 Submit a migration matrix for every system and drawing interface within the Work showing point source and destination, command authority, alarm owner, trend location, schedule owner, cutover stage and final operator function.

.6 Submit a data, backup and recovery plan identifying database and historical storage, backup schedule, retention, restoration procedure, time source, software images and recovery responsibilities.

.7 Submit the staged changeover and rollback plan, including critical-space temporary control and monitoring, permitted outages, test criteria and responsibilities for PHSA FMO and IT.

1.06 CLOSEOUT SUBMITTALS

.1 Provide record architecture and configuration documents reflecting the installed system, including component inventory, network and interface diagrams, software and firmware versions, licence entitlements and the final integration matrix.

.2 Provide complete recoverable backups of controller applications, management database, graphics, alarms, trends and schedules with documented restoration procedures and required tools.

.3 Transfer approved administrative access, credentials and licence information through a secure PHSA-approved method. Demonstrate that PHSA or its authorized service provider can operate, maintain, back up and restore the delivered installation.

2 PRODUCTS

2.01 SYSTEM COMPONENTS

.1 Provide controllers, network/interface components, software configuration and licence additions for the defined Work at the existing 2021 Siemens BMS. Retain management software, hosting and workstations. Verify the exact installed product/version, integration permissions, support and capacity before procurement; identify incompatible conditions for written direction.

.2 Select components compatible with the Owner's existing BMS, the verified retained-system interfaces and Owner IT requirements. Use supported software and firmware versions and demonstrate capacity for the added workload.

.3 Use an architecture that permits future controllers and points to be added through documented interfaces, engineering tools and supported modular expansion. Document the route for future coexistence and phased migration of retained systems, including command/alarm ownership and licence/capacity increments. Do not make future expansion dependent on an undocumented gateway or vendor-only source file.

.4 Provide controller, engineering and integration licences and existing BMS point-capacity additions required for the delivered Work. Identify recurring charges and Owner licence entitlement in the submittals.

2.02 EXISTING MANAGEMENT ENVIRONMENT

.1 Verify that the existing management environment can support the added point, graphic, trend and event load, integration drivers, data retention and backup activity. State available and required capacity in the submittal.

.2 Provide resilient storage and backup arrangements consistent with the approved PHSA IT architecture. A redundant server or failover arrangement is required only where shown or approved for the critical functions in the Contract Documents.

.3 Maintain consistent time synchronization, data integrity and audit information across the management platform and connected controllers. Coordinate time sources and security configuration with PHSA IT.

.4 Do not use external cloud storage, direct internet access or remote vendor hosting unless expressly approved by PHSA IT and identified in the Contract Documents.

2.03 OPERATOR INTERFACES

.1 Provide operator access at PHSA-approved locations for graphics, commands, alarm acknowledgment, schedules, trends and reports for all transferred systems.

.2 Configure role-based access to distinguish routine operators, maintenance personnel, engineering users and administrators. Coordinate authentication, session control and audit requirements with PHSA IT.

.3 Restore operator functions for the affected NCM-1 systems at the Owner's existing BMS in accordance with the migration matrix. Retain operator functions serving unaffected systems.

2.04 INTEGRATION AND LOCAL OPERATION

.1 Use documented BACnet/IP interfaces between replacement field controllers and the Owner's existing BMS, together with approved interfaces to retained equipment. Map names, units, status, priorities and alarm states.

.2 Ensure that supervisory failure does not defeat local control, independent safeties or the approved fallback modes. Provide defined restart and recovery behaviour following power or communications interruption.

.3 Coordinate alarm, trend and schedule ownership during staged migration and demonstrate a single authoritative source for each function at final acceptance.

3 EXECUTION

3.01 INSTALLATION AND CONFIGURATION

.1 Install components in Owner-approved locations with verified power, environmental conditions, physical security, network access and maintenance clearance. Coordinate all work on PHSA infrastructure with PHSA IT.

.2 Configure the delivered integration and applications using supported versions compatible with the existing Owner BMS. Record the final configuration and obtain approval for changes or updates affecting retained systems.

.3 Back up existing configurations before modification. Stage migration system by system and maintain a documented route to restore the prior operating arrangement until acceptance.

.4 Apply user roles, alarm routing, data retention, backup and cybersecurity settings as approved by PHSA IT and FMO. Do not activate unapproved remote access or external services.

3.02 SYSTEM VERIFICATION

.1 Verify every architecture component and interface against the approved diagram and responsibility matrix. Demonstrate graphics, points, commands, alarms, trends, schedules and historical access for all transferred systems.

.2 Test local control and recovery during server, workstation, network and power interruptions under an approved procedure. Confirm critical-space monitoring and alarm delivery during changeover and after restoration.

.3 Demonstrate backup and restoration of representative server or database configuration and controller application data, and confirm the Owner can access delivered licences and engineering tools.

.4 Correct deficiencies, update records and repeat affected tests before requesting acceptance. Coordinate final training and handover with Section 25 05 00.

END OF SECTION

1 GENERAL

1.01 SUMMARY

.1 Provide sensors, transmitters, switches, transducers and accessories required for the affected NCM-1 replacement and drawing point schedules.

.2 Replace sensors identified for replacement on the Drawings and sensors within the Work that are unsuitable for the new controller, sequence or required accuracy. Verify retained devices proposed for reuse.

.3 Maintain existing independent safeties and monitoring designated to remain. Do not remove a device required for continued operation or approved temporary cutover arrangements.

1.02 RELATED REQUIREMENTS

.1 Section 23 05 00 – Common Work Results for HVAC.

.2 Section 25 05 00 – Common Work Results for Integrated Automation.

.3 Section 25 05 53 – Identification for Integrated Automation.

.4 Section 25 35 13 – Integrated Automation Actuators and Operators.

.5 Section 25 41 00 – Building Automation Controllers.

1.03 EXISTING CONDITIONS AND SUBMITTALS

.1 Verify the identity, location, application, connection, range and condition of each field device serving an affected NCM-1 cutover system against the point schedules and installed conditions. Record missing, inaccessible or undocumented devices.

.2 Submit a device schedule listing equipment served, point ID, location, measured quantity, existing/new/reused status, manufacturer/model, range, output signal, accuracy, power, controller connection and calibration requirement.

.3 Submit product data, mounting details, wiring and interface requirements for new devices. Coordinate device types and signal ranges with controller input capacity and approved sequences.

.4 Submit a reuse test report before relying on existing devices. Include measured response, calibration status, physical condition and proposed correction for devices that do not meet the approved requirements.

.5 Coordinate access, infection prevention and control, shutdowns, temporary monitoring and testing in Pharmacy and other occupied clinical spaces with PHSA Facilities Maintenance and Operations (FMO). Comply with the site-specific work plan, Preventive Measures Analysis (PMA), IPAC plan and multidisciplinary team (MDT) coordination requirements in Section 01 35 13. Establish the required preventive measures before applicable work, including ceiling access and above-ceiling work.

2 PRODUCTS

2.01 GENERAL DEVICE REQUIREMENTS

.1 Provide devices suitable for the measured medium, installed environment, operating range and required response. Select ranges so normal and alarm conditions can be resolved without excessive span.

.2 Provide output signals, power supply and electrical isolation compatible with the approved controllers and wiring. Protect field devices from foreseeable moisture, vibration, mechanical damage and electrical interference.

.3 Provide accessible calibration and service provisions. Clearly identify each device in accordance with Section 25 05 53. Furnish calibration evidence where required by the device schedule.

.4 Do not substitute software-calculated values for independently required safety or clinical monitoring signals unless expressly approved by the Owner.

2.02 TEMPERATURE DEVICES

.1 Provide room, duct, immersion or outdoor temperature sensors only where indicated by the points schedule. Select a sensing element and output compatible with the controller and required accuracy.

.2 Use averaging sensors where a representative duct temperature cannot be obtained from a single-point probe. Use suitable thermowells for immersion applications and maintain access for removal and calibration.

.3 Maintain existing low-temperature and high-temperature protection as hardwired equipment safeties where present or required by the equipment sequence. Verify manual-reset action and alarm indication.

2.03 HUMIDITY AND CRITICAL SPACE SENSORS

.1 Provide room or duct humidity sensors where indicated, with a range and accuracy suitable for the specified control and alarm thresholds. Protect devices from condensation and locations subject to local heat or moisture sources.

.2 Locate room sensors to represent the occupied or monitored zone. Coordinate exact locations with PHSA FMO and affected departments before installation; do not place devices where supply air, sunlight or equipment heat will bias the reading.

.3 For critical spaces, provide calibration access and documented verification at the final alarm thresholds. Coordinate any parallel clinical environmental monitoring system without assuming the BMS replaces it.

2.04 PRESSURE AND AIRFLOW DEVICES

.1 Provide duct static, filter differential, hydronic differential or room pressure devices only where indicated. Match range, wetted materials, tubing and overpressure protection to the service.

.2 For room pressure monitoring, use a measurement range and resolution suitable for the approved room pressure limits. Install sensing ports so that door movement, drafts and tubing damage do not produce misleading readings.

.3 Provide airflow measuring devices where identified by the points schedule and suitable straight-run or manufacturer-approved installation provisions are available. Coordinate scaling and units with controller programming.

.4 For Details A and B, provide new zone temperature and cold-deck and total-airflow pressure sensors as shown; verify retained discharge-air sensors. For Detail D, provide the indicated new zone temperature and supply-air pressure sensors. Provide the fourteen additional deck static-pressure inputs in the M3.1 schedule, counted once per physical sensor, and preserve their indicated retained-system interfaces.

.5 Provide cabinet temperature sensing, fan proof/status inputs and pit water detection for each of the six LINAC cabinets under Detail G. Verify detector location, mounting, contact polarity and temperature-sensor location with the equipment operator before installation.

2.05 STATUS AND OTHER DEVICES

.1 Provide current switches, auxiliary contacts, flow switches or proof-of-operation devices where shown. Select thresholds and ratings to distinguish actual operation from a command signal.

.2 Preserve the function of existing safety switches and interlocks. Integrate status indication to the BMS without defeating the independent protective circuit.

.3 Provide other sensor types, including carbon dioxide or occupancy devices, only where explicitly identified by the points list and control sequence.

3 EXECUTION

3.01 INSTALLATION

.1 Install devices in accessible locations representative of the measured condition and in accordance with manufacturer instructions. Protect and restore duct, piping, insulation, vapour barrier and fire separation integrity disturbed by the Work.

.2 Label and protect existing devices and wiring before disconnection. Coordinate a planned interruption with PHSA FMO and maintain temporary monitoring where required by the approved cutover plan.

.3 Terminate wiring in suitable enclosures and use approved cable routing, separation and identification. Record final installation locations and signal ranges on the record drawings.

3.02 CALIBRATION AND FUNCTIONAL VERIFICATION

.1 Calibrate new devices and verify reused devices over the operating and alarm ranges. Record reference instrument, readings, adjustments, date and technician.

.2 Perform point-to-point checks to confirm sensor value, engineering units, scaling, alarm state and device failure indication at both the controller and operator interface.

.3 Verify installed devices under representative operation and demonstrate the related sequence, alarms and trends. Correct deficient devices and repeat affected tests before acceptance.

END OF SECTION

1 GENERAL

1.01 SUMMARY

.1 Provide actuator interfaces and modifications required for the affected NCM-1 replacement. Retain HVAC equipment and existing actuators indicated to remain following verification of compatibility and operation.

.2 Inspect and test existing actuators and operators proposed for reuse. Retain them only where compatible with the new controller, equipment arrangement, control sequence and required fail action.

.3 Maintain independent equipment protection and fire and smoke functions and the operation of systems designated to remain during staged cutover.

1.02 RELATED REQUIREMENTS

.1 Section 23 05 00 – Common Work Results for HVAC.

.2 Section 25 05 00 – Common Work Results for Integrated Automation.

.3 Section 25 05 53 – Identification for Integrated Automation.

.4 Section 25 30 00 – Integrated Automation Instrumentation and Terminal Devices.

1.03 SUBMITTALS AND COORDINATION

.1 Verify each valve and damper assembly controlled by an affected NCM-1 cutover system, including linkage, actuator, power, signal, stroke, operating pressure, normal position and access before selecting replacement components.

.2 Submit a schedule for each actuator and valve in the Work. Show equipment and point ID, location, existing/new/reused status, manufacturer/model, service, size, control mode, signal, supply voltage, required and selected torque or force, stroke time and fail position.

.3 For control valves, include fluid, design flow, pressure drop, close-off pressure, valve characteristic, leakage class and connection details where a valve is to be replaced.

.4 Submit product data, mounting and wiring details, interface schematics and a reuse test report. Identify any valve or damper that cannot achieve the approved sequence or fail position.

.5 Coordinate equipment shutdowns, temporary operation, field access and restoration with PHSA Facilities Maintenance and Operations (FMO) and affected clinical departments.

2 PRODUCTS

2.01 GENERAL PERFORMANCE

.1 Provide operators suitable for the installed valve or damper assembly, ambient conditions, power source, control signal and approved sequence. Furnish required brackets, couplings, linkages, transformers and accessories.

.2 Size actuators using verified equipment data and the maximum operating differential, including a suitable margin to drive the assembly through its full travel without stalling or excessive force.

.3 Provide a defined fail position or fail-in-place action as indicated by the approved sequence and equipment schedule. Do not infer that every existing valve or damper requires spring return.

.4 Provide position indication and auxiliary proof or feedback where identified in the points list. Use compatible, serviceable devices accessible for adjustment and replacement.

2.02 DAMPER ACTUATORS

.1 Provide the control mode scheduled on the Drawings, including floating open/close outputs for retained terminal damper actuators in Details A, B and D. Verify common supply, output switching ratings, direction, travel and timing. Do not substitute a modulating actuator for a retained floating actuator without review.

.2 Where a damper provides freeze protection, ventilation isolation or another defined protective function, provide the specified fail action and verify the complete damper assembly reaches the required position.

.3 Maintain existing fire and smoke damper listing and control arrangement. Do not replace or modify a life-safety actuator without the approvals and testing applicable to that assembly.

2.03 CONTROL VALVES AND VALVE ACTUATORS

.1 Retain an existing valve body where its condition, flow characteristic, close-off pressure and connection to the approved actuator are suitable. Replace the valve only where indicated or where reuse is not viable and the correction is approved.

.2 Select any replacement valve for the verified fluid, design flow, pressure, temperature, pipe connection, control characteristic and specified leakage performance. Do not alter the existing hydronic balance without the required verification.

.3 Provide a valve actuator with adequate force or torque at maximum differential pressure, compatible control signal, full stroke, position indication and required fail action. Verify manual operation where specified.

2.04 EXISTING PNEUMATIC EQUIPMENT

.1 Where pneumatic devices are confirmed to remain, verify available air pressure, tubing, leakage, spring range and positioning before connecting to a new control interface.

.2 Provide the 0–10 V analog output and electric-to-pneumatic interface indicated for MV-D in Details B and C. Match transducer output pressure to the verified existing actuator spring range and control air supply. Test commanded travel; retain the pneumatic mechanical equipment.

3 EXECUTION

3.01 INSTALLATION AND ADJUSTMENT

.1 Install and adjust actuators and valves in accordance with manufacturer instructions, maintaining access to manual overrides, service points and identification.

.2 Protect equipment from unintended movement during changeover. Label and record disconnected linkages, wiring and pneumatic tubing before modification.

.3 Restore insulation, vapour barriers, firestopping and finishes disturbed by the Work. Identify new or modified devices in accordance with Section 25 05 53.

3.02 FUNCTIONAL VERIFICATION

.1 Stroke each new and reused actuator through its full travel. Verify command direction, actual position or proof signal, modulation, end limits, fail action, manual override and response time against the approved sequence.

.2 Verify valve shutoff, damper closure or opening and associated equipment response under the relevant operating and fault conditions. Investigate leakage, binding and unstable control.

.3 Coordinate point-to-point and integrated functional tests with Division 25. Record settings and corrections, and repeat tests after deficiencies are addressed.

END OF SECTION

1 GENERAL

1.01 SUMMARY

.1 Provide new BACnet/IP controllers, I/O modules, panel accessories, applications and interfaces for the affected NCM-1 legacy controls and additional interfaces identified on the Drawings.

.2 Replace the legacy Johnson Controls 2000 field and supervisory control functions served by the failed NCM-1 within the defined Work. Transfer their indicated control, monitoring and alarm functions to the Owner's existing BMS before decommissioning the replaced components. Retain unaffected controls.

.3 Maintain control and environmental monitoring in occupied clinical areas, particularly Pharmacy, through the approved staged cutover and temporary arrangements.

1.02 RELATED REQUIREMENTS

.1 Section 25 05 00 – Common Work Results for Integrated Automation.

.2 Section 25 05 53 – Identification for Integrated Automation.

.3 Section 25 17 00 – Operational Technology Networks for Integrated Automation.

.4 Section 25 24 00 – Integrated Automation System Architecture Requirements.

.5 Section 25 30 00 – Integrated Automation Instrumentation and Terminal Devices.

.6 Section 25 35 13 – Integrated Automation Actuators and Operators.

.7 Section 25 45 00 – Centralized Building Management System.

.8 Section 25 70 00 – Integrated Automation Building Systems Integration.

.9 Section 25 90 00 – Integrated Automation Control Sequences.

1.03 EXISTING CONDITIONS AND COORDINATION

.1 Survey controllers, panels, modules, power supplies, wiring and communications within the defined Work. Reconcile drawings, points lists and graphics with field conditions; report omitted or conflicting records for direction without automatically adding other systems.

.2 Identify each existing point within the defined Work and equipment item to be migrated, with its existing controller and terminal, signal, power source, safety interlock and temporary operating arrangement. Identify approved devices for reuse separately.

.3 Coordinate controller selection and interfaces with the Owner's existing BMS, FMO, IT and retained-equipment suppliers. Verify licences, BACnet/IP services and interface capability.

.4 Confirm work or equipment already supplied or installed by PHSA or others and distinguish it from the remaining Work before procurement.

1.04 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit an existing-to-proposed controller schedule for the defined Work showing equipment, panel and controller IDs, location, I/O count by type, communications, power and spare capacity.

.2 Submit a point-by-point migration matrix for the defined replacement and drawing interfaces identifying existing and new terminations, signal and range, safeties, command source, alarm and trend destination and cutover stage.

.3 Submit product data for controllers, expansion modules, power supplies, enclosures, interface devices and software or firmware. State environmental ratings, supported protocols, available I/O, memory and manufacturer support status.

.4 Submit panel layouts, wiring diagrams, network topology and calculations for I/O, transformer and power-supply loading. Show segregation of power, signal and communication wiring and the means of preserving hardwired safeties.

.5 Submit controller applications, control diagrams and a sequence compliance matrix for review before field download. Identify loss-of-power, loss-of-network and sensor-failure responses for each affected system.

.6 Submit a staged changeover and rollback plan with backup of existing configuration, temporary control and monitoring, proposed outages, witness points and restoration steps. Coordinate the plan with PHSA FMO, IT and affected clinical departments.

1.05 CLOSEOUT SUBMITTALS

.1 Provide final panel and point schedules, as-built wiring and network diagrams, controller applications in editable and recoverable formats, firmware versions, licence information, settings, passwords and complete configuration backups through an Owner-approved secure method.

.2 Provide point-to-point, sequence, failure-mode and recovery test records. Document the final alarm, trend and schedule assignment on the Owner’s existing BMS and its verified interfaces to systems designated to remain.

.3 Demonstrate to PHSA FMO or its authorized service provider the procedures and access required to diagnose, modify, back up and restore the installed controllers.

2 PRODUCTS

2.01 GENERAL CONTROLLER REQUIREMENTS

.1 Provide current, manufacturer-supported, programmable controllers and modules compatible with the approved architecture and the installed field-device signals. Size the system from the verified point schedule and approved sequences.

.2 Provide I/O channels and accessories for all scheduled points and spare capacity expressly indicated in the Contract Documents. Submit installed, used and unallocated channels by signal type, panel space and modular expansion options; identify fixed terminal-controller limitations and capacity/licence increments.

.3 Store applications and essential configuration in non-volatile memory. Provide a real-time clock, retained settings, diagnostic indication and controlled restart after power interruption.

.4 Protect outputs and field wiring from shorts, overvoltage and electrical noise as appropriate to the installation. Provide manual intervention facilities only where they cannot bypass equipment safeties or cause conflicting commands.

.5 Locate controllers in accessible, lockable panels or manufacturer-approved equipment enclosures suitable for the ambient conditions. Provide labelled terminals and adequate space for wiring, heat dissipation and service.

2.02 STAND-ALONE OPERATION AND FAILURE RESPONSE

.1 Execute local equipment control loops and protective responses within the controller serving that equipment. Loss of the server, operator workstation or supervisory connection must not interrupt the approved local operating sequence.

.2 Maintain existing independent, hardwired equipment safeties, fire and smoke functions and protective interlocks. An operator command, software override or communication failure must not defeat them.

.3 Provide defined safe action for power loss, controller fault, sensor failure and loss of communications according to the approved sequence. Restore normal operation in a controlled manner when the fault clears.

.4 Buffer alarms and trend records locally where required by the approved architecture and forward retained records after communications recover, subject to confirmed storage and retention criteria.

2.03 INPUTS OUTPUTS AND FIELD INTERFACES

.1 Provide analog, binary and universal I/O as needed for the verified sensors, actuators, equipment contacts and approved control sequences. Match input impedance, resolution, signal scaling, output capacity and electrical isolation to the connected devices.

.2 Provide separate indication of command and proof of operation where identified in the points schedule. Do not infer equipment operation solely from a controller output.

.3 Provide interface relays, isolation, signal conversion and surge protection where required by the connected equipment and approved panel design. Keep voltages and contact ratings within manufacturer limits.

.4 Connect fire alarm, smoke control and equipment protection interfaces only as indicated by the approved design and applicable equipment requirements; preserve existing listing and independent operation.

.5 Identify existing field devices proposed for reuse and verify compatibility and operation. Replace unsuitable devices as required by Sections 25 30 00 and 25 35 13 and the Contract Documents.

2.04 DRAWING POINT REQUIREMENTS

.1 Provide the hardware I/O required by Details A to D for each scheduled terminal: A has 4 AI and 4 BO; B has 4 AI, 1 AO and 4 BO; C has 1 AI and 1 AO; D has 2 AI and 2 BO. For Detail D, supply velocity pressure S-VP is an analog input; DPR-OP and DPR-CL are separate floating damper binary outputs. Provide all scheduled software values, alarms, trends, schedules and graphics. Match signal type and actuator switching to retained devices.

.2 Provide the fourteen additional deck static-pressure AI points listed on M3.1. Where the corresponding terminal row already includes a fifth AI, count that same sensor once. Count medical gas, Phoenix and LINAC interfaces separately from standard terminal I/O. MV-12 is the ancillary MV-D output associated with the Detail B assembly; do not duplicate the complete assembly point total. Show each point and host assignment in the coordinated submittal.

.3 Detail F requires thirteen medical gas alarm BI inputs, twelve remote alarm relay BO outputs and two communication-failure software states for the entire interface. Detail G requires 1 AI, 3 BI and 2 BO per cabinet; six cabinets require 6 AI, 18 BI and 12 BO. Provide the scheduled software functions for each interface.

.4 Phoenix EV/SV valve rows are not Detail A terminal controllers. Apply M3.1 General Note 4 and the Phoenix interface tables on M3.2/M3.3: provide the scheduled status and alarm software points per connected hood, with required source-controller interfaces, licences and mapping. Do not duplicate terminal hardware I/O or infer hood quantity solely from valve-row counts. Verify identifiers and interface availability with the existing hood controls before programming.

2.05 COMMUNICATION AND SUPERVISORY INTERFACES

.1 Provide the communication ports, addressing, software and licences required to connect controllers to the approved BMS network and operator interface. Coordinate protocol and cybersecurity configuration with Sections 25 17 00 and 25 24 00.

.2 Provide native BACnet/IP controllers with BTL certification/listing for the proposed model and firmware and a manufacturer PICS. Submit the scheduled object/property/service matrix and demonstrate interoperability at the existing 2021 Siemens BMS, including read/write rights, command priority and relinquish, alarm/event handling, schedules, trend access, time synchronization, stale-data indication and loss/restoration of communications. Identify limitations before product acceptance.

.3 Where retained systems or packaged equipment are interfaced, provide approved gateways, protocol conversion and point mapping, and demonstrate commands, alarms and recovery.

.4 Provide consistent point IDs, units, alarm states and time synchronization. Prevent conflicting commands during coexistence and demonstrate the assigned command authority for transferred functions after cutover.

2.06 SOFTWARE AND CONFIGURATION

.1 Provide editable controller applications implementing the approved sequences, alarms, schedules and local trends for every transferred system.

.2 Provide user-adjustable setpoints and schedules only where authorized in the approved sequence and operator-access matrix. Protect safety limits and critical environmental settings against inadvertent change.

.3 Provide Owner/FMO and its authorized service provider with native editable controller applications, graphics and databases, complete recoverable backups, administrative and engineering credentials, and the programming, diagnostic, download and restoration tools and licences required to maintain and modify the delivered Work. Disclose licence duration, renewal charges, transfer restrictions and vendor dependencies before product acceptance; licence terms shall not defeat the specified access. Transfer credentials through the Owner-approved secure method.

3 EXECUTION

3.01 INSTALLATION AND CHANGEOVER

.1 Install controllers and modules in accordance with manufacturer instructions and the approved panel drawings. Confirm power quality, grounding, network connection, enclosure conditions and available access before energizing.

.2 Label and back up existing Johnson Controls controllers, wiring and software before disconnection. Transfer points in stages with required temporary controls, monitoring and alarms. Remove legacy controllers only after functions pass testing.

.3 Coordinate shutdown windows, infection prevention and control, temporary arrangements and access in Pharmacy and other occupied areas with PHSA FMO and affected departments. Do not remove a working control path until its replacement is demonstrated. Comply with the site-specific work plan, Preventive Measures Analysis (PMA), IPAC plan and multidisciplinary team (MDT) coordination requirements in Section 01 35 13. Establish the required preventive measures before applicable work, including ceiling access and above-ceiling work.

.4 Record actual terminal assignments, controller addresses, firmware, application versions and changes made during installation.

3.02 CONFIGURATION AND TESTING

.1 Test each input and output from the physical field device to the controller and approved operator interface. Verify engineering units, scaling, command direction, proof, alarms and point naming.

.2 Demonstrate each transferred system sequence in representative modes, including schedules, manual command, seasonal changeover and critical-space alarms as applicable.

.3 Test loss and restoration of controller power, supervisory network, front-end communication and representative field signals under an approved procedure. Verify local control, equipment safeties, alarm delivery and restart behaviour.

.4 Demonstrate operation of transferred functions through the Owner’s existing BMS, point mapping, command authority, trends and alarm ownership. Verify independence from the failed NCM-1 and replaced legacy controllers and continued operation of retained-system interfaces.

.5 Correct deficiencies, repeat affected tests and deliver final backups and record documents before requesting acceptance.

END OF SECTION

1 GENERAL

1.01 SUMMARY

.1 Provide additions and configuration at the Owner’s existing BMS for the affected NCM-1 replacement and drawing interfaces, including operator access, monitoring, alarms, trends, schedules and graphics.

.2 Restore the operator functions for the defined Work at the Owner's existing Siemens BMS installed in 2021, retained as the long-term front end. Retain management software, hosting, workstations and unaffected operator functions. New field products shall meet the neutral functional and integration requirements; no separate replacement front end is included.

.3 Provide software configuration, licences, drivers, interfaces and operator functions for the transferred point inventory and drawing interfaces. Verify compatibility and available capacity at the existing Owner BMS.

.4 Keep real-time equipment control and independent safeties in the field controllers and equipment. Loss of the management platform or operator workstation shall not interrupt the approved local sequence.

1.02 RELATED REQUIREMENTS

.1 Section 25 05 00 – Common Work Results for Integrated Automation.

.2 Section 25 05 53 – Identification for Integrated Automation.

.3 Section 25 17 00 – Operational Technology Networks for Integrated Automation.

.4 Section 25 24 00 – Integrated Automation System Architecture Requirements.

.5 Section 25 41 00 – Building Automation Controllers.

.6 Section 25 70 00 – Integrated Automation Building Systems Integration.

.7 Section 25 90 00 – Integrated Automation Control Sequences.

1.03 EXISTING CONDITIONS AND COORDINATION

.1 Review existing operator graphics, points, alarms, schedules, trends, reports and available historical records for systems within the Work. Identify records to transfer, preserve or archive and confirm the existing BMS integration method.

.2 Identify functions lost through the controller failure and functions presently provided by temporary controls or independent environmental monitoring. Confirm which existing displays, alarms and records must remain available during cutover.

.3 Coordinate hosting, network access, cybersecurity, operator accounts, remote support, backups and data retention with PHSA IT and PHSA Facilities Maintenance and Operations (FMO) before procuring software or modifying Owner infrastructure.

.4 Confirm any software, licences, graphics, database changes or integration work already supplied by PHSA or others and document the remaining scope without duplication.

1.04 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit an operator-function matrix for every system within the Work showing graphics, commands, alarms and routing, trends, schedules, reports and final platform ownership.

.2 Submit interface diagrams showing the existing Owner BMS connection, new controllers, gateways and point paths, replaced legacy components and retained systems.

.3 Submit a point mapping and graphics schedule listing point ID, equipment, source controller, display location, engineering unit, command permissions, alarm priority, trend interval and retention requirements.

.4 Submit software/product data and a complete licence/Owner-access schedule for the existing 2021 Siemens BMS integration, operator clients, points, drivers, engineering tools, history and support. State included entitlements, five-year service/support renewals, native editable files, maintenance rights and disclosed charges after the service term. Distinguish the one-year comprehensive warranty from the five-year support commitment under Section 25 05 00. Verify exact existing versions and permissions before procurement.

.5 Submit a software configuration and migration plan showing backups, account permissions, alarm routing, historical data treatment, temporary monitoring, staged cutover, test criteria and rollback steps.

.6 Submit calculations for added point, licence, trend, graphic, storage and operator workload against the verified capacity of the existing BMS. Coordinate any necessary additions under Section 25 24 00.

1.05 CLOSEOUT SUBMITTALS

.1 Provide final graphics, point mapping, alarm matrix, schedules, trend definitions, account and role matrix, interface settings, software and firmware versions, licence entitlements and record architecture.

.2 Provide recoverable backups of the delivered database, graphics, configuration and software applications with documented restoration procedures. Transfer credentials and licence information by a PHSA-approved secure method.

.3 Provide test records, instructions and training for operation, alarms, trends, backup and restoration of the delivered integration and controller work at the existing Owner BMS.

2 PRODUCTS

2.01 MANAGEMENT PLATFORM AND LICENSING

.1 Provide supported software configuration and integration modules compatible with the Owner’s existing BMS and new BACnet/IP controllers, sized for all transferred points and functions.

.2 Provide licences for all delivered points, operator clients, integrations, engineering functions and historical storage. Demonstrate adequate licensed capacity for the verified point and application schedule.

.3 Verify the 2021 Siemens hosting, software/firmware versions, integration permissions, point/interface licences, network connections and operator/engineering access before procurement. Include additions necessary for all scheduled Work and expressly specified spare capacity; retain the existing management environment. Report unavailable capacity or incompatible versions for direction before ordering.

.4 Provide documented BACnet/IP integration into the Owner's existing BMS and interfaces to retained equipment where indicated. Transferred functions shall not rely on the failed NCM-1 or controllers replaced under this Contract.

2.02 OPERATOR INTERFACE AND GRAPHICS

.1 Provide navigation from each served floor and area to system, equipment and point. Provide graphics for all transferred systems showing state, values, setpoints, commands, alarms and trends.

.2 Use consistent point names, units, equipment identifiers and graphic symbols. Clearly identify points unavailable during changeover and distinguish actual proof or feedback from a command.

.3 Provide operator commands, overrides and setpoint adjustments only to authorized roles and in accordance with the approved sequence. Show an active override and provide a means to return to automatic control.

.4 Provide new or updated graphics at the Owner's existing BMS for all transferred systems. Retain unaffected displays and archive available legacy records as directed by PHSA.

2.03 ALARMS AND EVENT MANAGEMENT

.1 Configure alarms for all transferred systems with point identification, priority, state, time stamp, acknowledgment and return-to-normal record, routed to approved recipients.

.2 Use alarm limits, delays and escalation rules approved for Pharmacy and other critical spaces. Provide distinct notification of communication failure, sensor failure and loss of environmental control where identified in the sequences.

.3 Prevent duplicate alarm delivery during migration. Preserve required notification until replacement paths are demonstrated, then retire only the legacy alarm functions replaced under this Contract.

.4 Maintain an event and audit record for operator commands, setpoint changes, overrides and alarm acknowledgment, subject to the approved PHSA configuration and retention criteria.

2.04 TRENDS SCHEDULES AND REPORTS

.1 Provide trends for transferred temperatures, humidity, pressures, airflow, equipment states, commands and setpoints as identified in the point schedules.

.2 Configure one authoritative schedule for each transferred system. Remove competing commands from the replaced legacy controls after verified cutover; retain unaffected schedules.

.3 Provide operator access to current and historical trends and export of data in a commonly usable format. Provide reports only where identified in the approved functional schedule.

.4 Coordinate archive location, trend intervals, storage capacity and retention with PHSA IT and FMO. Where historical data cannot be migrated, document that limitation and preserve existing records as directed by PHSA.

2.05 ACCESS SECURITY AND RECOVERY

.1 Provide role-based access for operators, maintenance, engineering and administration. Use PHSA-approved authentication, time synchronization, session management and audit settings.

.2 Provide backup and recovery functions for delivered configuration and historical data under the approved architecture. Maintain the ability to restore the management application without relying on undocumented vendor settings.

.3 Enable remote access, cloud services and third-party support only through the method approved by PHSA IT. Disable default credentials and unused services before connection to the Owner network.

3 EXECUTION

3.01 CONFIGURATION AND CHANGEOVER

.1 Back up affected existing configurations, graphics, points and available histories before modification. Install required integration modules and licence additions at the Owner-approved existing management environment.

.2 Configure transferred points, graphics, alarms, trends, schedules, roles and reports at the existing Owner BMS. Coordinate command authority with new field controllers and retained systems.

.3 Stage cutover system by system with PHSA FMO, IT and affected clinical departments. Maintain temporary monitoring and notification for critical spaces and a documented means to restore the previous arrangement until acceptance.

3.02 TESTING AND HANDOVER

.1 Verify every transferred point at the designated operator interface against its physical device or controller, including values, units, commands, proof, alarms, trends and graphics.

.2 Demonstrate alarm routing and acknowledgment, schedule execution, trend retrieval, loss-of-communication indication and recovery. Test critical-space notifications with the responsible PHSA staff under an approved procedure.

.3 Demonstrate that failure of a server, workstation or supervisory connection does not defeat local control or independent equipment safeties and that operator visibility recovers after communications return.

.4 Demonstrate that Owner/FMO or its authorized service provider can access delivered native applications, graphics, databases, engineering tools, licences and credentials to maintain, edit and restore representative Work. Verify full recoverable backups and update records following the demonstration.

.5 Correct deficiencies, repeat affected tests, update record documents and complete operator training before requesting acceptance.

END OF SECTION

1 GENERAL

1.01 SUMMARY

.1 Provide interfaces between the replacement BACnet/IP controls, the Owner's existing BMS and retained equipment identified on the Drawings. Transfer the affected NCM-1 functions within the defined Work and preserve unaffected systems.

.2 Provide the interfaces and point mappings identified by the Drawings, schedules and migration matrix for the defined Work. Maintain retained-system operation during staged cutover.

.3 Provide BAS monitoring and alarm annunciation for the existing generator alarm points associated with the affected system, as required by M0.1. Verify existing alarm contacts, point definitions, controller connections and notification routing before cutover. Retain independent generator controls, safeties and local alarms; generator plant replacement and changes to primary controls are not included.

.4 Preserve independent equipment safeties and local control. A third-party interface or supervisory software shall not be the sole means of executing an essential real-time control loop or protective function.

1.02 RELATED REQUIREMENTS

.1 Section 25 05 00 – Common Work Results for Integrated Automation.

.2 Section 25 05 53 – Identification for Integrated Automation.

.3 Section 25 17 00 – Operational Technology Networks for Integrated Automation.

.4 Section 25 24 00 – Integrated Automation System Architecture Requirements.

.5 Section 25 41 00 – Building Automation Controllers.

.6 Section 25 45 00 – Centralized Building Management System.

.7 Section 25 90 00 – Integrated Automation Control Sequences.

1.03 EXISTING CONDITIONS AND COORDINATION

.1 Identify equipment, controller types, protocols, available data, hardwired connections and point ownership for every affected NCM-1 cutover system and each required interface to equipment designated to remain.

.2 Coordinate with PHSA FMO/IT, Island Health FMO responsible for the RJH Power House, the BAS supplier and affected equipment vendors for access, ownership boundaries, approved connections, licences, power, communication-loss response, shutdowns and witnessing. Include the complete medical-gas input-to-EN-6 relay path in the coordinated interface documentation; preserve unrelated plant controls and independent primary alarms.

.3 Identify interface, database or graphics work completed or underway by PHSA or others and document its status and incorporation in the Work.

.4 Do not connect to a fire alarm, smoke control, medical or clinical monitoring system or change an existing life-safety interface without the applicable approved design and coordination with its responsible vendor.

1.04 SUBMITTALS

.1 Submit an interface matrix for all transferred systems and remaining integration boundaries, identifying equipment ID, source, destination, point, data type, permissions, update method, alarm/trend owner, protocol and licence.

.2 Submit data-flow and network diagrams showing new controllers, existing systems to remain, packaged equipment, gateways, network boundaries and Johnson Controls components to be removed.

.3 Submit protocol/interface documentation, model/firmware PICS and BTL evidence as applicable, object/property/service lists, addressing, read/write rights, priority/relinquish behaviour, alarm/schedule ownership, trend methods, stale-data/failure/recovery response, software versions, licences and required vendor permissions. Identify retained-system exceptions and proprietary dependencies.

.4 Submit a test plan covering point mapping, command authority, alarm routing, trends, schedules, communication loss and restoration, and operation during the staged cutover.

.5 Submit a record integration manual with final maps, settings, test results, licences, backups, vendor contacts and procedures to restore each interface.

2 PRODUCTS

2.01 SYSTEM INTERFACES

.1 Provide documented, manufacturer-supported hardware and software interfaces compatible with the approved architecture and each connected system. Furnish required gateways, drivers, communication modules, licences and power supplies.

.2 Use a direct hardwired connection for local control and safety functions where identified in the approved controls drawings. Use a documented data connection for supervisory monitoring, approved commands and noncritical data exchange.

.3 Provide the BACnet/IP objects, properties and services required for every scheduled function at the existing 2021 Siemens BMS. Demonstrate commands and priority/relinquish, alarms/events, schedules, trends, time synchronization, valid/stale data and recovery. Document retained-equipment conversions, point/driver limits and licensing before product acceptance.

.4 Provide consistent equipment and point identifiers, units, scaling, states, time stamps and alarm priorities through every interface. Identify the source and meaning of status, command and feedback separately.

.5 Maintain sufficient licensed point and interface capacity for the verified design. Identify any continuing software subscription or vendor dependency before procurement.

2.02 INTERFACE FAILURE RESPONSE

.1 Detect and indicate loss of an integration link, stale data and invalid values. Define the operating response for each dependent point in the approved sequence and restore valid data when the link recovers.

.2 Do not issue a duplicate command from two platforms to the same equipment. Apply an approved priority and ownership arrangement and document how a temporary override is cleared.

.3 Keep equipment local controls and independent safeties operational during an interface failure under the approved fallback arrangement; indicate stale or invalid supervisory data.

2.03 EQUIPMENT SPECIFIC INTERFACES

.1 Phoenix interfaces: retain the existing air-valve and fume-hood safety and local control functions. Provide the scheduled status/alarm interface for each connected hood and map identifiers, controller source, signal meaning and permissions. Do not infer a fixed number of hoods from generic point names.

.2 Medical gas Detail F: integrate thirteen alarm inputs, including the separate nitrogen alarm in room 1512, and reproduce the twelve specified alarm states at the existing EN-6 relay interface at the RJH Power House. Physical panel locations are panel 1, room 1100 Reception Booking; panel 2, room 1301 Waiting; panel 3, room 2307 Nurse's Desk; and panel 4, room 2219 Corridor. Distinguish these from BAS host-controller locations. Document the complete input-to-relay path, terminations, polarity, normal/alarm states, power supplies and power/communication-loss response. Provide compatible interfaces for the drawn function and retain unrelated EN-6 plant controls.

.3 Retain the independent primary medical gas alarm system and its protective functions. BMS acknowledgment shall not suppress a primary alarm. Demonstrate each of the twelve input-to-relay paths and the separate nitrogen notification with FMO and the responsible equipment representative. No nitrogen relay output is shown.

.4 LINAC Detail G: provide cabinet temperature, fan status, fan commands and pit-water alarm functions for six cabinets. Coordinate the six existing fan pairs EF-7/8, EF-9/10, EF-11/12, EF-13/14, EF-15/16 and EF-17/18 with the cabinet/room schedule. This interface serves cabinet exhaust and pit monitoring; do not connect to treatment-machine controls.

3 EXECUTION

3.01 CONFIGURATION AND CHANGEOVER

.1 Back up available Johnson Controls and other affected configurations before changing controllers, gateways or databases. Record current settings and use PHSA-approved network access.

.2 Configure and map each point in accordance with the approved interface matrix. Set read and write rights, priority, scaling, units, alarm ownership and trend locations before enabling commands.

.3 Transfer interfaces in stages with PHSA FMO and affected clinical departments. Maintain required temporary control, monitoring and alarm notification until replacement functions have been verified.

.4 Coordinate necessary access to Johnson Controls proprietary equipment with authorized service personnel for migration and decommissioning. Do not alter independent systems designated to remain without approval.

3.02 TESTING AND CLOSEOUT

.1 Verify each mapped point against the physical device, controller or packaged-equipment source. Demonstrate values, statuses, commands, feedback, alarm transitions and trend capture at the designated operator interface.

.2 Test data loss and restoration at each interface under an approved procedure. Verify stale-data indication, local control, safe fallback, reconnection and recovery of operator visibility.

.3 Demonstrate final command authority and alarm ownership at the Owner’s existing BMS without duplicate or conflicting actions. Verify independence of transferred functions from the failed NCM-1 and replaced legacy controls.

.4 Correct deficiencies, repeat affected tests and deliver the final integration manual, configuration backups and licences before requesting acceptance.

END OF SECTION

1 GENERAL

1.01 SUMMARY

.1 Provide programming and functional verification for affected NCM-1 legacy systems and additional interfaces identified on the Drawings, integrated into the Owner's existing BMS.

.2 Recreate the approved functional intent for every transferred system, incorporating documented corrections and verified points. Maintain controls designated to remain and obtain PHSA review before changing equipment operation.

.3 Implement the equipment-specific sequences and points on M3.1 to M3.4 for the corresponding equipment on M2.1 to M2.4. The common provisions below supplement those sequences. Report conflicts or missing equipment-specific details before programming; unlisted plant replacement and unconfirmed clinical setpoints are not authorized.

1.02 RELATED REQUIREMENTS

.1 Section 25 05 00 – Common Work Results for Integrated Automation.

.2 Section 25 30 00 – Integrated Automation Instrumentation and Terminal Devices.

.3 Section 25 35 13 – Integrated Automation Actuators and Operators.

.4 Section 25 41 00 – Building Automation Controllers.

.5 Section 25 45 00 – Centralized Building Management System.

.6 Section 25 70 00 – Integrated Automation Building Systems Integration.

1.03 EXISTING CONDITIONS AND DESIGN BASIS

.1 Review available existing control drawings, points lists, BAS graphics, alarm histories, trend records, equipment manuals and field operation with PHSA Facilities Maintenance and Operations (FMO). Identify temporary manual settings and functions lost through the controller failure.

.2 Verify every transferred equipment tag, point, actuator, safety, interlock, schedule, setpoint and mode against records and installed operation before programming.

.3 Submit a sequence schedule for each transferred system including modes, control loops, resets, alarms, failure response and any interface to an existing non-Johnson Controls system designated to remain.

.4 Obtain PHSA review of proposed changes to existing operation, particularly Pharmacy and other clinical environments. Apply the equipment-specific sequences and clinical criteria issued for this Contract; historical sequences or generic energy-saving strategies do not authorize changes to current clinical operation.

1.04 SUBMITTALS AND CLOSEOUT

.1 Submit controller programs, annotated control schematics, sequence narratives, point mapping, setpoint and alarm schedules, and a sequence compliance matrix before downloading applications.

.2 Submit a staged test and cutover plan identifying temporary control and monitoring, affected spaces, permitted outages, witness points, rollback procedure and conditions for returning each system to automatic operation.

.3 Provide final editable sequences, controller applications, parameter lists, alarm and schedule settings, trend definitions, test results and recoverable backups at closeout.

2 PRODUCTS

2.01 NOT USED

.1 Not used.

3 EXECUTION

3.01 GENERAL PROGRAMMING CRITERIA

.1 Place local control loops, equipment interlocks and failure responses in the controller serving the equipment. Use the management platform for authorized commands, graphics, alarms, trends and schedules.

.2 Provide operator-adjustable setpoints, delays and schedules only where indicated in the approved sequence. Limit critical environmental settings and safety thresholds to authorized roles.

.3 Use control loops, deadbands, minimum run times, start delays and output limits suited to the connected equipment. Tune loops under representative operating conditions to avoid hunting, short cycling and unstable airflow or pressure.

.4 Verify commanded and proven equipment states separately. An output command alone does not establish fan, pump, valve or damper operation.

.5 Maintain hardwired freeze protection, high-limit, fire and smoke and other independent safeties. BAS programming shall monitor their state and respond as approved without bypassing their protective action.

3.02 COMMON ENABLE AND SHUTDOWN SEQUENCE

.1 On an approved enable command, check permissives and safety states, position required dampers and valves, start equipment in the manufacturer-approved order, and verify proof of operation before enabling dependent outputs and control loops.

.2 On a normal stop, release control loops and stop equipment in the approved order. Drive valves and dampers to the documented shutdown positions, subject to freeze protection, minimum ventilation and any independent safety requirement.

.3 After power restoration, restart equipment in a controlled sequence with adjustable delays to avoid simultaneous starts. Maintain equipment locked out where a manual-reset safety or unresolved fault requires intervention.

.4 On failure of a critical sensor or proof signal, annunciate the fault and move only the dependent equipment to the fallback condition documented for that system. Do not substitute an unverified value for a critical room condition.

3.03 SERVING AIR SYSTEM INTERFACES

.1 Maintain serving air-handling and ventilation control systems designated to remain. Reconnect the terminal and deck-pressure interfaces shown on the Drawings and verify their effect on the retained serving controls. Do not assume replacement of air-handling controllers or addition of unlisted plant points.

.2 Maintain required ventilation and critical-space environmental control during occupied and other required operating periods. Apply unoccupied setback or shutdown only where the approved room and equipment schedule permits it.

.3 Preserve existing supply-air and static-pressure control functions at retained serving systems. Connect only the scheduled pressure and airflow signals and document signal ownership, destination and failure response.

.4 Preserve independent fan, freeze-protection and fire/smoke safety actions at the retained serving systems. Test only the interfaces affected by this Work under an approved procedure.

.5 Where supply and exhaust air valves or VAV terminals are included, coordinate airflow commands and feedback with the serving air handler. Maintain required minimum and maximum flows and any room pressure relationship under the approved clinical criteria.

3.04 PHARMACY AND CRITICAL SPACE CONTROL

.1 For each identified Pharmacy or other critical space, control temperature, humidity, airflow and room pressure only where the relevant points and devices are shown in the approved design. Maintain the defined relationship between supply, exhaust and adjacent spaces.

.2 Annunciate out-of-range conditions and loss of control or monitoring using approved thresholds, delays and recipients. Trend the measured values, setpoints and related equipment states at the approved interval.

.3 During staged changeover, maintain independent monitoring and notification as directed by PHSA. Confirm normal environmental conditions and alarm delivery before removing temporary arrangements. Coordinate ventilation, airflow and room-pressure impacts in all affected clinical areas with the Owner and project MDT, including IPAC as applicable. Follow the reviewed recovery protocol, record independent environmental readings and restore required control and alarm functions before return to service. Following a failure, obtain the MDT/IPAC risk review and required Owner authorization before resuming affected work or releasing the space.

.4 Where an existing clinical monitoring system operates independently of the BAS, maintain its function and coordinate the interface without assigning it BAS control authority unless specifically approved.

3.05 TERMINAL AND SPECIAL INTERFACE SEQUENCES

.1 Details A and B: use the drawn zone-temperature loop to reset discharge-air temperature and proportion hot- and cold-deck airflow while maintaining scheduled total flow. Provide floating damper commands, discharge temperature and cold-deck/total-flow feedback. Implement the drawn one-hour occupancy override and occupied/unoccupied functions; Detail B also controls the indicated MV-D analog output.

.2 Use the minimum, maximum and unoccupied airflow settings scheduled for each terminal and the applicable clinical operating requirements. Enable the drawn unoccupied minimum-flow mode only where permitted and required continuous ventilation and pressure relationships remain satisfied. Do not apply a generic percentage reduction. Record accessible existing operating settings, reconcile missing or conflicting values with the Consultant and FMO before programming, and document final accepted settings at handover.

.3 Details C and D: implement the drawn zone-temperature sequences. Detail C uses the scheduled 0-10 V MV-D output and separate Phoenix status/alarm interface. Detail D uses AI S-VP supply velocity-pressure feedback and two floating damper outputs, DPR-OP and DPR-CL, to regulate airflow between the applicable minimum and maximum settings. Preserve the independent fire alarm shutdown interface where indicated; do not replace its protective action with BMS logic.

.4 Detail F: annunciate each medical vacuum, air and oxygen alarm from the four panels, map it to the corresponding EN-6 relay output, and monitor the separate nitrogen alarm. Use verified contact polarity and the documented communication/power-failure response. Test every path without impairing primary medical gas alarms.

.5 Detail G: enable cabinet exhaust control and pit monitoring continuously. Operate each fan pair as lead/lag and alternate after 200 operating hours, adjustable. Initially cycle the lead fan at 23 °C and start the lag fan above 26 °C with a high-temperature alarm, as shown on the Drawings. On proven lead-fan failure start the lag fan and alarm; annunciate pit water detection. Confirm and record final setpoints, deadband, proving delay, rotation logic and equipment interlocks before cutover.

.6 Generator monitoring: annunciate the existing affected-system generator alarm contacts at the Owner's BMS and restore their verified notification routing in accordance with M0.1. Verify contact polarity and alarm/normal definitions before cutover and test each transferred notification path. Retain independent generator controls, safeties and local alarms; no BAS generator start/stop command or primary control modification is included.

3.06 SCHEDULES ALARMS AND LOSS OF COMMUNICATION

.1 Configure one authoritative schedule and command source for each affected system. Show manual overrides and their expiration or release method at the operator interface.

.2 Provide alarms for equipment failure, sensor failure, communication loss, critical-space excursion and other states listed in the approved alarm schedule. Identify equipment and point, time, priority, acknowledgment and return to normal.

.3 On loss of the front end or supervisory network, continue local control in the approved mode using local inputs, retained setpoints and schedules where required. Record alarms and trends locally to the extent supported by the approved architecture.

.4 When communications recover, restore operator visibility, alarm and trend transfer, and scheduled control without duplicate commands or unexpected equipment cycling.

3.07 FUNCTIONAL VERIFICATION

.1 Test each sequence from field device through controller to the designated operator interface. Demonstrate normal start, stop, modes, interlocks, proof, alarms, trends and recovery at representative conditions.

.2 Test the approved failure cases, including sensor fault, loss of fan or pump proof, network interruption and controller power restoration, without creating an unacceptable clinical condition. Coordinate test methods with PHSA FMO.

.3 Record final setpoints and tuned parameters, correct deficiencies and repeat affected tests before acceptance. Update the editable sequence narrative to reflect the installed control application.

END OF SECTION

Purpose	To provide guidance on requirements for cleaning and transporting clean tools, equipment, supplies, and waste in health care facilities, including the highest-risk population risk group areas. Tool and equipment cleaning is important to stop the spread of potential pathogens inside a Health Care Facility.
Scope	To be used by Facilities Management (FM; FMO and FDC) personnel and/or contractors for the purpose of cleaning tools/equipment prior to use throughout specific locations within a health care facility. • To be used when a baseline level of cleanliness is required. • An additional level of cleaning and disinfecting may be required, dependent on the population risk group occupying the location (as per *CSA Z317.13 Table 2),* on a case-by-case basis ***as recommended and instructed by the MDT***.
Infection Control Risk Assessment	Tools and equipment that are visibly soiled or otherwise contaminated with potentially pathogenic micro-organisms can act a direct contact mode of transmission to patients. Higher-risk patient population groups are more susceptible to construction-related infections from contaminated tools/equipment. Contaminants have the potential to impact patients directly or indirectly, by way of contaminated equipment, supplies, furniture, etc.
Outcomes	To reduce the risk of construction-related infections in health care facilities that are related to biohazards and contaminated tools/equipment/waste.

This guidance also applies to all contractors completing work in our health care facilities.

- ❖ Project Coordinator must ensure the contractors are aware of, and adhere to, all requirements.
- ❖ FMO may periodically audit contractors to ensure requirements are being met.

1.0 Cleaning - Equipment and PPE Requirements

The exact equipment needed is dependant on the nature and extent of cleaning, as well as the type of tool that is being cleaned. Some examples below.

- Cleaning:
  - HEPA vacuum (with valid HEPA-filter leak test certificate).
  - Clean damp cloth, wet wipes, or equivalent (i.e. a material used to clean hard surfaces).
  - Shop sink with soap and warm water.
- Disinfection (enhanced level of cleanliness):
  - Accelerated hydrogen peroxide wipes, or equivalent hospital-grade disinfectant.
- PPE:
  - Follow manufacturer's instructions or Safety Data Sheets when using any products to determine the appropriate PPE requirements.

This material has been prepared solely for use at Island Health. Island Health accepts no responsibility for use of this material by any person or organization not associated with Island Health. A printed copy of this document may not reflect the current, electronic version on the Island Health Intranet.

2.0 Cleaning Requirements

As per the CSA Z.317.13standard, all tools/equipment/supplies used or transported within a health care facility must be visibly clean.

- ☐ When to clean:
  - ✓ Prior to starting a job
    - Before entering the building, or
    - Before leaving the FMO workshop/maintenance location.
  - ✓ Upon completion of a job
    - Before leaving a job-site (i.e. tools and cart must be cleaned following work within a containment prior to exiting the containment into the hospital zone).
  - ✓ Any time there is the potential for contaminants to spread.

- ☐ What to clean:
  - ✓ All tools, equipment, supplies
    - HEPA vacuums and accessories[1]
    - Hand tools
    - Pop-up containment systems
    - Construction waste bins
    - Modular hoarding
    - Ladders
    - Carts
    - Tool kits
    - Wheels on carts/vacuums
  - ✓ Clothing/attire, PPE

- ☐ How to clean:
  - ✓ Items must be visibly cleaned and free from all dust and debris. Accomplish this by any of the following, depending on nature of item to be cleaned (e.g. do not try to clean a cloth bag with a wet rag, use a HEPA vacuum instead).
    - HEPA vacuum – best for porous surfaces
    - Clean damp cloth, wet wipes, or equivalent – best for hard surfaces
    - Shop sink with soap and water – best for small items that can be submerged e.g. bit buddie. Always ensure equipment is sufficiently dried and monitor for any potential fungal growth.
  - ✓ Once there is no visible dust or debris apparent, the item is considered visibly clean.

- ☐ Disinfection ***may be required***, pending direction from the MDT (e.g. before use in a highly sensitive area). See Section 4.0 below for instructions.

[1] HEPA equipment have additional maintenance requirements which are not included within this document, including filter changing and disinfection. See applicable maintenance document for HEPA equipment.

This material has been prepared solely for use at Island Health. Island Health accepts no responsibility for use of this material by any person or organization not associated with Island Health. A printed copy of this document may not reflect the current, electronic version on the Island Health Intranet.

3.0 Disinfection

Disinfection may be required dependant on a multitude of factors. The premise is to provide a level of cleanliness such that potential pathogens and other microorganisms have been destroyed or inactivated (whereas cleaning only removed visible dust, debris, and dirt and may not kill microorganisms).

Examples of scenarios where disinfection should be utilized:

- ✓ Upon completion of a mould abatement – ***always required***
- ✓ Prior to completion of work in a highly sensitive environment (such as sterile supply area) – ***may be required***

It is the responsibility of the MDT to determine whether enhanced cleaning is required, and to make FMO aware of the requirement (with exception to post-mould abatement cleaning, where it is always required).

How to complete enhanced cleaning:

☐ **Step 1: Preparation**
- ✓ Gather equipment
- ✓ Perform hand hygiene
- ✓ Don a pair of nitrile gloves

☐ **Step 2: Initial clean**
- ✓ Wipe clean all surfaces using a disinfectant wipe until they are visibly clean

☐ **Step 3: Disinfection**
- ✓ Using a second wipe, repeat step 2
- ✓ Allow for surface to remain wet as per the manufacturer's instructions listed on the product label. The appropriate wet contact time is required to ensure adequate disinfection. Staying wet allows decontamination to take place when using sterile wipes.
- ✓ Discard all wipes in garbage

☐ **Step 4: Labeling/Identification (recommended)**
- ✓ It is ***recommended*** to implement a system to track which tools/equipment have been disinfected so as to keep them separate from other tools/equipment. Each shop may implement their own system of labeling as needed (e.g. a tool bag/box and designated areas for dirty vs. clean vs. disinfected equipment).

4.0 Guidance – Transporting Tools, Equipment, Supplies IN to Population Risk Group 3 & 4 Areas

Population Risk Group 4 areas are occupied by the highest risk individuals/supplies and require the highest level of care to reduce the risk of contamination from construction activities. The following guidance will reduce such risk:

Tools & Equipment

- ☐ **Keep to a minimum** – avoid the use of tool carts when possible.
- ☐ Placed in **clean coverings (e.g. bags or bins)** or otherwise contained during transport.
- ☐ **Clean** (including equipment carts) prior to transport (see Sec. 2).

This material has been prepared solely for use at Island Health. Island Health accepts no responsibility for use of this material by any person or organization not associated with Island Health. A printed copy of this document may not reflect the current, electronic version on the Island Health Intranet.

Supplies & Materials

- ☐ Must be **protected from exposure to dust and moisture** during delivery to the site, unloading, storage, and construction (i.e. store in appropriate area with coverings as needed).
  - Storage should be in controlled climate: 16-28°C ; <60 % RH.
  - Stored off the floor (to prevent water damage).

5.0 Guidance – Transporting Tools, Equipment, Supplies OUT of Population Risk Group 3 & 4 Areas

Tools and equipment are considered contaminated as soon as they are used in a risk group 3 & 4 areas. The following guidance will reduce the risk of contaminating spaces while leaving the work site:

Tools & Equipment

- ☐ Placed in **clean coverings (e.g. bags or bins)** or otherwise contained during transport.
- ☐ **Clean** (including equipment carts) prior to transport (see Sec. 2).

Waste & Debris

- ☐ Placed in **covered container** or covered with a clean sheet (or other type of cover) before transporting.

As with tools, equipment, and supplies, all workers must ensure their clothing is clean before transitioning through patient care areas.

- ❖ HEPA vacuum all clothing prior to leaving work site, or
- ❖ Wear protective coveralls when working and then remove prior to leaving

6.0 Important Considerations

- ☐ Carts must be covered and clean when being transported through a patient care area.
  - ✓ Clean prior to entering a patient care area (i.e. in the FMO shop or outside of the facility, or before leaving an active work zone).
- ☐ Construction waste/debris must be transported in a closed, cleaned container (i.e. never transport a waste bin with an open top through a facility).
  - ✓ Similar to tool/equipment cart, waste bin must be cleaned prior to transport.

This material has been prepared solely for use at Island Health. Island Health accepts no responsibility for use of this material by any person or organization not associated with Island Health. A printed copy of this document may not reflect the current, electronic version on the Island Health Intranet.

7.0 Definitions

The following key definitions and abbreviations apply:

HCF	Health Care Facility	**MDT**	Multidisciplinary Team
CAHU	Construction Air Handling Unit	**PM**	Preventive Measure
ICP	Infection Control Professional	**PMA**	Preventive Measures Analysis
IPAC	Infection Prevention and Control	**PPE**	Personal Protective Equipment
FM	Facilities Management (includes FMO + FDC)	**HEPA**	High-Efficiency Particulate Air

HEPA filtered vacuum:	A vacuum cleaner equipped with HEPA filtration that is capable of being performance leak-tested. Will have a minimum efficiency of 99.97% when tested on particles 0.3µm in size.
Terminal clean:	A thorough cleaning of a clinical space by the hospital's housekeeping team before the space is used for patient care, storage of clean/sterile supplies, or medical equipment. This cleaning is only to occur following a final construction clean by the Constructor. A terminal clean typically occurs as the last clean prior to patient occupancy. A terminal clean is sometimes referred to as a hospital clean, clinical cleaning, or return to service cleaning.

8.0 Related Island Health Standards

- N/A

9.0 References and Documents

- CSA Z317.13 *Infection control during construction, renovation, and maintenance of health care facilities*

10.0 Resources

For reference only (always follow documented procedures listed in this link):

- https://intranet.islandhealth.ca/departments/infection_prevention/Pages/hand-hygiene.aspx

This material has been prepared solely for use at Island Health. Island Health accepts no responsibility for use of this material by any person or organization not associated with Island Health. A printed copy of this document may not reflect the current, electronic version on the Island Health Intranet.

Purpose	To mitigate the release of dust and potential contaminants (e.g. *Aspergillus* from construction-related activities) into the environment while pulling electrical or data cables through a ceiling space.
Scope	Applicable to FM personnel and/or contractors when completing data or electrical cable and/or conduit pulls (type C activity) within the ceiling space. **Limitations**: • Does not apply in situations where there is observable contamination of a ceiling tile (e.g. stained or wet ceiling tile) or hazardous materials may be present. Additional controls may be required.
Infection Control Risk Assessment	Construction work activity classification: • Type C activity = electrical work above ceilings • Risk Groups 2, 3, and 4 ⚠ For Risk Group 4, PMA/ICRA approval is REQUIRED for work to go ahead.
Outcomes	Provide clear directions to FM personnel on the preventive measures required to work safely in health care facility ceiling spaces.

Preventive Measures Analysis as per CSA Z317.13:22 for use in Health Care Facilities

Population Risk Group	Construction Activity Type			
	Type A	Type B	Type C	Type D
Group 1	I	II*	II	III
Group 2	II	II	III	IV
Group 3	II	III*	III	IV
Group 4	II	III*	IV	IV

- Potential sources of contamination when completing the task include:
  - Dust/contaminants from the ceiling space released into the patient care areas if controls fail. Ceiling space is typically grossly contaminated with settled dust and debris.
  - Dust/contaminants on uncleaned equipment/tools/supplies/individuals.
  - Dust/contaminants released into the atmosphere if the HEPA vacuum is not properly maintained.
- Contaminants have the potential to impact patients directly or indirectly, by way of contaminated equipment, supplies, furniture, etc.

1.0 Equipment and PPE Requirements

- Equipment:

This material has been prepared solely for use at Island Health. Island Health accepts no responsibility for use of this material by any person or organization not associated with Island Health. A printed copy of this document may not reflect the current, electronic version on the Island Health Intranet.

  - HEPA vacuum (with valid HEPA-filter leak test certificate).
  - Clean damp cloth, wet wipes, or equivalent (i.e. a material used to clean hard surfaces).
  - Ladder.
  - Pop-up containment unit.
  - Protective clothing (Tyvek suit and gloves; dust mask optional).
  - Task-specific tools, as required.
  - Waste bags.
- Always follow specific unit guidelines, including:
  - Use of unit-specific PPE or clothing (e.g. gown, face mask, hair net etc.), as required.
  - Use of alcohol based hand rub before entering and after exiting a unit.

2.0 Procedure

***Notes – Prior to work beginning*:**

- *Preventive measures are based on CSA Z317.13:22 Clause 7.5.3. "ceiling access for activities up to and including construction activity Type C and Population Risk Group 3 or 4".*
- *A qualified worker must assess the population risk group of the impacted area prior to using this procedure.*
  - *A qualified worker refers to one who has demonstrated experience and knowledge of the principles and practices of infection control during construction,*
- *These procedures are assuming that the pop-up containment unit is designed in a way that allows it to be sealed to the ceiling grid by way of a gasket or equivalent.*
  - *If a pop-up containment cannot be used in a particular space (e.g. it does not fit in the room), a simple airtight containment constructed from poly and taped to the underside of ceiling must be used.*
- *Never leave a tile removed or a hatch open unattended.*
- *Never remove more than one tile at a time without additional controls.*

No patients or residents permitted in the room while accessing ceiling space

A minimum of 2 workers are required to carry out this SOP

***Prior to work*:**

1. Contact the department/unit leader, or the individual who submitted the work request to discuss logistics:
   a. Determine a period of low activity to complete the work.
   b. Discuss the requirement for space to be vacant from all patients. If this is not possible, determine in consultation with IPAC an appropriate exclusion zone and prepare to use barrier tape to create zone.
2. Clean all equipment, tools, if not already cleaned, etc.

This material has been prepared solely for use at Island Health. Island Health accepts no responsibility for use of this material by any person or organization not associated with Island Health. A printed copy of this document may not reflect the current, electronic version on the Island Health Intranet.

3. Contact housekeeping department to arrange for a terminal clean immediately after the work is scheduled. This includes the entire length of the planned cable pull (highlighted drawing may work best).

Completing the work:

4. Remove or protect (with poly) any patient care equipment or supplies in the immediate vicinity of the ceiling access location.
5. Place all required equipment inside the pop-up containment.
6. Roll the pop-up containment to the work area.
7. Lift the pop-up containment to surround the tile to be removed, ensuring a tight seal to the surrounding tile and grid.
8. Don protective clothing; enter containment.
    a. *Critical that the worker who enters the pop-up (active worker) must remain inside the containment until another worker (support worker) wheels them to a Risk Group 1 location to decontaminate and exit. As applicable, if this can not be achieved the lowest risk group area should be used, or the nearest corridor.
9. Turn on HEPA vacuum and apply continuously at the point of tile removal (a hook hanging from the ceiling grid can be used to hold the vacuum near the tile).
    a. HEPA vacuum to stay running for the entirety of the work activity to scrub the air within the pop-up containment.
10. Remove ceiling tile, keep level, and place on an adjacent tile.
    a. Important: this may contaminate the underside of the tile with ceiling dust. Ensure the underside of the tile is HEPA vacuumed upon replacement.
11. HEPA vacuum all surfaces within the ceiling space that will be impacted by the work activity.
    a. This should be completed to all areas within reach that are along the planned cable/data pull.
12. Complete electrical or data pull work.
    a. Important: limit the disturbance to ceiling infrastructure and surfaces as much as possible.
13. HEPA vacuum all surfaces within the ceiling space that were impacted upon the completion of work.
14. Carefully replace ceiling tile.

Prior to moving the containment:

15. HEPA vacuum the following:
    a. Bottom surface of the ceiling tile that was replaced.
    b. All PPE/clothing.
    c. All surfaces within the pop-up containment, including tools and equipment.
16. Allow the HEPA vacuum to run for at least 5 minutes to scrub the air of airborne dust.
    d. If the pop-up containment has an in-line HEPA filtration system, ensure it has a valid leak test certificate and use.
17. HEPA vacuum surfaces in the immediate vicinity of the work location.

This material has been prepared solely for use at Island Health. Island Health accepts no responsibility for use of this material by any person or organization not associated with Island Health. A printed copy of this document may not reflect the current, electronic version on the Island Health Intranet.

18. Once steps above are complete (15-17) the containment may be wheeled, by the support worker with active worker remaining within the containment, to the next ceiling tile to be removed along the pull route and start process again from step 4 or proceed to the steps below to exit the containment.

Upon completion of work and prior exiting the containment:

19. If working in a Risk Group 2, 3 or 4 area, the support worker will wheel the containment unit to a Risk Group 1 area of the facility. As applicable.
20. HEPA vacuum the following:
    a. All PPE/clothing.
    b. All surfaces within the pop-up containment, including tools and equipment.
21. Remove protective clothing and place in a waste bag. Waste to be disposed of as general waste.
22. Housekeeping to complete a terminal clean of the area in the immediate vicinity of all locations where ceiling access was required to conduct cable pull work.
23. Replace all furniture, equipment, supplies that may have been moved.

3.0 Definitions

The following key definitions and abbreviations apply:

HCF	Health Care Facility	**MDT**	Multidisciplinary Team
CAHU	Construction Air Handling Unit	**PM**	Preventive Measures
ICP	Infection Control Professional	**PMA**	Preventive Measure Analysis
IPAC	Infection Prevention and Control	**PPE**	Personal Protective Equipment
FM	Facilities management (includes FMO + FDC)	**HEPA**	High-Efficiency Particulate Air

HEPA (high-efficiency particulate air) filtered vacuum:

- A vacuum cleaner equipped with HEPA filtration that is capable of being performance leak-tested. Will have a minimum efficiency of 99.97% when tested on particles 0.3µm in size.

Terminal clean:

- A thorough cleaning of a clinical space by the hospital's housekeeping team before the space is used for patient care, or the storage of clean/sterile supplies, or medical equipment. This cleaning is only to occur following a final construction clean by the Constructor. A terminal clean typically occurs as the last clean prior to patient occupancy. A terminal clean is sometimes referred to as a sterile clean.

4.0 Related Island Health Standards

- *IC GD 2 – Cleaning Tools and Equipment Guidance*

This material has been prepared solely for use at Island Health. Island Health accepts no responsibility for use of this material by any person or organization not associated with Island Health. A printed copy of this document may not reflect the current, electronic version on the Island Health Intranet.

5.0 References and Documents

- CSA Z317.13:22 *Infection control during construction, renovation, and maintenance of health care facilities*

6.0 Resources

- Specific manufacturer's instructions should be reviewed prior to using the pop-up containment unit.

This material has been prepared solely for use at Island Health. Island Health accepts no responsibility for use of this material by any person or organization not associated with Island Health. A printed copy of this document may not reflect the current, electronic version on the Island Health Intranet.