

SECTION 01 17 71: PROJECT TURNOVER REQUIREMENTS

1. GENERAL

A. This section details the requirements for project turnover and Closeout, as well as record document information required prior to project closeout, including but not limited to:

- 1. Red line mark-up as-built Documents**
- 2. Contractor stamped Record Drawing Documents**
- 3. Demonstrations and Training for Equipment and Systems and building components**
- 4. Building systems software and programming**
- 5. Data sheets for interior finishes (ceiling, flooring, walling, paint, signs, etc.)**
- 6. Project Closeout documentation**

B. Related Design & Construction Standards

- 1. Section 01 17 73: Operation & Maintenance Manuals**
- 2. Section 01 33 10: Computer Aided Design (Cad) & Building Information Modeling (BIM) Deliverable Guidelines**
- 3. Section 01 78 00: Survey Control**
- 4. Section 23 09 00 – Building Automation Systems Design Criteria**

C. Implementation

- 1. Many of the Project Turnover requirements noted herein are fully required for major (Category 1 and Category 2) projects. Smaller (Category 3 and Category 4) projects may or may not require all of the indicated Turnover and Closeout information due to the nature and scope of the project.**
- 2. It is expected that the Project team will review this Turnover Standard, with an FM-OPs representative, at the beginning of the project to identify the applicable portions of this document to be included as Project Turnover Deliverables, based on the defined project scope. If the project scope expands during the project execution, additional turnover requirements may apply.**

2. SUBSTANTIAL COMPLETION

- A. Many of the turnover requirements are based on the project’s substantial completion date (however, due to construction phasing, individual system turnover and warranty dates may differ from the project’s turnover date)**
 - B. The date used for Substantial Completion shall not be earlier than four weeks after submittal of the Draft O&M package**
 - C. The four defined delivery categories of projects have two types of substantial completion determination methods.**
 - 1. Category 1: Major Campus Impact projects require the completion of the AIA Document G705 - “Certificate of Substantial Completion”, to be signed by the AVP of Facilities Operations or their designee.**
 - 2. Category 2: Substantial Renovation projects require the completion of the AIA Document G705 - “Certificate of Substantial Completion”, to be signed by the AVP of Facilities Operations or their designee.**
 - 3. Category 3: Typical Upgrade projects require a formal notification of substantial date via email to the AVP of Facilities Operations; the Director of Operations, Logistics and Support; and the Preventive Maintenance Manager. This communication also requires the formal reply from the AVP of Facilities Operations or his/her designee, to the notification email, accepting the substantial completion date for the project.**
 - 4. Category 4: Simple projects require a formal notification of substantial date via email to the AVP of Facilities Operations; the Director of Operations, Logistics and Support; and the Preventive Maintenance Manager. This communication also requires the formal reply from the AVP of Facilities Operations or his/her designee, to the notification email, accepting the substantial completion date for the project.**
- 3. MARKED-UP AS-BUILT DRAWINGS**
- A. During construction, all contractors will maintain one set of full size, hard copy contract plans at the site, dedicated for use as a red line marked-up record/as-built set of documentation.**
 - B. Red line marked-up plans are to be modified as construction progresses and maintained continuously during the project.**
 - C. Maintain the as-built/marked-up set (site “red-lines”) available for review by the architect, owner, and owner’s representatives.**

- D. **Failure to maintain accurate as-built mark-ups will constitute sufficient justification for withholding payments to the contractor.**
 - E. **The corrections on the as-built/marked-up set are to be incorporated into original contract plan CAD files for final delivery to the owner. All plans to be included in the set.**
 - F. **The plans are to be marked up to show construction deviations in the as-built drawings from the contract drawings. Deviations are to be shown in the same general detail utilized in the contract drawings. The drawings are to show the following, but not be limited to:**
 - 1. **Locations and descriptions of any utilities constructed or located within the construction limits. Provide survey point numbers on the plans for reference.**
 - 2. **Locations and dimensions of changes within the facility. Floor plan/layout changes should also include revised room numbers, as physically tagged in the field.**
 - 3. **Changes in grade, alignment, location, elevations, details, and dimensions of all work including facilities, structures, roads and utilities.**
 - 4. **Incorporate approved sketch (SK) drawings**
 - 5. **Where the contract drawings show options, only show the option used in construction**
- 4. AS-BUILT RECORD DRAWINGS**
- A. **The design team and contractor's construction manager will combine items B through E below to create the record plans and matching electronic formats.**
 - B. **At the end of construction, the design team will provide to the contractor a complete set of CAD file(s) with all the plan adjustments (bulletins and sketches produced by the design team) fully incorporated into the base CAD file(s). This is to happen within 14 days of substantial completion.**
 - C. **The contractor will coordinate the process to take all field changes/adjustments (site "red-lines") by all subcontractors and add these changes accurately to the CAD file(s). All hand-drawn SKs that are not included in the design team's electronic update must be added to the CAD file(s) by the contractor. This is to happen within 21 days of receipt of updated electronic files from the design team.**
 - D. **The contractor will also include any electronic MEPFP (Mechanical, Electrical, Plumbing & Fire Protection) coordination drawings produced by the construction team in the final electronic as-built drawing issue. The coordination drawings shall not replace any of the original contract drawings,**

and they shall be fully labeled to demonstrate the area of the building shown and identify all elements depicted on the plan. If abbreviations are used, a key must be included on these plans. This is to happen within 21 days of receipt of updated electronic files from the design team.

- E. The contractor will ensure that all notes and schedules included in the design drawings are updated to accurately reflect actual installed conditions. This will happen within 21 days of receipt of updated electronic files from the design team.**
- F. Review and Approval:**
 - 1. The contractor will print hard copies of the draft as-built packages (with all items noted in 3) and send a copy to each of the major design consultants, the owner's representative and the commissioning agent within 21 days of receipt of updated electronic files from the design team.**
 - 2. All design team/owner comments/mark-ups on the draft package are to be returned to the contractor within 21 days; the contractor will then make the required corrections on the electronic set within 21 days of receipt.**
 - 3. A hard copy of the full corrected set will then be sent to the owner's rep for final approval.**
 - 4. Upon approval, the electronic set will be submitted to the owner's rep.**
- G. CAD files must conform to the CAD deliverable guidelines; survey work must conform to Survey Control Standard.**

5. TURNOVER DELIVERABLES

- A. Final approved as-built drawings for all systems and trades, marked "As-Built"**
- B. Final Operations & Maintenance Manuals for MEPFP (Mechanical, Electrical, Plumbing & Fire Protection) equipment and Building Finishes**
- C. Final Building Equipment list**
- D. All required system acceptance letters and test reports**
 - 1. Building hydronic systems and airflow TAB (Test and Balance) Reports**
 - 2. Fume Hood ASHRAE acceptance test reports**
 - 3. Electrical system Acceptance Test reports**
 - 4. Electrical system Arc flash and protective device coordination Studies and labeling.**
 - 5. MEP equipment startup and testing reports**
 - 6. Fire Alarm system and Fire suppression system acceptance letters**
 - 7. Elevator certification letters**

8. Fire life-safety and emergency power integration report

- E. **Provide and install framed charts in appropriate building MEP rooms for one-line diagrams, process flow diagrams and valve charts. Existing charts shall be updated where necessary.**
 - F. **Basis of Design Information: Provide copies of the final “Basis of Design “ information for MEPFP systems and their intended sequences of operation. For example, for HVAC systems, include design air change rates, temperature, humidification and dehumidification setpoints and setpoint deviations.**
 - G. **Software: Provide copies of the final “as-installed” system software and device configuration files for all electronic systems installed under the project. Files to be provided on formatted CD, mass storage device or other acceptable media. Include applicable software documentation and user manuals. Systems requiring software backup include but are not limited to:**
 - 1. **Building Automation Systems (BAS)**
 - 2. **Fire Alarm Systems and Smoke Control Systems**
 - 3. **Elevator Controls**
 - 4. **Lighting Controls**
 - 5. **Door Access Control Systems**
 - 6. **Other system containing application-specific programming**
 - 7. **Systems and equipment attic stock (spare parts) turn over to Brown FM**
6. **DEMONSTRATION AND TRAINING: EQUIPMENT AND SYSTEMS**
- A. **Provide training and demonstrations of the equipment and sequences of systems operation installed under the project to FM-Operations department staff and their designated service personnel.**
 - B. **Submit proposed training plan for review using the submittal process at least 30 days prior to scheduling training sessions.**
 - C. **Training Plan structure: Each Training and instruction plan shall include a syllabus and defined training objectives. As a minimum, instruction shall include the following topics:**
 - 1. **Equipment / System Design and operational philosophy**
 - 2. **Failsafe and Failure modes of operation**
 - 3. **Review of Project design information**
 - 4. **Review of O&M manual contents**
 - 5. **Equipment / system Operation**
 - 6. **Recommended Equipment / system Maintenance**
 - 7. **Recommended Spare Parts**
 - 8. **Common Operational Adjustments**

9. **Troubleshooting**
10. **Repair**

D. Instruction:

1. **Instruction shall be provided by instructors who are qualified and knowledgeable in the equipment operation and maintenance procedures**
2. **Provide instruction at mutually agreed upon times. For equipment that requires seasonal operation, schedule instruction at the beginning of the first available seasonal change for that season. Schedule training with the Owner at least 14 days in advance.**
3. **Due to COVID, training sessions should be limited to recommended in-person attendance guidelines in place at the time of the training, following all Brown University COVID protocols.**
4. **Training sessions shall be videotaped for future reference and for training of other staff not in attendance.**
5. **Training videos shall be a deliverable for posting into Brown's training video storage secure access location.**
6. **Provide multiple training sessions for staff when requested. Brown FM-Operations preference is to schedule one training session in the morning for day-shift staff and a follow-up session late afternoons for second and third-shift staff.**
7. **Brown University reserves the right to invite its contracted service vendors to attend training and demonstration with respect to systems for which those service vendors will be responsible to maintain as part of a service agreement.**
8. **To the extent possible, training and demonstration for conditions that are designed and anticipated to take place at some future date shall be simulated to reflect those future conditions, e.g. simulating the loss of power and the connection of a portable emergency power source.**
9. **Preferred training days are Tuesdays, Wednesdays or Thursdays.**

E. Training and demonstrations of equipment and systems to include the following in conjunction with designated personnel:

1. **Operate the equipment and systems for a minimum of two hours or five repetitions, or as otherwise required. If problems occur, correct them and repeat the full demonstration.**
2. **Demonstrate proper equipment and systems operation, as well as procedures for cleaning, lubrication, maintenance, replacement of**

routine expendable parts and all other actions required for normal operations and maintenance.

- 3. Demonstrate and review both normal and failure modes of system controls operation where they are designed as such.**
- 4. Place systems into full operation.**

7. FINAL PROJECT TURNOVER PRESENTATION TO OPERATIONS DEPARTMENT

- A. At least 4 weeks prior to substantial completion, the contractor is to coordinate with the Brown University project manager to schedule a project turnover presentation. This meeting will include the Brown University project manager, contractor, sub-contractors, architect/engineers (if applicable), Brown FM representatives, and other Brown stakeholders at the discretion of the project manager.**
- B. At the meeting, an overview of the project will be presented by the project manager or designee and shall include presentations by the design team, contractor and others as designated.**
- C. Commissioning Review (Where Applicable): The project commissioning agent's final report detailing their findings, recommendations, and summary of any open issues will be made available and reviewed in the course of the project turnover meeting(s).**

8. PROJECT WARRANTY and SERVICE CONTRACTS

- A. In the course of project submittals, the project team is to develop and provide a list of all major equipment and building system warranties and maintenance service contracts that are supplemental to the contractor's letter of warranty.**
- B. At substantial completion of all work, as certified by the owner and architect/engineer, the contractor shall deliver a Letter of Warranty to the owner. This warranty certifies that the contractor shall promptly replace or repair any defects in equipment, materials or workmanship that becomes apparent within one (1) year from the date of substantial completion, or owner's acceptance of the project, whichever is later.**
- C. The warranty shall include repairs and corrections to pipe covering, paint, woodwork, or any other material and equipment caused to be imperfect due to defective workmanship or materials. All direct and consequential repairs shall be entirely at the expense of the contractor.**
- D. Additional manufacturers' extended warranties for major equipment and building system components shall be supplementary to this guarantee.**
- E. For extended Maintenance and Service contracts provided under the project, include the names and contact information of the Service provider, coverage dates and copies of the maintenance agreements.**

- F. Organize warranty and service documents in an orderly sequence based on the O&M Manual Table of Contents**
- G. Provide a Warranty and Maintenance Summary Matrix in electronic form (Google Sheet or equivalent) that reflects the information contained in 8 B-F above.**

9. PROJECT CLOSEOUT MILESTONES

- A. A project is considered complete upon completion and acceptance of all of the following:**
 - 1. All open Punchlist and Commissioning items (where applicable) are resolved to the satisfaction of the Brown FM Operations representatives**
 - 2. Final Equipment List has been received;**
 - 3. Door signage and room finish schedules have been received;**
 - 4. Final Operations & Maintenance Manuals have been received, with draft submittal comments resolved;**
 - 5. Equipment startups have been completed with the appropriate witnesses present and startup test reports have been received;**
 - 6. Training has been completed;**
 - 7. Data sheets for interior finishes (ceiling, flooring, walls, paint, signage, etc.) received;**
 - 8. Updated building airflow and hydronic system Test and Balance (TAB) reports, and fume hood ASHRAE test reports (if applicable) received.**
 - 9. For Lab and Research buildings, Lab Ventilation Management Plan (LVMP) record documentation updated to incorporate revised airflow values resulting from the project.**
 - 10. Updated As-Built drawings received;**
 - 11. Electrical system acceptance testing reports and protective device coordination studies completed and submitted;**
 - 12. Electrical system Arc flash studies completed and labels installed;**
 - 13. Certification letters (i.e.: Fire Alarm System Acceptance test letters and elevator certifications) submitted for all applicable systems;**
 - 14. System Warranty letters received, Warranty start dates established and Warranty terms specified;**
 - 15. Copies of all electronic system programming and operating software received as defined in section 5.F**
 - 16. Project Turnover Meeting(s) with the Brown FM-Operations team have been scheduled and completed**

17. **Project team has returned all keys and access cards assigned to the project team to the Brown Key Control Shop;**

END of SECTION