

## SECTION 01 17 90 – UTILITY & CRITICAL SYSTEM CONNECTIONS AND INTERRUPTIONS

### PART 1 - GENERAL

#### 1.1 SUMMARY:

- A. Brown University operates and maintains extensive campus and building utilities and distribution systems. These systems include: water, chilled water, process water, steam, medium and high temperature hot water, Heating, Ventilation and Air Conditioning (HVAC) systems, electrical distribution (low and medium voltage), fire alarm, fire suppression, building automation systems (BAS), campus metering systems, Computing & Information Systems (CIS) telecommunications networks, and Department of Public Safety (DPS) security and video systems.
- B. This section details the minimum coordination requirements for system connections and service interruptions that may be required for new construction and renovation projects.
- C. RELATED SECTIONS:
  - 1. Section 01 17 91 – Utility & Critical System Outage Checklist (OCL)
  - 2. Section 01 17 92 – Utility & Critical System Outage Planning Flowchart

#### 1.2 GENERAL REQUIREMENTS:

- A. If a project or contract work requires the shutdown or de-energizing of any campus utility or building system, FM Operations and Engineering staff must be first contacted for general direction and scheduling availability prior to the work being performed (refer to Scheduling section).
- B. In general, Contractors are not allowed to operate valves open or closed, or energize and de-energize switches without prior coordination and approval from FM Operations staff. Exceptions to this policy are for new construction or within buildings that are closed for total renovation, where the utilities affected are within the construction zone and have been verified ahead of time not to have an adverse effect on other building or campus operations.
- C. Chilled water, high temperature hot water and steam shutdowns can be scheduled only during off-peak seasons with limited exceptions such as an emergency repair.
- D. The project team (Engineer of Record and Architect) shall be responsible for the development of draft Utility & Critical System Outage Checklist(s) (OCL's).
- E. Contractors shall coordinate to have the building fire alarm system disabled prior to performing any work, such as cutting or welding that may cause inadvertent operation of the fire alarm system, ("Hot Work") and arrange for it to be enabled at the completion of the work.
- F. "Hot work" permits are required prior to any cutting and welding operations within buildings; follow all policy safety precautions.
- G. Other than Brown-owned or operated utilities shall be coordinated directly with the respective utility owner by the project manager.

#### 1.3 OUTAGE TYPES:

- A. There are three general types of outages, depending upon the impact that the work will have on existing building infrastructure and campus utilities. The level of planning and detail coordination required varies for each, as noted below.

B. Independent Outages:

1. Independent outages typically have no impact on existing campus utilities, operating communications infrastructure, building occupants or building systems. Examples include work within new building construction or “gut” building renovations, or installation of new campus utilities not yet in service.
2. For independent outages, minimal Brown coordination is required; FM Project Managers (PM’s) will coordinate with the project Construction Manager for the outage scheduling, as well as outage notification, to other Brown departments and building Users affected by this work. FM Operations support is not required for this type of outage.

C. Minor Outages:

1. Minor outages typically have a limited impact on existing campus utilities, including operating communications infrastructure within the project site or running through the site; building occupants or building systems. Examples include fire alarm zone lock-outs for welding or other “Hot work” permits, to suit the installation of new fire alarm devices, or for branch line water shut-offs to suit connections of new plumbing fixtures.
2. For Minor outages, limited Brown coordination is required; FM Project Managers will coordinate outage scheduling with the project Construction Manager and with Brown FOE managers for Trades staff required to support the outage work, as well as develop work orders for Trades support. Details of the outage work will be developed as a general scope of work.
3. Project Managers will also coordinate the outage notification to other Brown departments and building Users affected by this work. Minimum outage notification times are required and an outage coordination meeting prior to the outage is required to review outage scope and details (See Scheduling section).

D. Major Outages:

1. Major outages typically have a significant impact on existing campus utilities, communication systems and infrastructure, building occupants or building systems. Examples include shut down of building electrical power systems, central heating and cooling systems, shutdown of BAS and fire alarm systems, or shutdown of campus water, heating and chilled water systems.
2. For Major outages, significant coordination is required for both Brown staff and the project staff. Determination of major outages will be made in the Project Planning phase. Details of the outage work, and general outage scheduling will be developed during the design phase as an outage checklist (OCL).
3. During the construction phase, FM Project Managers will coordinate outage scheduling with the project Construction Manager and with Brown FOE managers for Trades staff required to support the outage work, as well as develop work orders for Trades support.
4. Project Managers will also coordinate the outage notification to other Brown departments and building Users affected by this work. Minimum outage notification times are required and an outage coordination meeting prior to the outage is required to review outage scope and details (See Scheduling section).

1.4 OUTAGE PLANNING PROCESS – PLANNING PHASE:

- A. The need or potential for required utility outages will generally be determined in the Project Planning process; these expected outages will be conveyed to the Project Engineer of Record at the inception of the Design phase.

1.5 OUTAGE PLANNING PROCESS – DESIGN PHASE:

- A. During the Design phase, the Project Engineer(s) will coordinate and work with Brown FM Operations and Engineering staff to identify and clearly define all new system connections and interconnections to existing building and campus utilities infrastructure.
  - 1. The outage impacts will be reviewed to determine if the outage(s) are independent, major or minor type.
  - 2. Facilities Management Operations and Engineering staff will assist the Project Engineer in identifying the necessary valves or switching required to accommodate the tie-in of new utility systems or shutdown of existing systems for the project, and identifying Project impacts (what buildings, utility systems and/or system loads are impacted by the work).
  - 3. The Project Engineer is responsible to do a physical walkdown and verification of what systems and equipment are affected by the proposed shutdown.
- B. Requirements for the specific discharge or disposal of water-based system drainage and flushing effluent shall be determined based on sampling and chemical composition of the effluent.
- C. Outage and shutdown requirements shall be included in the bid documents by the Project Engineer. This information is required for scheduling, maintaining integrity of existing systems, and rerouting of services during construction.
- D. The following Deliverables are required to be provided during the Design phase:
  - 1. Summary of all required outages, and the type of outage. For multiple outages that may be required in the course of a complex project, a detailed conceptual construction phasing plan shall be developed.
  - 2. For minor outages, a summary of work required and the impacts on each system for each outage shall be developed.
  - 3. For major outages, a draft Utility & Critical System Outage Checklist (OCL) shall be developed and filled out for each major outage.
- E. Utility & Critical System Outage Checklist(s) (OCL's) and shutdown requirements shall be reviewed with FM Operations and Engineering staff, as well as with staff from other Brown departments, such as EH&S, CIS and DPS as required during the design development stage of the project. Key items to be identified for each outage include:
  - 1. Draft Outage schedule (time/date of when work will be performed and outage durations), including contingency communications for work that will extend beyond schedule.
  - 2. Required prep work to be completed or to be in place prior to support the actual outage work (install portable generator(s), pipe flushing procedures, discharge permits, filling and venting procedures, etc.).

3. Brief description of the actual outage work and essential tasks being performed during the outage (Switches or valves being opened/closed, piping connections, etc.).
4. Note key coordination issues that need to be included as a part of the outage (need for portable generators to maintain power, street closure(s), police details, etc.).
5. For hydronic systems, include how system draining, flushing, refilling and venting will be accomplished.
6. Identify disposal methods of system drain and flush effluent.
7. For building electrical system outages, include copies of the panelboard schedules for all affected electrical equipment (panelboards, switchboards, motor control centers, etc.).
8. Review and identify any potential outage impacts that may affect ongoing critical Research and Academic activities: i.e.: campus water and/or electrical services; building ventilation and exhaust systems, BAS controls, etc.
9. Identify required outage lead time required based on FM Operations and Engineering input of project workload and outage complexity.

#### 1.6 OUTAGE PLANNING PROCESS – CONSTRUCTION PHASE:

- A. The Construction Manager will utilize the Utility & Critical System Outage Checklist deliverables provided in the Design phase and incorporate all required outages into their project construction schedule as milestone activities.
- B. The Contractor shall utilize and update the draft Utility & Critical System Outage Checklist(s) (OCL's) based on their proposed project schedule and plan for construction.
- C. The updated Utility & Critical System Outage checklist shall be used for required outage coordination review meetings to review and confirm the outage impacts and resources required to support the outage from Brown, the project team or others. Updated outage checklists shall clearly identify:
  1. Project impacts (what buildings, utility systems and/or system loads are impacted by the work).
  2. Any updates determined in the course of Contractor's physical walkdown and verification of what systems and equipment are affected by the proposed shutdown.
  3. Outage schedule (time/date of when work will be performed and outage durations), including contingency communications for work that will extend beyond schedule;
  4. Required prep work to be completed or to be in place prior to support the actual outage work (install portable generator(s), pipe flushing procedures, filling and venting procedures, etc.).
  5. Brief description of the actual outage work and essential tasks being performed during the outage (Switches or valves being opened/closed, piping connections, etc.);

6. Note key coordination issues that need to be included as a part of the outage (need for portable generators to maintain power, street closure(s), police details, etc.).
  7. For hydronic systems, include how system draining, flushing, refilling and venting will be accomplished.
  8. For building electrical system outages, include copies of the panelboard schedules for all affected electrical equipment (panelboards, switchboards, motor control centers, etc.).
  9. Review and identify any potential outage impacts that may affect ongoing critical Research and Academic activities: i.e.: campus water and/or electrical services; building ventilation and exhaust systems, BAS controls, etc.
  10. Listing of key contacts and phone numbers for the Contractor, Brown FM staff, EH&S, CIS and DPS staff, and affected building staff.
- D. As a prerequisite of outage planning and preparations, it is the responsibility of the Contractor/project team to perform their own visual inspection and walk down to verify what utilities and systems will be physically affected by the shutdown. This effort shall be made after review of available Record documentation, and consultations with the Project Engineer and FM Operations and Engineering staff, as well as other affected Brown departments, such as EH & S, CIS and DPS. The intent of the physical inspection and walkdown is to:
1. Verify known systems and system loads that will be affected by the outage.
  2. Identify any other undocumented systems and loads that may be affected by the proposed outage.
  3. Verify locations of existing system isolation switches, valves, bypasses, and temporary services.

#### 1.7 OUTAGE REQUIREMENTS:

- A. Brown Environmental Health & Safety (EH&S) office shall be notified for all interruptions that affect building fire alarm and detection systems, fire suppression systems (fire sprinklers, kitchen hood suppression systems, dry systems, clean agent or Halon suppression systems), fire pumps and water distribution lines that connect to fire suppression systems.
- B. For Research facilities, EH&S shall be notified of all interruptions affecting: fume hoods, HVAC supply and exhaust systems, Potable and non-Potable water systems, electrical, heating and cooling systems and Process cooling systems.
- C. Brown Computing and Information Services (CIS) office requires notification for all communications systems and infrastructure outages and interruptions that affect telephone or network services. Notification shall be sent to: [campuspoweroutages@brown.edu](mailto:campuspoweroutages@brown.edu)
- D. Proper Lockout/Tagout procedures shall be followed by both the Contractor and FM staff.

#### 1.8 SCHEDULING:

- A. Outage dates shall be coordinated with the Brown Academic calendar and identified blackout (no outage work) periods.

- B. Independent Outages: Per Brown Project Manager discretion.
- C. Minor Outages: normal workday hours; 48-hour minimum advance notice. Weekend/off-hours; 72-hour minimum advance notice. Actual outage scheduling is subject to FM Operations staff availability.
- D. Major Outages: As determined by draft Utility & Critical System Outage checklist: minimum (2) week notice after approval; (4) weeks is preferred for major shutdowns.
- E. FM Project Managers will assist the Constructor Manager in the scheduling, as well as the notification of, related building Users and other Brown departments affected by this work.

#### 1.9 OUTAGE COORDINATION:

- A. The FM Project Manager shall coordinate the shutdown details required for the project with the FM Operations and Engineering staff, the project team, EH&S, DPS and CIS staff and the Building Users (as required by the particular system interruption).
- B. A coordination meeting shall be held with representatives of the Contractor, affected building Users, and other concerned parties to review the planned outage sequences and timing. FM Operations, Service Response and Engineering staff will generally advise of what campus operations and building Users will be affected by the proposed outage or shutdown; the Project Manager is in turn responsible to contact all the affected groups to determine the proper time for the shutdown and any special requirements to be provided during the shutdown.
- C. A Utility and Critical System Outage Checklist (OCL) is required to be filled out for each major outage by the Project Design team and Contractor. The checklist includes relevant pre-outage work required prior to the outage, sequence(s) of work to be performed during the outage, expected outage times and durations, and key contact (cell phone) information for the Contractor, FM staff, other affected Brown Department staff and affected Users. The completed checklist requires sign-off from the FM Operations Director.
- D. The FM Project Manager will submit the signed outage checklist to the Brown Service Response Office as well as a Project Support Service Order for the appropriate Divisional resource allocation to perform and monitor the shutdown. Service Response will in turn formally notify all affected parties of the planned outage date(s) by e-mail and physical posting of the impacted buildings.

#### 1.10 RECORD DRAWINGS

- A. New lines, valves, and switches installed as part of the project are to be included on the Campus Record Utility drawings. The architect or engineer shall include these details on the as-built documentation to be delivered at the completion of the project.

END OF SECTION