

SECTION 01 70 00  
EXECUTION AND CLOSEOUT REQUIREMENTS  
(DEVELOPMENT PROJECTS)

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Field surveying.
- B. Closeout procedures.
- C. Starting of systems.
- D. Demonstration and instructions.
- E. Project record documents.
- F. Operation and maintenance data.
- G. Spare parts and maintenance products.
- H. Product warranties and product bonds.
- I. Examination.
- J. Execution.
- K. Cutting and patching.
- L. Protecting installed construction.
- M. Final cleaning.
- N. Certification, Conveyance, and Plats.

1.2 FIELD SURVEYING

- A. Employ licensed land surveyor for Project layout and location records.
- B. Locate and protect survey control and reference points. Promptly notify Engineer of discrepancies discovered.
- C. Control datum for survey is established by Engineer-provided survey and indicated on Drawings.
- D. Verify easements; confirm Drawing dimensions and elevations.

- E. Provide field surveying and recording services. Establish elevations, lines, and points using recognized survey practices.
- F. Protect survey control points prior to starting Site Work; preserve permanent reference points during construction.
- G. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to Engineer.
- H. Final Record Survey: Prior to Substantial Completion, submit markup of final record in accordance with Project Record Documents in this section.

### 1.3 CLOSEOUT PROCEDURES

- A. Prerequisites to Utility Activation: Complete following items before requesting Utility Activation, either for entire Work or for portions of Work:
  1. Complete testing, adjusting, balancing of systems and equipment, demonstrations, and instructions to CFPUA's operating and maintenance personnel as specified in compliance with this Section and CFPUA Specification Section 01 30 00, Administrative Requirements.
  2. Submit maintenance manuals, spare parts, Project record documents, markups, gravity sewer video inspection, warranty letters and other similar final record data in compliance with this Section.
  3. Coordinate Final Walk Through inspection by CFPUA to establish basis for request that Work is complete.
  4. Make final change-over of locks and transmit keys directly to CFPUA. Advise CFPUA's personnel of change-over in security provisions.
  5. Discontinue or change over and remove temporary facilities and services from Project Site.
  6. Perform final cleaning according to this Section.

### 1.4 STARTING OF SYSTEMS

- A. Coordinate schedule for startup of various equipment and systems.
- B. Notify Engineer seven days prior to startup of each item.
- C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions which may cause damage.
- D. Verify that tests, meter readings, and electrical characteristics agree with those required by equipment or system manufacturer.
- E. Verify that wiring and support components for equipment are complete and tested.
- F. Execute startup under supervision of manufacturer's representative or Contractors' personnel according to manufacturer's instructions.

- G. When specified in individual Specification Sections, require manufacturer to provide authorized representative who will be present at Site to inspect, check, and approve equipment or system installation prior to startup and will supervise placing equipment or system in operation.
- H. Submit a written report that equipment or system has been properly installed and is functioning correctly.

#### 1.5 DEMONSTRATION AND INSTRUCTIONS

- A. Demonstrate operation and maintenance of products to CFPUA personnel.
- B. Demonstrate Project equipment and instructed by authorized manufacturer's representative who is knowledgeable about the Project.
- C. Use operation and maintenance manuals as basis for instruction. Review contents of manual with CFPUA personnel in detail to explain all aspects of operation and maintenance.
- D. Demonstrate startup, operation, control, adjustment, troubleshooting, servicing, maintenance, and shutdown of each item of equipment at scheduled time, at equipment location.

#### 1.6 PROJECT RECORD DOCUMENTS

- A. Maintain one set of the following record documents; record actual revisions to the Work:
  - 1. Drawings.
  - 2. Specifications.
  - 3. Reviewed Shop Drawings, product data, and Samples.
  - 4. Manufacturer's instruction for assembly, installation, and adjusting.
- B. Ensure entries are complete and accurate, enabling future reference by Owner.
- C. Record information concurrent with construction progress, not less than weekly. Report recording status at progress meetings.
- D. Specifications: Legibly mark and record, at each product Section, description of actual products installed, including the following:
  - 1. Manufacturer's name and product model and number.
  - 2. Product substitutions or alternates used.
  - 3. Changes made by Addenda and modifications.
- E. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction as follows:
  - 1. Include Contract modifications such as Addenda, supplementary instructions, change directives, field orders, minor changes in the Work, and change orders.
  - 2. Include locations of concealed elements of the Work.
  - 3. Identify depth of buried utility lines and provide dimensions showing distances from permanent facility components that are parallel to utilities.

4. Dimension ends, corners, and junctions of buried utilities to permanent facility components using triangulation.
  5. Identify and locate existing buried or concealed items encountered during Project.
  6. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
  7. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
  8. Field changes of dimension and detail.
  9. Details not on original Drawings.
- F. Certified, surveyed record drawings (“as-built” plans), sealed by a North Carolina licensed Professional Land Surveyor and/or Professional Engineer, shall be furnished to the Cape Fear Public Utility Authority (Authority) by the Engineer of Record (or Developer where applicable) upon completion and acceptance of the infrastructure by the Authority. The “as-built” plans shall conform to the as-built checklist included herein.
- G. For sewer projects, the “as-built” plans shall include accurate information regarding pipe size, pipe material, pipe length, manhole construction (size of manhole, invert, rim, alignment, location), services, and pump stations along with any relevant rights-of-way, property boundaries and easements. Plans shall also include sewer profiles showing any utility crossings along with the aforementioned information.
- H. For pump station projects, the “as-built” plans shall include accurate information regarding interior and exterior pipe sizes, material, length, as well as all structural dimensions of the pump station, all electrical equipment (make and model), pump information (make, model, and impeller size), and site layout information. Top plan, sectional plan, and full cross-section views are required on the “as-built” plans.
- I. For water projects, the “as-built” plans shall include accurate information regarding pipe size, pipe material, pipe length, valve locations (and turn direction), hydrant locations, fitting locations, services, and blow-off locations along with any relevant rights-of-way, property boundaries and easements.
- J. Submit marked-up paper copy documents to Engineer at each payment request and before Substantial Completion.
- K. Digital “as-built” information shall be provided by the Engineer of Record in AutoCAD format and PDF format with seal, signature, and date by surveyor and engineer and shall include all information required on the “as-built” drawings. No other digital formats will be accepted.

**AS-BUILT CHECK LIST Rev. 5**  
**CAPE FEAR PUBLIC UTILITY AUTHORITY**

Date: \_\_\_\_\_

Subdivision name: \_\_\_\_\_

Reviewed by: \_\_\_\_\_

CFPUA Project Number: \_\_\_\_\_

W	S	#	√ - COMPLETED	X -INCOMPLETE	N/A - NOT APPLICABLE
		1	Name of subdivision (if applicable), owners name, date of construction, north arrow, scale, vicinity map and as-built plan		
		2	Drawings shall indicate water/sewer phases and their relationship to subdivision phases		
		3	Sheet numbers and number of total sheets.		
		4	Clearly indexed cover sheet with location of plan - profile sheets on cover sheet, by sheet number		
		5	Accurate location map and index planning map at a scale of 1 inch = 200 feet.		
		6	Total linear feet on cover sheet listed by phases: Water lines: _____ Gravity lines: _____ Force main: _____		
		7	Certifications notes listed by phase and location on cover sheet		
		8	All inverts into and out of manholes shall be field verified to 1/100 ft.		
		9	Show manhole top elevation & flood elevation or surface water flow levels @ each MH.		
		10	Elevations shall be tied to mean sea level. Indicate any benchmarks within project area.		
		11	Manhole sewer monuments, if manhole is buried.		
		12	Show approximate vertical and horizontal separations of waterlines, sewer mains, and force mains to proposed or existing utilities and structures (includes storm water piping)		
		13	For each sewer reach, show pipe diameter, length, type, slope, existing surface elevations and proposed finish grades. Show station or distance to beginning and end of change in pipe material.		
		14	Show location of air release valves, gate valves and fittings along water main and sanitary sewer force main.		
		15	Show stations and material types for force main.		
		16	Plans shall show stubs for individual services. C/O shown open circle, water meters open box. Sewer Cleanouts (COs) shall be located by measuring from each manhole along the sewer main up stream to a point which lies on a line that is perpendicular to the sewer main and connects said point and C.O. - zero point shall be the immediate downstream manhole and measured from main to C/O, i.e., 127/14R. No stations shall be used. Indicate size and location of all of services.		
		17	Indicate size of services greater than 4".		
		18	Indicate manhole service taps, service casing &/or material transition.		
		19	All lettering shall be at least 0.10 inches in height. The scale shall be 1" = 50' (horizontal) and 1" = 5' (vertical).		
		20	As-built plans shall be inked on original base mylar sheets (24" X 36"), or the engineer shall provide drawings on Dupont Crovx Erasable Image (wash-off) sheets or approved equal. A PDF and digital copy (format no older than AutoCAD 2005) must be provided to the Authority. All drawings shall become the property of the Cape Fear Public Utility Authority.		
		21	Reference ties into existing sewer systems by title and page of as-built drawing for existing system. The Authority will assist with obtaining this information, (i.e. existing manhole number, project name, CFPUA number and sheet number. Show information on plan-profile sheet and cover sheet.		
		22	Lot numbers, property lines and owner reference lines, street names and all easements		
		23	Engineer's seal and Surveyor's seal as applicable or required		
		24	Show all water supply wells within 50' & community wells within 100' of sewer main.		
		25	Water & sewer layers to be bolder line type than drainage, streets, etc.		
		26	Make contour lines very light or turn off		

Date Final Inspection Completed \_\_\_\_\_

Inspectors Signature \_\_\_\_\_

Approved:

Revision:

## 1.7 OPERATION AND MAINTENANCE DATA

- A. Submit in PDF composite electronic indexed file.
- B. Submit data bound in 8-1/2 x 11-inch text pages, three D side ring binders with durable plastic covers.
- C. Prepare binder cover with printed title "OPERATION AND MAINTENANCE INSTRUCTIONS," title of Project, and subject matter of binder when multiple binders are required.
- D. Internally subdivide binder contents with permanent page dividers, logically organized as described below; with tab titling clearly printed under reinforced laminated plastic tabs.
- E. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.
- F. Contents: Prepare table of contents for each volume, with each product or system description identified, typed on white paper, in three parts as follows:
  - 1. Part 1: Directory, listing names, addresses, and telephone numbers of Engineer, Contractor, Subcontractors, and major equipment suppliers.
  - 2. Part 2: Operation and maintenance instructions, arranged by system and subdivided by Specification Section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Include the following:
    - a. Significant design criteria.
    - b. List of equipment.
    - c. Parts list for each component.
    - d. Operating instructions.
    - e. Maintenance instructions for equipment and systems.
    - f. Contact information for warranty items.
    - g. Safety precautions to be taken when operating and maintaining or working near equipment.
  - 3. Part 3: Project documents and certificates, including the following:
    - a. Shop Drawings and product data.
    - b. Certificates.
    - c. Photocopies of warranties and bonds.

## 1.8 SPARE PARTS AND MAINTENANCE PRODUCTS

- A. Furnish spare parts, maintenance, and extra products in quantities specified in individual Specification Sections.
- B. Deliver to Project Site and place in location as directed by CFPUA; obtain receipt prior to final payment.

## 1.9 PRODUCT WARRANTIES AND PRODUCT BONDS

- A. Obtain warranties and bonds executed in duplicate by responsible Subcontractors, suppliers, and manufacturers within ten days after completion of applicable item of Work.
- B. Execute and assemble transferable warranty documents and bonds from Subcontractors, suppliers, and manufacturers.
- C. Verify documents are in proper form, contain full information, and are notarized.
- D. Co-execute submittals when required.
- E. Include table of contents and assemble in three D side ring binder with durable plastic cover.
- F. Submit prior to final completion.
- G. Time of Submittals:
  - 1. For equipment or component parts of equipment put into service during construction with CFPUA's permission, submit documents within ten days after acceptance.
  - 2. Make other submittals prior to final completion.

## PART 2 PRODUCTS – NOT USED

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Verify that existing Site conditions are acceptable for subsequent Work. Beginning new Work means acceptance of existing conditions.
- B. Examine and verify specific conditions described in individual Specification Sections.
- C. Verify that utility services are available with correct characteristics and in correct locations.

### 3.2 EXECUTION

- A. Comply with manufacturer's installation instructions, performing each step, in sequence. Maintain one set of manufacturer's installation instructions at Project Site during installation and until completion of construction.
- B. When manufacturer's installation instructions conflict with Contract Documents, request clarification from Engineer before proceeding.
- C. Verify that field measurements are as indicated on approved Shop Drawings or as instructed by manufacturer.

- D. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.
  - 1. Secure Work true to line and level and within specified tolerances, or if not specified, industry-recognized tolerances.
  - 2. Physically separate products in place, provide electrical insulation, or provide protective coatings to prevent galvanic action or corrosion between dissimilar metals.
- E. Allow for expansion of materials.
- F. Mounting Heights: Where not indicated, mount individual units of Work at industry recognized standard mounting heights for particular application indicated.
  - 1. Refer questionable mounting heights choices to Engineer for final decision.
- G. Adjust operating products and equipment to ensure smooth and unhindered operation.
- H. Clean and perform maintenance on installed Work as frequently as necessary through remainder of construction period. Lubricate operable components as recommended by manufacturer.

### 3.3 CUTTING AND PATCHING

- A. Employ skilled and experienced installers to perform cutting and patching.
- B. Submit written request in advance of cutting or altering elements affecting:
  - 1. Structural integrity of element.
  - 2. Integrity of weather-exposed or moisture-resistant elements.
  - 3. Efficiency, maintenance, or safety of element.
  - 4. Work of CFPUA or separate contractor.
- C. Execute cutting, fitting, and patching including excavation and fill to complete Work and to:
  - 1. Fit the several parts together, to integrate with other Work.
  - 2. Uncover Work to install or correct ill-timed Work.
  - 3. Remove and replace defective and nonconforming Work.
  - 4. Provide openings in elements of Work for penetrations of mechanical and electrical Work.
- D. Execute Work by methods to avoid damage to other Work and to provide proper surfaces to receive patching and finishing.
- E. Cut masonry and concrete materials using masonry saw or core drill.
- F. Restore Work with new products according to requirements of Contract Documents.
- G. Fit Work tight to pipes, sleeves, ducts, conduits, and other penetrations through surfaces.
- H. Maintain integrity of wall, ceiling, or floor construction; completely seal voids.



- I. Refinish surfaces to match adjacent finishes. For continuous surfaces, refinish to nearest joint or intersection; for equipment assembly, refinish entire unit.
- J. Identify hazardous substances or conditions exposed during the Work to Engineer for decision or remedy.

### 3.4 PROTECTING INSTALLED CONSTRUCTION

- A. Protect installed Work and provide special protection where specified in individual Specification Sections.
- B. Provide temporary and removable protection for installed products. Control activity in immediate Work area to prevent damage.
- C. Protect corrosion protected (coated) surfaces. When activity is necessary, obtain recommendations for protection from coating material manufacturer.
- D. Prohibit traffic from landscaped areas.

### 3.5 FINAL CLEANING

- A. Execute final cleaning prior to final Project assessment.
- B. Clean Site and Facilities; sweep paved areas, rake clean landscaped surfaces.
- C. Remove waste and surplus materials, rubbish, and construction facilities from Site.

### 3.6 Certification, Conveyance, and Plats

- A. Follow the Certification, Conveyance, and requirements outlined in the Development Process and Procedures Manual.

END OF SECTION