**NOTES TO ARCHITECT/ENGINEER (A/E) & DAS/CS PROJECT MANAGER:**

This version of the Division 01 General Requirements is for **ALL** CT Department of Administrative Services (DAS) Construction Services (CS) **Design-Bid-Build (DBB) AND Construction Manager at Risk (CMR) Capital Construction Projects.**

IMPORTANT NOTE: Section 01 78 23 Operation and Maintenance Data includes administrative and procedural requirements for preparing and submitting operation, instruction, and maintenance manuals. Edit paragraphs carefully to reflect specific project requirements, or delete them if they do not apply.

**EDITING:** To Show the Editing Notes in this MS Word document the show/hide symbol (¶) button must be must turned on in the MS Word Toolbar. To print this document show/hide symbol (¶) must be turned off in the MS Word Toolbar, this will enable the document to indicate the correct number of total pages.

**TEXT:** The below **blue text** are project specific information that must be completed by the A/E as applicable to the specific project. When complete change **blue text** to **black text.** The ***bold and italicized text*** is for example purposes only and must be modified and edited by the A/E to make it project specific. For **text boxes**, left click on **Insert** and then insert project specific information over the word **Insert** in the underlined space.

**TABLES:** To view the Table Grid in this MS Word document, click inside any table, then go to the **Table Tools > Layout** tab, **Table** group, and click **View Gridlines.**

**HEADERS: The header** for each page of the Project Manual shall match the format, font (Arial), size (9 pt), font style (BOLD & CAPITALIZED) and line borders, of the header shown herein. The header of each page shall contain the Section Number, the Section Title, and the page number & number of pages as shown herein.

**FOOTERS: The footer** for each page of the Project Manual shall match the format, font (Arial), size (9 pt), font style (BOLD & CAPITALIZED) and line borders, of the footer shown herein. The footer shall contain the project number in the right hand side as shown herein. The revision date in the left side of the footer is to remain as it is for Department informational purposes only and should not be altered by the Architect/Engineer.

**SECTIONS AND PARAGRAPHS:** If a **Section** is not part of the project scope, **do not use** the Section in the General Requirements. Check “**NOT USED**” in the Table of Contents. **DO NOT delete** the Section title from the Table of Contents.

If a **Paragraph** is not applicable to the project, **delete the contents** of the Paragraph and renumber the subsequent Paragraphs. Edit **Paragraphs** carefully to reflect specific project requirements. DO NOT include Paragraphs or parts of Paragraphs in the project manual, which have no applicability to the specific project. KEEP IN NUMERICAL SEQUENCE and re-number as necessary.

**GENERAL CONDITIONS:** Please review the General Conditions carefully and coordinate the requirements of those Articles including the Definitions.

**DIVISION 01 SECTIONS** are the organizational key of the Project Manual. All revisions to this Division are the responsibility of the A/E. Division 01 must be closely coordinated with Division 00, Divisions 02 through 49, Division 50 (Project-Specific Available Information), the Drawings, and the Department’s Consultant Bid Data Statement (Form 6005, to be filled out by the A/E for bidding).

**IMPORTANT NOTE REGARDING “HIDDEN TEXT”:**

Each document contains Editing Notes in the form of “hidden text”. The Editing Notes assist the Architect in modifying and editing the document to make it project-specific. In order to show the “hidden text”, click the **Home** tab, and in the **Paragraph** group, click the **Show/Hide** symbol (¶). **Turn off** the Show/Hide symbol (¶) **before printing the document** in order to indicate the correct number of pages. **DELETE THIS NOTE.**

**IMPORTANT NOTE REGARDING FORMATTING:**

Insert a blank page at the end of all *odd numbered* specification sections that states “THIS PAGE INTENTIONALLY LEFT BLANK”. **DELETE THIS NOTE.**

# PART 1 - GENERAL

## RELATED DOCUMENTS

#### **A.** Drawings and general provisions of the Contract, including Division 00 General Conditions and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

## SUMMARY

### This Section includes administrative and procedural requirements for operation and maintenance manuals, including the following:

#### Preparing and submitting operation and maintenance manuals for building operating systems and equipment.

#### Preparing and submitting instruction manuals covering the care, preservation, and maintenance of architectural products and finishes.

### **Related Sections:** The following Sections contain requirements that relate to this Section:

NOTE: Retain subparagraphs below to reference the section that specifies the preparation of material frequently included in operation and maintenance manuals.

#### Division 01 Section 01 33 00 "Submittal Procedures" specifies preparation of Shop Drawings and Product Data.

#### Division 01 Section 01 75 00 "Starting and Adjusting" specifies instruction of the Owner and Agency operating personnel in the operation and maintenance of building systems and equipment and the general requirements for starting-up equipment and systems.

#### Division 01 Section 01 77 00 "Closeout Procedures" specifies general closeout requirements.

#### Division 01 Section 01 78 30 "Warranties and Bonds" specifies requirements for submittal of warranties and bonds.

#### Division 01 Section 01 81 13 "Sustainable Design Requirements" specifies requirements for submittals related to green building certification.

#### Division 01 Section 01 91 00 “Commissioning” specifies requirements for submittals related Commissioning.

#### Appropriate Sections of Divisions 02 through 49 specify special operation and maintenance data requirements for specific pieces of equipment or building operating systems.

## QUALITY ASSURANCE

NOTE: Paragraphs below establish high-quality assurance provisions. For many projects, less stringent requirements are advisable. Modify below to suit project.

### **Maintenance Manual Preparation:** In preparation of maintenance manuals, use personnel thoroughly trained and experienced in operation and maintenance of equipment or system involved.

#### Where maintenance manuals require written instructions, use personnel skilled in technical writing where necessary for communication of essential data.

#### Where maintenance manuals require drawings or diagrams, use draftsmen capable of preparing drawings clearly in an understandable format.

### **Instructions for the Owner and Agency Personnel:** The Construction Manager must use experienced instructors thoroughly trained and experienced in operation and maintenance of equipment or system involved, to instruct the Owner's operation and maintenance personnel.

### **Commissioning (Cx) Coordination:** The Commissioning process requires detailed O&M documentation. The Contractor must submit O&M manuals to the Construction Administrator for review and approval by Commissioning Agent (CxA).

## SUBMITTALS

NOTE: Usually retain subparagraph below. It gives the architect an opportunity to review contents before substantial completion. Revise number of copies required to suit project.

### **Submittal Schedule:** Comply with the following schedule for submitting operation and maintenance manuals:

#### Before Substantial Completion, when each installation that requires operation and maintenance manuals is nominally complete, submit **four (4)** draft copies of each manual to the Owner’s Representative, Commissioning Agent (CxA), Agency Representative, and Architect for review. Include a complete index or table of contents of each manual.

NOTE: Complex projects may require additional time. Revise number of days for review to suit project.

##### The Owner’s Representative will return **one (1)** copy of the draft with comments within **twenty - one (21)** calendar days of receipt.

NOTE: Increase time indicated in 2 subparagraphs below, depending on the project's complexity.

##### Submit **four (4)** copies of data in final form at least **twenty-one** **(21)** calendar days before final inspection. The Owner’s Representative will return **one (1)** copy within **twenty-one (21)** calendar after final inspection, with comments.

#### After final inspection, make corrections or modifications to comply with the Commissioning Agent’s (CxA), Architect's, and Agency Representative’s comments. Submit final copies to the Owner’s Representative within **twenty-one (21)** calendar days of receipt of the Commissioning Agent’s (CxA), Architect's, and Agency Representative’s comments.

NOTE: Paragraph below describes typical requirements for binding copies of operation and maintenance manuals. Revise to suit project.

### **Form of Submittal:** Prepare operation and maintenance manuals in the form of an instructional manual for use by the Owner's operating personnel. Organize into suitable sets of manageable size. Where possible, assemble instructions for similar equipment into a single binder.

NOTE: Possibly revise subparagraphs below to satisfy other requirements. An alternate binding would be post-type fasteners. Other storage methods include heavy manila envelopes or fiberboard boxes.

#### **Binders:** For each manual, provide heavy-duty, commercial-quality, 3-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to receive **8-1/2-by-11- inch** paper. Provide a clear plastic sleeve on the spine to hold labels describing contents. Provide pockets in the covers to receive folded sheets.

NOTE: Modify 2 subparagraphs below to suit project.

##### Where **two (2)** or more binders are necessary to accommodate data, correlate data in each binder into related groupings according to the Project Manual table of contents. Cross-reference other binders where necessary to provide essential information for proper operation or maintenance of the piece of equipment or system.

NOTE: In subparagraph below, insert special requirements, such as indicating the CSI 6-digit section number on bottom of spine for identification.

##### Identify each binder on front and spine, with the printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter covered. Indicate volume number for multiple volume sets of manuals.

#### **Dividers:** Provide heavy paper dividers with celluloid-covered tabs for each separate section. Mark each tab to indicate contents. Provide a typed description of the product and major parts of equipment included in the section on each divider.

NOTE: Subparagraph below provides protection for troubleshooting software used in some sophisticated operation systems. Delete requirements where unnecessary.

#### **Protective Plastic Jackets:** Provide protective, transparent, plastic jackets designed to enclose diagnostic software for computerized electronic equipment.

NOTE: Requirements below are normal. Insert special requirements, such as special paper or plastic lamination of important items for permanent preservation, if circumstances warrant.

#### **Text Material:** Where maintenance manuals require written material, use the manufacturer's standard printed material. If manufacturer's standard printed material is not available, provide specially prepared data, neatly typewritten, on **8-1/2-by-11-inch, 20-lb/sq ft** white bond paper.

#### **Drawings:** Where maintenance manuals require drawings or diagrams, provide reinforced, punched binder tabs on drawings and bind in with text.

##### Where oversize drawings are necessary, fold drawings to the same size as text pages and use as a foldout.

NOTE: Avoid placing loose, oversize drawings in binder pockets. They are often lost. Use reduced drawings. If not practical, place folded drawings in labeled envelopes and place envelopes in pockets or bind envelopes in the manual.

##### If drawings are too large to be used practically as a foldout, place the drawing, neatly folded, in front or rear pocket of binder. Insert a typewritten page indicating drawing title, description of contents, and drawing location at the appropriate location in the manual.

NOTE: Consider other special requirements, such as use of photographs instead of drawings, to demonstrate unusual installations.

## MANUAL CONTENT

### In each manual include information specified in the individual Specification Section and the following information for each major component of building equipment and its controls:

NOTE: Modify list below to suit project.

#### **General system or equipment description.**

#### **Design factors and assumptions.**

#### **Copies of applicable shop drawings and product data.**

#### **System or equipment identification, including:**

##### **Name of manufacturer.**

##### **Model number.**

##### **Serial number of each component.**

#### **Operating instructions.**

#### **Emergency instructions.**

#### **Wiring diagrams.**

#### **Inspection and test procedures.**

#### **Maintenance procedures and schedules.**

#### **Precautions against improper use and maintenance.**

#### **Copies of warranties.**

#### **Repair instructions including spare parts listing.**

#### **Sources of required maintenance materials and related services.**

#### **Manual index.**

### Organize each manual into separate sections for each piece of related equipment. As a minimum, each manual shall contain a title page; a table of contents; copies of product data, supplemented by drawings and written text; and copies of each warranty, bond, and service contract issued.

#### **Title Page:** Provide a title page in a transparent, plastic envelope as the first sheet of each manual. Provide the following information:

NOTE: Revise list below to suit project. Make appropriate revisions if the project is performed under multiple prime contracts.

##### **Subject matter covered by the manual.**

##### **Name and address of the Project.**

##### **Date of submittal.**

##### **Name, address, and telephone number of the Construction Manager.**

##### **Name and address of the Architect and Owner’s Representative.**

##### **Cross-reference to related systems in other operation and maintenance manuals.**

NOTE: Revise subparagraph below if the project is performed under multiple prime contracts.

#### **Table of Contents:** After title page, include a typewritten table of contents for each volume, arranged systematically according to the Project Manual format. Include a list of each product included, identified by product name or other appropriate identifying symbol and indexed to the content of the volume.

##### Where a system requires more than one volume to accommodate data, provide a comprehensive table of contents for all volumes in each volume of the set.

General Information NOTE: Modify subparagraph below to suit project. For simple projects that require few manuals, include this information on title page.

#### Provide a general information section immediately following table of contents, listing each product included in the manual, identified by product name. Under each product, list the name, address, and telephone number of the subcontractor or Installer and the maintenance subcontractor. Clearly delineate the extent of responsibility of each of these entities. Include a local source for replacement parts and equipment.

NOTE: Coordinate subparagraph below with Division1 sections "Submittals" and "Contract Closeout." Make certain there are sufficient copies of product data sheets to include in the manuals. Possibly insert specific requirements, such as the method for highlighting text or tabular material.

#### **Product Data:** Where the manuals include manufacturer's standard printed data, include only sheets that are pertinent to the part or product installed. Mark each sheet to identify each part or product included in the installation. Where the Project includes more than one (1) item in a tabular format, identify each item, using appropriate references from the Contract Documents. Identify data that is applicable to the installation, and delete references to information that is not applicable.

NOTE: Revise subparagraph below to suit project. Add special operating procedures, if necessary.

#### **Written Text:** Prepare written text to provide necessary information where manufacturer's standard printed data is not available, and the information is necessary for proper operation and maintenance of equipment or systems. Prepare written text where it is necessary to provide additional information or to supplement data included in the manual. Organize text in a consistent format under separate headings for different procedures. Where necessary, provide a logical sequence of instruction for each operation or maintenance procedure.

NOTE: Coordinate subparagraph below with Division 1 Section "Contract Closeout." Require additional record drawings to include in operation and maintenance manuals. If necessary, modify Division 1 Section "Contract Closeout."

#### **Drawings:** Provide specially prepared drawings where necessary to supplement manufacturer's printed data to illustrate the relationship of component parts of equipment or systems or to provide control or flow diagrams. Coordinate these drawings with information contained in project record drawings to assure correct illustration of the completed installation.

NOTE: Retain subparagraph below. It is not advisable to use record drawings in operation and maintenance manuals.

##### **a.** Do not use original Record Documents as part of operation and maintenance manuals.

#### **Warranties and/or Bonds:** Provide a copy of each warranty and/or bond in the appropriate manual for the information of the Owner's operating personnel. Provide written data outlining procedures to follow in the event of product failure. List circumstances and conditions that would affect validity of warranty or bond.

NOTE: Subparagraph below provides information in the event of product failure. It may be necessary to provide additional information for specific products.

## MATERIAL AND FINISHES MAINTENANCE MANUAL

### Submit **four (4)** copies of each manual, in final form, on material and finishes to the Owner’s Representative for distribution. Provide **one (1)** section for architectural products, including applied materials and finishes. Provide a second section for products designed for moisture protection and products exposed to the weather.

#### **1.** Refer to individual Specification Sections for additional requirements on care and maintenance of materials and finishes.

### **Architectural Products:** Provide manufacturer's data and instructions on care and maintenance of architectural products, including applied materials and finishes.

#### **Manufacturer's Data:** Provide complete information on architectural products, including the following, as applicable:

##### Manufacturer's catalog number.

##### Size.

##### Material composition.

##### Color.

##### Texture.

##### Reordering information for specially manufactured products.

#### **Care and Maintenance Instructions:** Provide information on care and maintenance, including manufacturer's recommendations for types of cleaning agents to be used and methods of cleaning. Provide information on cleaning agents and methods that could prove detrimental to the product. Include manufacturer's recommended schedule for cleaning and maintenance.

### **Moisture Protection and Products Exposed to the Weather:** Provide complete manufacturer's data with instructions on inspection, maintenance, and repair of products exposed to the weather or designed for moisture-protection purposes.

#### **1.** **Manufacturer's Data:** Provide manufacturer's data giving detailed information, including the following, as applicable:

NOTE: Modify list below to suit project.

##### **Applicable standards.**

##### **Chemical composition.**

##### **Installation details.**

##### **Inspection procedures.**

##### **Maintenance information.**

##### **Repair procedures.**

## EQUIPMENT AND SYSTEMS MAINTENANCE MANUAL

### Submit **four (4)** copies of each manual, in final form, on equipment and systems to the Owner’s Representative for distribution. Provide separate manuals for each unit of equipment, each operating system, and each electric and electronic system.

#### **1.** Refer to individual Specification Sections for additional requirements on operation and maintenance of the various pieces of equipment and operating systems.

### **Equipment and Systems:** Provide the following information for each piece of equipment, each building operating system, and each electric or electronic system.

#### Description: Provide a complete description of each unit and related component parts, including the following:

NOTE: Modify list below to suit project.

##### **Equipment or system function.**

##### **Operating characteristics.**

##### **Limiting conditions.**

##### **Performance curves.**

##### **Engineering data and tests.**

##### **Complete nomenclature and number of replacement parts.**

#### **Manufacturer's Information:** For each manufacturer of a component part or piece of equipment, provide the following:

NOTE: Modify list below to suit project.

##### **Printed operation and maintenance instructions.**

##### **Assembly drawings and diagrams required for maintenance.**

##### **List of items recommended to be stocked as spare parts.**

#### **Maintenance Procedures:** Provide information detailing essential maintenance procedures, including the following:

#### **Operating Procedures:** Provide information on equipment and system operating procedures, including the following:

NOTE: Modify list below to suit project.

##### **Startup procedures.**

##### **Equipment or system break-in.**

##### **Routine and normal operating instructions.**

##### **Regulation and control procedures.**

##### **Instructions on stopping.**

##### **Shutdown and emergency instructions.**

##### **Summer and winter operating instructions.**

##### **Required sequences for electric or electronic systems.**

##### **Special operating instructions.**

#### **Servicing Schedule:** Provide a schedule of routine servicing and lubrication requirements, including a list of required lubricants for equipment with moving parts.

#### **Controls:** Provide a description of the sequence of operation and as-installed control diagrams by the control manufacturer for systems requiring controls.

#### **Identification Drawings:** Provide each Subcontractor's Identification Drawings.

##### **a.** Provide as-installed, color-coded, piping diagrams, where required for identification.

#### **Valve Tags**: Provide charts of valve-tag numbers, with the location and function of each valve.

#### **Circuit Directories:** For electric and electronic systems, provide complete circuit directories of panel boards, including the following:

NOTE: Modify list below to suit project.

##### Controls.

##### Communication.

### **Electronic Media:**

NOTE: Choose media below to suit project delete media not used.

#### For equipment which requires maintenance by operational personnel, provide a professionally developed **[video tape] [DVD]** for the use of maintenance training for the facility. Each **[video tape] [DVD]** will be accompanied by a written index which can be utilized to find any specific item of information by time or place on the **[video tape] [DVD]**.

#### The Construction Manager is responsible for this production. This **[video tape] [DVD]** will be provided to the Owner’s Representative at the same time as the delivery of the other maintenance material.

#### The **[video tape] [DVD]** must be able to be edited for future changes to the equipment and modifications as they occur.

## COMMISSIONING RECORD AND TESTING DATA MANUAL

The Contractor shall cooperate with Commissioning Agent (CxA) in the preparation of a separate Manual dedicated to documenting the Commissioning process which will include all certifications and testing data and some repeating of O&M data. Description of this Manual is found in Section 01 91 00 Commissioning and shall be prepared by the Commissioning Agent (CxA).

# PART 2 - PRODUCTS (Not Applicable)

# PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01 78 23