

READ THIS FIRST

This Project Spec Document may need additional modifications to suit your project. It is recommended that you proofread each section, paying attention to any “Notes” boxes such as this one--you should remove these “Notes” sections as you go. Also, do a search for all bracket characters “ [] “ as they are used to show you areas containing options or project specific details (you can use Microsoft Word’s Find feature {Ctrl-F} to jump to an open bracket “ [“ character quickly). Again, these bracket characters should be removed.

It is important that every paragraph be numbered to allow for easy referencing. If you use the document’s built in styles and formatting your outline should be fine (turn on the formatting toolbar by going to View > Toolbars > Formatting). Most paragraphs will use the style “Numbered Material” and can be promoted (Tab) or demoted (Shift-Tab).

You should not have to manually enter extra spaces, carriage returns or outline characters such as A, B, C, or 1.01, 1.02; the formatting will do this for you. The entire document is 11 pt. Arial. If you paste items in, you may need to reapply the “Numbered Material” format.

O&M Data requirements are identified by package. Contact PM if technical specifications do not identify package types.

PART 1 GENERAL

1.01 SUMMARY

- A. Submit a complete and concise description of the product, system, or piece of equipment, stressing and enhancing the importance of system interactions, troubleshooting, and long-term preventive maintenance and operation.
- B. This section identifies the requirements for the formatting and compilation of all operation and maintenance (O&M) documentation for this project and equipment labeling by posting condensed operating instructions as identified in the technical specifications. Unless otherwise directed by the Engineer, the Contractor shall prepare and compile O&M documentation as defined in this section.
- C. This section also includes requirements for the Contractor’s input to the Port Computerized Maintenance Management System (CMMS) form listing equipment installed as part of the Work.
 - 1. Attachment A contains the project’s CMMS form

1.02 SUBMITTALS/APPROVALS

- A. O&M Documentation and the CMMS form shall be submitted in accordance with Section 01 33 00.
 - 1. CMMS forms shall be submitted as a PDF within the O&M submittals along with the Excel source file.
 - 2. Port acceptance of draft O&M is required prior to training of Port personnel, Partial Substantial or Substantial Completion. Submit draft documentation 60 days prior to the anticipated scheduled Punchlist Inspection date.

- a. For Partial Substantial Completion, the O&M and index shall be complete for the respective elements being turned over to the Port. Partial manuals shall be clearly labeled on the cover sheet as “PARTIAL O&M MANUAL.”
- 3. Port acceptance of the final O&M is required for Physical Completion and shall be submitted prior to Final Inspection. If changes are required to Final Document, the Contractor shall incorporate revisions and resubmit a full electronic copy of the manual. All changes shall be submitted with a transmittal identifying all changes.
 - a. Final documentation shall contain “Partial” O&M documentation.

1.03 OPERATING AND MAINTENANCE DOCUMENTATION

- A. The O&M documentation shall be electronic utilizing Microsoft Word or searchable Adobe PDF format. The electronic data shall have software search features and interactive capabilities in the format prescribed within this section.
 - 1. PDF versions originating from scanned documentation shall be generated from legible documents, indexed, formatted and fully text searchable.
 - 2. Contractor is responsible for obtaining written releases dealing with copyright restrictions.
- B. The electronic documentation shall be titled as follows :

Fill out C to provide project’s WP Number and Contract Name consistent with the project documents: Draft O&M Manual WPU00013 Contract Name and Final O&M Manual WPU00013 Contract Name.

- 1. Draft O&M Manual [WPXXXXX ContractName]
- 2. Final O&M Manual [WPXXXXX ContractName]

1.04 CMMS FORMS

- A. An electronic (Excel) file will be provided to the Contractor by the Engineer after Contract Execution. The Contractor is responsible to ensure the form is accurately and fully completed.
 - 1. The file name shall be titled: *WPXXXXXX CMMS FORM [FINAL or DRAFT]*

1.05 OPERATIONS AND MAINTENANCE (O&M) DOCUMENTATION FORMAT

- A. The O&M documentation shall be organized to include four sections:
 - 1. Title page
 - a. The title page shall identify Port information including the Port project number and formal Port project name, Contractor information and the anticipated substantial completion date and warranty start date(s). See Appendix A.
 - 2. Table of Contents
 - a. The table of contents shall identify product, system or piece of equipment by the CSI section within the technical specifications and shall be hyperlinked to the manual content.

3. Computerized Maintenance Management System (CMMS): provide a PDF of the Excel file within the O&M Documentation.
4. Technical Content of all the product, system(s) or equipment organized by technical specification Construction Specifications Institute (CSI) section number and title. It is comprised of two sections:
 - a. Summary Information on products, systems and equipment
 - b. Data Package information (see Parts 1.06B and 1.07).

1.06 TECHNICAL CONTENT

A. Summary Information on Products, Systems and Equipment.

1. Contractor, distributor and manufacturer support information:
 - a. Provide the name, address, and telephone number of each Subcontractor who installed the product, system or equipment.
 - b. For each item, also provide the name address and telephone number of the manufacturer's representative and service organization that can provide replacements most convenient to the project site.
 - c. Provide the name, address, and telephone number of the product, equipment, and system manufacturers.
 - d. Include the 24-hour emergency support numbers.
2. Equipment information: All equipment information identified in the CMMS form shall be included in the O&M documentation on the first applicable product page and include the CMMS equipment identification number and description as provided in the CMMS form. All equipment identification numbers shall be in bold-type face in a contrasting color from the balance of the font on the page. Red is a typical contrasting color. Include the following:
 - a. Equipment or system photo as installed within the project with description and design intent.
 - b. Special outside agency permits including Washington State Labor & Industries.
 - c. Copies of condensed operating instructions posted on equipment.
3. Submittal and Product Data: Include accepted submittal data, cut sheets and appropriate shop drawings. If submittal was not required for acceptance, descriptive product data shall be included.
 - a. Include all building material and finishes. Provide specific information, lot numbers, local distributors and suppliers with their company names, addresses, and phones numbers. List all information needed to identify, maintain, and replace/duplicate any finish materials, equipment or features installed in this project. Examples include:
 - (1) Material or finish designation.

- (2) Manufacturer’s name, model number, make, size, local vendor and supplier.
- (3) Proportions of mixes. (Example: terrazzo)
- (4) Color formula list for each project specific paint color used.
- b. Highlight the submittal/product data pertinent to the Contract within manufacturer’s boiler plate information documentation.
- c. Clearly mark the work product, system or piece of equipment and eliminate or strikeout advertisement and other data that does not specifically relate to the Work.
- 4. Warranty Information: List and explain the various warranties and clearly identify the servicing and technical precautions prescribed by the manufacturers or Contract in order to keep warranties in force.
- 5. Start Up and Testing/Balancing Information:
 - a. Testing and Performance Data: Include completed pre-functional checklists, functional performance test forms, and monitoring reports. Include recommended schedule for retesting and blank test forms.
 - b. Copy of the start-up report.
 - c. Completed pre-commissioning and pre-functional checklists with all data and documentation.
 - d. Completed functional test and calibration results.
- B. Data Packages. The type of data depends upon the complexity of the product, system, or equipment. Data Package data is categorized into three (3) kinds of information: Operating Instructions, Preventive Maintenance, and Corrective Maintenance. See as identified in Table 1 and described below in Part 1.07 for the kinds of information included in the data packages.
 - 1. Data Package 1: typically used for architectural items requiring simple but specific maintenance and replacement; for example, acoustical ceiling, floor tile or carpeting system.
 - 2. Data Package 2: used for an item that has motors or adjustable electronics; for example, an item having a motor and some sequence of operation such as a refrigerated drinking fountain or adjustable photosensor.
 - 3. Data Package 3: used for an complex piece of equipment, having an extensive sequence of operation, a complex troubleshooting sequence and one requiring frequent operator attention; at least for start-up and shut-down.

TABLE 1		Data Packages		
Technical Data Content		1	2	3
Operating Instruction				
Safety Precautions		X	X	X

DIVISION 1 - GENERAL REQUIREMENTS

Section 01 78 23.13 – Aviation Operations and Maintenance Documentation

TABLE 1		Data Packages		
		1	2	3
Technical Data Content				
	Operator prestart			X
	Startup, shutdown, and post-shutdown procedures			X
	Normal operations		X	X
	Emergency operations			X
	Operator service requirements			X
	Environmental conditions		X	X
	Parts identification		X	X
	Testing equipment and special tool information			X
Preventive Maintenance (PM) Plan & Schedule				
	Manufacturer’s PM recommendation		X	X
	Calibration recommendations		X	X
	Cleaning recommendations	X	X	X
	Lubrication data		X	X
Corrective Maintenance (Repair)				
	Troubleshooting guides and diagnostic techniques			X
	Wiring diagrams and control diagrams			X
	Maintenance and repair procedures	X	X	X
	Removal and replacement instructions		X	X
	Spare parts and supply lists	X	X	X
	Corrective Maintenance Work Hours			X
Video O&M Documentation				
	O&M Videos		X	X

1.07 DATA PACKAGE TECHNICAL INFORMATION

- A. Operating Instructions: Include specific instructions, procedures, and illustrations for the following as required by installed products, systems and equipment:
1. Safety Precautions: List personnel hazards and equipment or product safety precautions for all operating conditions. Include Safety Data Sheets.
 2. Operator Prestart: Include procedures required to install, set up, and prepare each system for use.
 3. Startup, Shutdown, and Post-Shutdown Procedures: Provide narrative description for Startup, Shutdown and Post-shutdown operating procedures including the control sequence for each procedure.
 4. Normal Operations: Provide narrative description of Normal Operating Procedures. Include Control Diagrams with data to explain operation and control of systems and specific equipment.
 5. Emergency Operations: Include Emergency Procedures for equipment malfunctions to permit a short period of continued operation or to shut down the equipment to prevent further damage to systems and equipment or harm personnel. Include Emergency Shutdown Instructions for fire, explosion, spills, or other foreseeable contingencies. Provide guidance and procedures for emergency operation of all utility systems including required valve positions, valve locations and zones or portions of systems controlled.
 6. Operator Service Requirement: Include instructions for services to be performed by the operator such as lubrication, adjustment, inspection, and recording gage readings.
 7. Environmental Conditions: Include a list of Environmental Conditions (temperature, humidity, and other relevant data) that are best suited for the operation of each product, component or system. Describe conditions under which the item equipment should not be allowed to operate.
 8. Parts Identification: Provide identification and coverage for all parts of each component, assembly, subassembly, and accessory of the end items subject to replacement. Include special hardware requirements, such as requirement to use high-strength bolts and nuts. Identify parts by make, model, serial number, and source of supply to allow reordering without further identification. Provide clear and legible illustrations, drawings, and exploded views to enable easy identification of the items. When illustrations omit the part numbers and description, both the illustrations and separate listing shall show the index, reference, or key number that will cross-reference the illustrated part to the listed part. Parts shown in the listings shall be grouped by components, assemblies, and subassemblies in accordance with the manufacturer's standard practice. Parts data may cover more than one model or series of equipment, components, assemblies, subassemblies, attachments, or accessories, such as typically shown in a master parts catalog.
 9. Testing Equipment and Special Tool Information: Include information on test equipment required to perform specified tests and on special tools needed for the operation, maintenance, and repair of components.

- B. Preventive Maintenance Plan and Schedule: Include the following information for preventive and scheduled maintenance to minimize corrective maintenance and repair for installed products, and the model and features of each system and piece of equipment.
1. Include manufacturer's schedule for routine preventive maintenance, inspections, tests and adjustments required to ensure proper and economical operation and to minimize corrective maintenance.
 2. For periodic calibrations, provide manufacturer's specified frequency and procedures for each separate operation.
 3. Cleaning Recommendations: Provide environmentally preferable cleaning recommendations.
 4. Lubrication Data: Include preventive maintenance lubrication data, in addition to instructions for lubrication provided under paragraph titled "Operator Service Requirements":
 - a. A table showing recommended lubricants for specific temperature ranges and applications.
 - b. Charts with a schematic diagram of the equipment showing lubrication points, recommended types and grades of lubricants, and capacities.
 - c. A Lubrication Schedule showing service interval frequency.
- C. Corrective Maintenance (Repair): Include manufacturer's recommended procedures and instructions for correcting problems and making repairs as required for installed products, and model and features of each system and pieces of equipment. Include potential environmental and indoor air quality impacts of recommended maintenance procedures and materials.
1. Troubleshooting Guides and Diagnostic Techniques: Include step-by-step procedures to promptly isolate the cause of typical malfunctions. Describe clearly why the checkout is performed and what conditions are to be sought. Identify tests or inspections and test equipment required to determine whether parts and equipment may be reused or require replacement.
 2. Wiring Diagrams and Control Diagrams: Wiring diagrams and control diagrams shall be point-to-point drawings of wiring and control circuits including factory-field interfaces. Provide a complete and accurate depiction of the actual job specific wiring and control work. On diagrams, number electrical and electronic wiring and pneumatic control tubing and the terminals for each type, identically to actual installation configuration and numbering.
 - a. Maintenance and Repair Procedures: Include instructions and a list of tools required to repair or restore the product or equipment to proper condition or operating standards.
 3. Maintenance and Repair Procedures: Include instructions and a list of tools required to repair or restore the product or equipment to proper condition or operating standards.

4. Removal and Replacement Instructions: Include step-by-step procedures and a list of required tools and supplies for removal, replacement, disassembly, and assembly of components, assemblies, subassemblies, accessories, and attachments. Provide tolerances, dimensions, settings and adjustments required. Instructions shall include a combination of text and illustrations.
5. Spare Parts and Supply Lists: Include lists of spare parts and supplies required for maintenance and repair to ensure continued service or operation without unreasonable delays. List spare parts and supplies that have a long lead-time to obtain. Corrective Maintenance Work-Hours: Include manufacturer's projection of corrective maintenance work-hours including requirements by type of craft.
6. Corrective maintenance that requires completion or participation of the equipment manufacturer shall be identified and tabulated separately.
7. Video O&M Documentation: Include reference to training videos as identified by the technical specifications. See Section 01 79 00 – Training for video and audio technical requirements. Video titles shall be coordinated with the table of contents for the respective section
 - a. Example: *Section [XXXXXX] Training Video for [specific equipment] provided separately.*

1.08 EQUIPMENT OPERATING INSTRUCTIONS: POSTING CONDENSED INSTRUCTIONS

- A. Condensed operating instructions shall be clearly laminated and secured adjacent to or inside the equipment where it can be easily read by operating personnel performing the steps listed. The writing shall not fade in sunlight and shall be secured to prevent easy removal, peeling and degradation if exposed to the weather.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

PART 4 MEASUREMENT AND PAYMENT

4.01 GENERAL

- A. Separate measurement or payment will be made for the Work required in this section. The cost for this portion of the Work will be included in the payments made for the applicable bid items in the [Schedule of Unit Prices] [Lump Sum price] bid for the project.

APPENDIX A: Title Page for Operations and Maintenance Documentation

POS Project Number	
Project Name	
Port Project Manager	
Port Resident Engineer	
Prime Contractor Name	
Prime Contractor Project Number	
Primary Contact Name	
Primary Contact Number	
Emergency Contact Number	
Anticipated Substantial Completion Date	
Phased Warranty Yes/No	If yes, list all anticipated dates:
Anticipated Warranty Date(s)	

End of Section