

# COBie

## INFORMATION DELIVERY PLAN

### COVER SHEET

Submitted On:

<b>Contract Number</b>	
<b>( Task Order Number )</b>	
<b>Project Name</b>	
<b>Location Name</b>	

Facility Name(s):

<b>Facility Name</b>	<b>Facility Category Code</b>

Submitted By:

<b>Name</b>	
<b>Company</b>	
<b>Phone</b>	
<b>Email</b>	

# SIGNATURE SHEET

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<b>Company</b>	
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(Reviewed by) QC Manager (Primary):

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(Approved by) Contractor/Designer Project Manager:

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# 1. INSTRUCTIONS

This template is meant to be a “COBie Cookbook.” The steps required to streamline existing paper processes and redundant data entry and file processing are outlined in this template.

The most efficient way for a Contractor to use this document is:

- 1) The person preparing the COBie Implementation Plan shall review this template Plan to understand how COBie data can be used to simplify current contract deliverables.
- 2) The preparer shall make a copy of this template and renaming it to reflect the various versions of the document.
- 3) If this is a design-build project, the preparer shall facilitate a conversation with the lead Architect and consulting engineers about the creation of COBie design deliverables.
- 4) If this is construct contract, or design-build project, the preparer shall facilitate a conversation with the construction contractor and subcontractors about the creation of COBie design deliverables.
- 5) The preparer shall capture the information needed to apply this generic Plan to a specific project.
- 6) To complete the Plan the preparer shall fill in the required content, make edits, and update each Plan section as instructed.
- 7) The prime Contractor shall submit any Requests for Information on the scope of this Plan to the Government for response.
- 8) Contractors with their own, equivalent, processes may substitute their processes as appropriate to meet the requirements of the COBie Specification.
- 9) The preparer shall clearly document all Contractor substitutions.
- 10) The preparer shall update all page footers and tables of contents. The “DRAFT” watermark shall be removed. Preparer instructions shall be removed from the final Plan document.
- 11) The prime contractor shall submit the project-specific Plan to the Government for Approval.
- 12) Government Approval is contingent upon (1) the completeness of the plan and (2) execution of the approved plan through the life of the project.

## 2. VERSION CONTROL

This version of the COBie Information Delivery Plan is the most recent Plan submission. Previous COBie Information Delivery Plan versions are noted in the table below.

**Preparer Instructions: Add/Remove rows as needed to document required information.**

Date Submitted	Date Approved	Version Number	Reason for Submission of New Version
		1.0	initial submission

### 3. SUBSTITUTIONS

The following substitutions or changes from the draft COBie Information Delivery Plan Template are documented in this plan:

**Preparer Instructions: Add/Remove rows as needed to document required information.  
If no substitutions, so state in first row of form.**

Date	Description of Substitution	Current Page Reference



## 4. REQUESTS FOR INFORMATION

The following requests for information related to the topics covered in this Plan, and their resolution, are noted as shown in the table below.

**Preparer Instructions: Add/Remove rows as needed to document required information. If no substitutions, so state in first row of form.**

Date Submitted	Date Resolved	Description of Request for Information	Current Page Reference

## 5. BASIC REQUIREMENTS

**Preparer Instructions: Identify any requirements not met under this Information Delivery Plan with the “strikeout” text style. This is an example of strikeout text.**

### 5.1 COBie QC Manager

The COBie QC Manager identified in this project has the following proficiencies:

- Use of Microsoft Excel
  - Use of multi-sheet Excel Workbooks
  - Use of Excel Filtering/Sorting Capabilities
- Use of Adobe Acrobat Reader
  - Use of Adobe Acrobat Reader Comment Tools
  - Use of Adobe Acrobat Reader Printing Tools
- Computer Administrative support
  - Ability to update and install PC software
  - Ability to install and update Java
- Use of Adobe Acrobat Pro (optional)
  - Bookmarking Tool
  - Optical Character Recognition Tool

### 5.2 COBie Subcontractor POC's

Subcontractor POC's will be required to provide information on their contracted parts of the construction. For example, subcontractor personnel are required to document nameplate information when equipment is installed. The COBie Subcontractor POC's will have the same skills as the COBie QC Manager except as follows:

**Preparer Instructions: Identify limitations on subcontractor POC qualifications**

### 5.3 Computer Hardware

- PC, running Microsoft Windows 7 (or later)
- 64-bit Operating System (click on Start > Control Panel > System to check)
- Installed memory (RAM) 4.00 GB (8.00 GB recommended for IFC-based models)
- Latest Java version installed (<https://www.java.com/en/download/installed.jsp>)

### 5.4 Computer Software

- Microsoft Excel 2007 (or later/equivalent)
- Adobe Acrobat Reader (<http://get.adobe.com/reader/>)
- Oracle JAVA (<https://java.com/en/download/index.jsp>)

- ERDC COBie Tool Kit ([http://projects.buildingsmartalliance.org/files/?artifact\\_id=5466](http://projects.buildingsmartalliance.org/files/?artifact_id=5466))
- (optional) Adobe Acrobat Pro
- (optional) ProjNet-eSubmittal (<https://www.projnet.org/>)

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## 6. COBie QC MANAGER DESIGNATION

The following personnel are designated as the Primary and Alternate COBie QC Managers for this project:

**Preparer Instructions: Add rows as needed to the table below.**

ROLE	ORGANIZATION	NAME	EMAIL	LOCATION	PHONE
COBie QC Manager (Primary)					
COBie QC Manager (Alternate)					

The COBie Quality Control (QC) Manager shall be responsible for overseeing overall implementation of the COBie Implementation Plan and will coordinate the extraction, collection, collating, testing, and delivery of all COBie-specified deliverables.

### Duties

- Preparation, approval and implementation of COBie Information Delivery Plan
- Preparation, review, and approval of all COBie-specific submittals
- Preparation, review, and approval of all COBie-formatted submittals
- Documentation and submission of current COBie collection processes
- Documentation, execution, and submission of streamlined COBie collection processes
- Identification, designation, and documentation of all COBie data collection personnel
- Coordination of all COBie data collection personnel to ensure accurate data merging
- Provision of COBie technical expertise to all COBie data collection personnel
- Carry out and lead monthly COBie progress meetings
- Identification, selection, and operation of all applicable COBie-supporting software
- Provision of computer hardware necessary to operate the COBie Tool Kit, or alternate
- Submission of request for equipment photographs, Documentation of Response
- If approved, preparation, review, and approval of equipment photographs
- Submission of request for electronic O&M manuals, Documentation of Response
- If approved, preparation, review, and approval of electronic O&M manuals
- Submission of request for electronic information delivery media and encryption specification
- Preparation, review, and approval of all electronic media, as specified
- Encryption of all electronic media, as specified

# 7. MAJOR COBie WORK ACTIVITIES

**Preparer Instructions:** (a) Identify any requirements not met under this Information Delivery Plan with the “strikeout” text style. ~~This is an example of strikeout text.~~ (b) Document specific activities in the later sections of this Plan.

## 1. Mobilization

Develop and Implement COBie Information Delivery Plan  
Document requirements for electronic vs. paper O&M manuals  
Document requirements for physical media and, if needed, encryption  
Coordinate with subcontractors to provide COBie-based submittals and as-built equipment data  
Document requirements for as-installed equipment photography

## 2. Produce COBie-specific Design Deliverables

*(design-build projects only)*

30% Architectural Design  
60% Architectural Design  
100% Construction Drawings

## 3. Produce COBie-specific Construction Deliverables

Construction Mobilization  
60% Completion  
Beneficial Occupancy  
Fiscal Completion

## 4. Produce COBie Project Submittals

Door Schedule  
Room Finish Schedule  
Hardware Schedule  
Signage Schedule  
As-Installed Equipment Schedule  
As-Installed Warranty Tags

## 5. Produce COBie O&M Submittals

Approved Submittals  
Spare Parts Schedule  
Warranty Certificates and Data  
Preventative Maintenance Plans  
Diagnostic Testing Plans  
Repair and Replacement Plans  
Real Property Equipment Transfer Report  
Operations and Maintenance Manuals

## 6. COBie Software Selection

ERDC COBie Tool Kit  
Selection of alternative COTS product (optional)  
Process of exporting current templates

## 7. COBie Submittal Templates

Exporting Submittal Templates  
Capturing Submittals/Updates As-required  
Importing and Merging Submittal Data

## 8. As-Installed Equipment Capture

Coordination with subcontractors  
Distribution of templates to subcontractors  
Monthly submission of templates  
Roll-up of subcontractor data

## 9. Electronic Submittal Processing

Process for marking and submitting mfg. PDF's  
Process for naming/archiving approved PDF's  
Bookmarking or separating individual types  
Use of ProjNet-eSubmittal (optional)

## 10. Feeding COBie data to Corps' RMS

Identification of Specific RMS data feed by COBie  
ERDC COBie Tool Kit automates RMS data entry

## 11. Production of Electronic O&M Manuals

Manual production of electronic O&M manuals  
ERDC COBie Tool Kit automates O&M manuals  
ERDC COBie Tool Kit production of eBook

## 7.2. COBie Software Selection

The following software will be used to test the quality of COBie-specific submittals:

Product Name	Used For
ERDC COBie Tool Kit	
Substituted Product	

The following software will be used to export templates and import updates to the COBie data set during the course of a project:

Product Name	Used For
ERDC COBie Tool Kit	
Substituted Product	

## 7.3. Produce COBie-specific Design Deliverables

**Preparer Instructions: (a) This section is applicable to the design phase of design-build contracts only. Remove the content of this section and enter “n/a” for construction only-contracts. (b) Make the selection required.**

Architectural discipline design deliverables shall be produced directly from native Building Information Modeling (or other) Design Software tool that has participated in a COBie Challenge. Architectural and other design documents produced by engineering and other disciplines included in this project shall be produced from the following software.

Design Discipline	Software Used
Architectural	
Mechanical	
Plumbing	
Electrical	
Control System	
Fire Suppression System	
Other	

For COBie-specific design deliverables, the following product shall be used to merge information from engineering disciplines with the information from the architectural model to produce a single, unified COBie data set.

Model Merging Software	
------------------------	--

The format of each COBie-specific deliverable shall be tested using [**ERDC COBie Tool Kit, or approved substitute**] prior to submitting that deliverable to the Government.

The content of each COBie-specific file shall be evaluated based on the requirement that “the data on drawing schedules match the data in the COBie file.” The following workflow shall be used within each design discipline, and associated software, to ensure that design schedule information may be exported directly into a COBie file.

Each COBie-specific file will include the complete set of design documents in PDF format. One PDF file shall be provided for each drawing sheet.

## 7.2. Produce COBie-specific Construction Deliverables

**Preparer Instructions: Make the selection required.**

A Construction Mobilization model will be prepared to provide the outline of facility assets needed to support the capture of COBie data through the construction phase. The software used may be any software that supports COBie for design or construction that has participated in a COBie Challenge.

Unless an approved substitution has been submitted and approved, COBie construction deliverables shall be created using **[ERDC COBie Tool Kit, or approved substitute]**. The output of each deliverable shall reflect the current state of each of the COBie-formatted submittals that have been imported into **[ERDC COBie Tool Kit, or approved substitute]**

COBie-Specific Deliverable	Software Used
Construction Mobilization	[to be defined by Contractor]
60% Completion	ERDC COBie Tool Kit
Beneficial Occupancy	ERDC COBie Tool Kit
Fiscal Completion	ERDC COBie Tool Kit

The format of each COBie-specific deliverable shall be tested using **[ERDC COBie Tool Kit, or approved substitute]** Construction Quality Control Report prior to submitting that deliverable to the Government.

The content of each COBie-specific file shall be evaluated based on the requirement that “the data on drawing schedules match the data in the COBie file.” The following workflow shall be used within each design discipline, and associated software, to ensure that design schedule information may be exported directly into a COBie file.

Each COBie-specific file will include the complete set of design documents, amendments and contract modifications, in PDF format. One PDF file shall be provided for each drawing sheet. One PDF file shall be provided for each amendment and each modification.

Each COBie-specific file will include PDF files for each approved or acknowledged submittal received. Submittals that have not been approved or acknowledged shall not be included in any COBie submissions.

If allowed by the Government, each COBie-specific file will include JPEG files for each piece of installed equipment.

## 7.3. Produce COBie Project Submittals

**Preparer Instructions: Make the selection based on current project plans.**

After importing the Construction Mobilization model, which forms the outline of requirements for the entire project, into **[ERDC COBie Tool Kit, or approved substitute]**, the following procedure shall be used by the COBie QC Manager to prepare and create COBie-formatted Submittals

Step	Description	Responsibility
a	Select and export the needed ERDC COBie Tool Kit template	COBie QC Manager
b	Deliver the template to personnel developing the submittal	COBie QC Manager
c	Those personnel enter their submittal data into the template	Submittal Creator
d	Those personnel provide the updated template back to the	Submittal Creator
e	Check the submittal for content accuracy, updated as required	COBie QC Manager
f	Import the submittal into the ERDC COBie Tool Kit	COBie QC Manager
g	Export the submittal (as data, document or RMS QCS format)	COBie QC Manager
h	Deliver the submittal to the Government for appropriate action	COBie QC Manager

The following submittals are typically provided once, near the start of the project, and do not need to be updated unless there is a change to the project. Unless a submittal is rejected for some reason, the process above is expected to be needed only once for each of these submittals:

- Door Schedule
- Room Finish Schedule
- Hardware Schedule
- Signage Schedule

The following submittals are updated during the project to eliminate the requirement to conduct post-installation job site surveys. Each of these submittals will follow the process noted in the table above on a monthly basis. The exported template will contain information previously entered information, as well as, blanks for information yet to be captured.

- As-Installed Equipment Schedule
- As-Installed Warranty Tags (if specified)

As-Installed Equipment Schedules and Warranty Tags information will be completed by the subcontractor responsible for the installation and/or testing of that type of equipment. Reliance on the installer to capture as-installed product data will ensure that post-installation job surveys will not need to be conducted. The following subcontractors will be required to complete these templates.



Discipline	Responsible Contractor/Subcontractor /Installer
Architectural Components	
Mechanical Equipment	
Plumbing Fixtures/Equipment	
Electrical Products	
Control System Products	
Fire Suppression System Products	
Other Products	

## 7.4. Produce COBie O&M Submittals

**Preparer Instructions: Make the selection based on current project plans.**

The majority of the information contained in O&M manuals is required to be provided, prior to the end of the project as standard submittals. The objective of creating COBie O&M submittals is to capture these standard submittal documents electronically to allow the information to be re-used in whatever format that is required on this project.

The following procedure will be used to create the RMS QCS submittal register. Essential in this process is the identification of each submittal with a specific product type or system that is already in the COBie data file.

Step	Description	Responsibility
a	Select and export the ERDC COBie Tool Kit Submittal template	COBie QC Manager
b	Update the submittal register to reflect all expected submittals	COBie QC Manager
c	Import the submittal register into the ERDC COBie Tool Kit	COBie QC Manager
d	Export the submittal register (as data, document or RMS QCS)	COBie QC Manager

Submittal files are to be provided electronically, in PDF format, by individual manufacture product family. The location of these files is to be provided in the COBie Submittal template. Submittals that cross manufacturer families shall not be submitted. Specific submittal documents within these documents are either to be identified by links found in the PDF document, or broken out into individual PDF files for each submittal type in the document. In either case, these documents are to be linked directly to the COBie Submittal Register template.

The following O&M submittals may be exported from [**ERDC COBie Tool Kit, or approved substitute**] and updated over time:

- Warranty Data
- Preventative Maintenance Plans
- Diagnostic Testing Plans
- Repair and Replacement Plans

Depending on the specifics of a given contract two templates are provided to delivery consumable, replacement, or on site parts

- Product-Specific Parts and Consumables
- General Building Parts and Consumables

Given the collection of COBie data during the course of a project, the following O&M submittals may be exported from [ERDC COBie Tool Kit, or approved substitute] at any time, based upon the information currently found in the COBie data set.

- Operations and Maintenance Manuals
- Real Property Equipment Transfer Report

## 7.6. COBie Submittal Templates

**Preparer Instructions: Make the selection based on current project plans.**

During the use of the [ERDC COBie Tool Kit, or approved substitute], the COBie QC Manager will process the export of the current template data and the import of updated/as-built COBie data. There are two templates provided to capture electronic submittal files:

- Product Type Submittals
- Product-Specific Submittals

The COBie QC Manager may provide subsets of these templates, as needed, to specific contractor and subcontractor personnel based on the scope of their specific work.

The COBie QC Manager will ensure that regular updates are provided to as-built equipment information from specific contractor and subcontractor personnel to eliminate the requirement for jobsite equipment surveys.

## 7.7. As-Installed Equipment Capture

The production and updating of installed equipment lists will be coordinated with the designated subcontractors. To produce a monthly roll-up of all equipment that appears on drawings schedules.

## 7.8. Electronic Submittal Processing

**Preparer Instructions: Customize this section to identify the way in which product data and other electronic documentation are to be captured for submission concurrent with relevant COBie-based information.**

The COBie QC Manager will ensure that original manufacturer PDF's are used as the basis for all submittals. All PDF's will be down-sized to "Standard" quality to ensure minimum file size.

To ensure the correct processing of automated O&M Manuals, the COBie QC Manager will ensure that each PDF provided is limited to a single manufacturer's product type. Individual submittals within those PDF files will be identified either by PDF book mark or by exporting each individual submittal type file within the manufacturer's original PDF.

The eSubmittal program is the only electronic submittal system authorized by Corps of Engineers' regulation and integrated with the Corps' Resident Management System. The contractor **[IS/IS NOT]** planning to use the ProjNet-eSubmittal register to submit, review, and archive PDF documents for all approved submittals.

The COBie QC Manager will use the following naming convention for all COBie submittal files when documenting the location in the COBie Submittal Template:

COBie.TypeName + Submittal Type + version

In the following example, separate files are provided for each submittal type:

- Pump-Type1-ProductData-v01
- Pump-Type1-InstallationInstructions-v01
- Pump-Type1-ReplacementParts-v01
- Pump-Type1-WarrantyCertificate-v01

## 7.9. Importing COBie data into the Resident Management System

**Preparer Instructions: (a) Make the selection based on current project plans. (b) Training on the use of the Resident Management System QCS Module will be provided by the RMS Center of Expertise.**

The ERDC COBie Tool Kit allows information to be captured through the **[ERDC COBie Tool Kit, or approved substitute]** and then be fed to Corps of Engineers' Resident Management System, Contractor Quality Control module (RMS QCS). This transfer eliminates the need to simplify the collection of information required by RMS QCS.

## 7.10. Production of Electronic O&M Manuals

**Preparer Instructions: Make the selection based on current project plans.**

The COBie QC Manager will produce electronic O&M Manuals through the **[ERDC COBie Tool Kit, or approved substitute]** software. The resulting set of files will be created in an eBook format suitable for printing or electronic transmission to the Government.

## 8. COBie-FORMATTED TEMPLATES

**Preparer Instructions: (a) Identify the responsible parties in the tables below. Remove any unused. (b) If a specific template is not required remove the table and add “n/a” under the heading.**

The following COBie Templates capture the party responsible to provide each template based on the plan for this specific project shall be identified in each sub section.

### 8.1. Schedule - Doors

ROLE	ORGANIZATION	NAME	EMAIL	LOCATION	PHONE

### 8.2. Schedule – Room Finish

ROLE	ORGANIZATION	NAME	EMAIL	LOCATION	PHONE

### 8.3. Schedule - Signage

ROLE	ORGANIZATION	NAME	EMAIL	LOCATION	PHONE

### 8.4. Submittals - Hardware

ROLE	ORGANIZATION	NAME	EMAIL	LOCATION	PHONE

## 8.5. Submittals - Product

ROLE	ORGANIZATION	NAME	EMAIL	LOCATION	PHONE

## 8.6. Submittals – Product Type

ROLE	ORGANIZATION	NAME	EMAIL	LOCATION	PHONE

## 8.7. Submittals - System

ROLE	ORGANIZATION	NAME	EMAIL	LOCATION	PHONE

## 8.8. Installed Products

ROLE	ORGANIZATION	NAME	EMAIL	LOCATION	PHONE

## 8.9. Warranties – Product Tags

ROLE	ORGANIZATION	NAME	EMAIL	LOCATION	PHONE

### 8.10. Warranties – Product Types

ROLE	ORGANIZATION	NAME	EMAIL	LOCATION	PHONE

### 8.11. Files - Drawings

ROLE	ORGANIZATION	NAME	EMAIL	LOCATION	PHONE

### 8.12. Files - Photos

ROLE	ORGANIZATION	NAME	EMAIL	LOCATION	PHONE

### 8.13. Consumables - General

ROLE	ORGANIZATION	NAME	EMAIL	LOCATION	PHONE

### 8.14. Consumables – Product Types

ROLE	ORGANIZATION	NAME	EMAIL	LOCATION	PHONE

### 8.15. Plan – Product Types - Maintenance

ROLE	ORGANIZATION	NAME	EMAIL	LOCATION	PHONE

### 8.16. Plan – Product Types – Diagnostic and Repair

ROLE	ORGANIZATION	NAME	EMAIL	LOCATION	PHONE

### 8.17. Plan – System - Operations

ROLE	ORGANIZATION	NAME	EMAIL	LOCATION	PHONE

## 9. USEFUL SPREADSHEET FUNCTIONS

While COBie data is provided in the very easy to use MS-Excel spreadsheet format, many COBie QC Managers may not be familiar with some functions support the creation of COBie Template sub-sets that maybe given to individual contractor or subcontractor personnel responsible for the deliverables identified in this plan. While this document is not intended to be a tutorial on MS-Excel, the following specific questions are answered to support the COBie QC Manager.

### 9.1. NO Changes to Template Sheets and Columns

Since MS-Excel is a very easy to use tool, some will think that changing the Template files is useful and permissible. **This is NOT the case. Template worksheet names and column headings may not, under any circumstances be changed.** Users may enter data, sort, filter, and hide data, however, other changes keep the ERDC COBie Tool Kit from properly importing any information in that changed file.

### 9.2. Sorting Template Data

In MS-Excel 2007 begin by highlighting the first row of the needed COBie template. That first row will be the row containing the headings for data found in that template. Now click the menu options **Data > Filter**. Notice now that there is an arrow in the bottom right corner of each heading cell.

Left-clicking on that arrow will show the filter and sorting window. The options “Sort A to Z” and “Sort Z to A” will sort that column of data in the order identified. Notice that when the sort option is selected all other rows in the worksheet are sorted at the same time.

You may also find that sorting the rows in one or another order allows you to see information sorted in consistent ways within a given category.

### 9.3. Filtering Template Data

In MS-Excel 2007 begin by highlighting the first row of the needed COBie template. That first row will be the row containing the headings for data found in that template. Now click the menu options **Data > Filter**. Notice now that there is an arrow in the bottom right corner of each heading cell.

Left-clicking on that arrow will show the filter and sorting window. At the bottom of this window is a list of check boxes called “Text Filters”. Selecting and unselecting these options, combined with sorting, will allow you to get directly to the information of interest. Notice that the row numbers to the left of the Template will no longer be contiguous. Filtering does not remove these other rows, just hides them.

The reader is strongly cautioned about making changes in filtered spreadsheets as information in both filtered and hidden rows will be made on bulk changes.

### 9.4. Creating and Using Sub-Templates

If a given COBie template is to be distributed to multiple contractor and subcontractor personnel to allow each to update only their information, this can be accomplished by created multiple sub-templates. Each sub-template will be created by copying the initial, full, template to a new file whose name should reflect



both the base template and the individual or company receiving the file. Once the new file is created, open that new file and delete all rows that are not of interest to that specific individual or company.

An alternative to this process is to use the ERDC COBie Tool Kit to produce each sub-template needed.

Once the sub-template has been updated by the responsible party, that sub-template may be directly imported back into the ERDC COBie Tool Kit. To see the result from the importation of multiple sub-templates, re-export the whole template again.

## **9.5. How to keep people from changing the Excel data?**

In MS-Excel 2007 worksheets, rows, columns, and cells may be locked from changes by using the “Protect” function. See Excel > Review > Protect. The COBie QC Manager should note that the use of a password will be required to un-protect the worksheet.

## **9.6. Putting COBie data back into BIM Software?**

While it is not recommended to do so unless there is a specification requiring this, some will need to put the COBie data back into a BIM model once the information has been collected. Provided that the COBie Construction Mobilization Model was created with the same software into which the COBie data is to be imported it may be possible to backfill COBie data into the BIM software. The first thing that will need to be checked is if the data in the COBie fields “ExtSystem”, “ExtObject”, and “ExtIdentifier” match the object identifiers for the related objects in the BIM model receiving the COBie data.

If the identifiers match, then either native or third-part software is typically available to merge the COBie as-built project information with that of a BIM software product.

# 10. ELECTRONIC SUBMITTALS GUIDE

Contractors are required to use original PDF files that are text searchable for COBie submittal documents. Scanned copies of faxed documents of manufacturer's files or fabricator's drawings are not permitted.

COBie submittal documents may be electronically marked to indicate the selections or options chosen for a given product. Annotations of deviations or optional selections appearing outside the submittal documents, shall be included in the body of the PDF file (possibly by the inclusion of an associated report).

If the Contractor decides to produce COBie submittal documents by recreating standard paper submittals from original manufacture PDF documents, or to submit such documents via the optional ProjNet-eSubmittal electronic submittal register. For information about subscription to ProjNet-eSubmittal, contact [dfernandez@nibs.org](mailto:dfernandez@nibs.org).

## 10.1. Reduce PDF Size in Acrobat Reader

Product manufacturer PDF Files are often produced by the marketing departments of their respective companies. As a result the resolution of these files is often suitable for full-color, high-quality printing. When creating PDF's of construction submittals only grayscale (black and white) and standard quality is required.

To use Acrobat Reader to reduce the file size of color product catalog use the File > Print option. Under "Adobe PDF Settings" tab, the "Default Setting" should be set to the "Standard" option. Under the "Paper Quality" tab, the option "Black & White" should be selected.

## 10.2. Annotate the PDF in Acrobat Reader

Acrobat Reader may also be used to select products and/or options within a PDF file. To do this select View > Comment > Annotation. The arrow and text box options may now be used, in the same way a maker or stamp would be used on a paper submittal. To save these changes and use this file as an electronic submittal or COBie file attachment use the File > Save As option.

## 10.3. PDF File Naming Convention

When creating COBie submittal documents it will be important for both the person creating the files and those receiving the files to have an easy to use standard for naming each file. The file naming convention to be used when creating COBie submittal documents is as follows: "Object-SubmittalType-VersionXX". "Object" is the name of the content of the information, e.g. "Window-Type1" where the type number matches the drawing schedule (and COBie.Type.Name). The list of "SubmittalType" (s) are provided in the next section. The designation of Submittal Type is critical, since it is that information (and its designation within the COBie.Document.Category) that allows the file to be used both for the submittal, commissioning, and handover processes. The version number of the file allows all parties to maintain version control of these documents. The text "XX" is replaced by the number of the file, starting with "01".

## 10.4. Allowed PDF File Contents

PDF files shall not have internal letters of transmittal from suppliers and subcontractors. Only the original electronic information and the Contractor's Quality Control Representatives notations and identification of deviations (if any) shall be identified. CQC Reps' comments must either be marked on top of the manufacturer's original file or added as one consolidated set of notes at the beginning of the PDF file. Again, multiple letters documenting the transmission of submittal data through the Contractors' supply chain are not to be included in COBie submittal documents.

Most manufacturer product catalog files have multiple types of submittals. In order to use submittal files to automatically create O&M manuals each of the types of individual submittals within those documents must be identified. COBie submittal documents of the following types must each be explicitly identified. The contractor is only responsible to produce those files that fall within the scope of their specific design-build or construction contract.

- Design Reports
- Design Review Comments
- Contract Drawings
- Contract Specifications
- Contract Amendments
- Contract Modifications
- Manufacturer's Product Data
- Manufacturer Certifications
- Manufacturer Instructions
- Manufacturer PM Schedules
- Manufacturer Warranty Certificates
- Fabrication Drawings
- Sample Image
- Installed Equipment Photo
- Test Reports
- Consumables - Equipment
- Consumables – Facility
- Start-Up Procedures
- Shut-Down Procedures
- Normal Operating Instructions
- Emergency Operating Instructions
- System Flow Diagrams
- Draft Property Transfer Report DD 1354

There are two options to support the automated generation of O&M manuals using COBie submittal documents.

### Option 1. Split Manufacturer's files

In this option, the COBie QC Manager is responsible to split files containing multiple types of COBie submittal documents into individual files corresponding to each different type of submittal. This option may be accomplished using Adobe Acrobat Reader.

### Option 2. Bookmark Manufacturer's files

In this option, the COBie QC Manager is responsible to create internal bookmarks within a single COBie submittal document file using Adobe Acrobat Pro. Using Adobe Acrobat Pro, the **Tools > Content Editing > More Content > Add Bookmark** allows the inclusion of bookmarks. To ensure that these bookmarks may be used by applications consuming this information it is recommended that the bookmark be one single concatenated word without any punctuation or spaces.

The Adobe document "Parameters for Opening PDF Files" dated April 2007 indicates that the way that these book marks can be identified is using the full name of the file, followed by a hashtag, followed by the name of the bookmark. The example, as it applies to our COBie files is: "Object-SubmittalType-VersionXX #WarrantyCertificate"

## 10.5. Move PDF to a Project-Specific COBie Directory

Once the COBie Submittal document has been created, it should be moved to a specific subdirectory to keep such files. Ultimately, this subdirectory will be called "docs". The subdirectory will be placed within the directory that holds the main COBie index file. If using the ERDC COBie Tool Kit, the creation of this directory structure will be completed automatically.

## 10.6. Link PDF to COBie Submittal Document List

To ensure that the COBie submittal document files are correctly linked into the overall COBie data set, and to ensure the proper automated creation of the electronic O&M manual, each COBie submittal document must appear as once as a single record in the COBie Submittal Documents Template.

When using this template with files that contain embedded bookmarks note that both the file name, the hashtag, and the book mark must also appear COBie submittal documents template.

# 11. COBie-RMS QCS INTEGRATION

This section identifies the specific places where RMS QCS data may be imported from the ERDC COBie Tool Kit. Information regarding the specific capability to update RMS QCS data from ERDC COBie Tool Kit can be provided by the RMS Center, Los Angeles District, Corps of Engineers.

The following procedure will be used to create the RMS QCS data identified in this section.

Step	Description	Responsibility
a	Select and export the ERDC COBie Tool Kit export routine	COBie QC Manager
b	Note the name/location of the export file	COBie QC Manager
c	Login to RMS QCS	COBie QC Manager
d	Import the export file into RMS QCS	COBie QC Manager
e	Spot check the imported row-count and first and last records	COBie QC Manager

**NOTE:** To ensure that RMS data remains synced, the COBie QC Manager will exclusively capture use the ERDC COBie Tool Kit to capture and import the data necessary for the associated RMS QCS module.

## 11.1. RMS QCS Requirements > Installed Property

The COBie Installed Equipment Template provides the information needed to deliver data to this RMS QCS module.

## 11.2. RMS QCS > QC Requirements > QC Tests

The COBie Component-Specific Submittals provides the information needed to deliver information into this RMS QCS module.

## 11.3. RMS QCS > QC Requirements > User Schools

The COBie Preventative Maintenance and Diagnostic and Report Templates provide the information needed to deliver information into this RMS QCS module.

## 11.4. RMS QCS > QC Requirements > Warranty Items

The top, fixed-part, of this RMS QCS program form will contain information provided by the COBie Installed Equipment Template. No specific import of this RMS QCS module is required.

## 11.5. RMS QCS > QC Requirements > Transfer Property

The COBie DD 1354 export form provides a significant portion of the information needed to complete the RMS QCS Transfer Property Form. Following the import of COBie DD 1354 export data, the Contractors' RMS POC will be required to complete the remaining transfer property data fields.

## **11.6. RMS QCS > Closeout > Real Property**

The COBie Parts and Consumables Templates provide the information needed to deliver data to this RMS QCS module.

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# 12. ELECTRONIC O&M MANUAL & eBOOK

The ERDC COBie Tool Kit will export all information collected during the course of the project and export that information one of several formats. The Selection of the specific export format will depend upon the specific requirements identified by the Government.

## 12.1. O&M Manual

If the option for an electronic O&M manual is selected for use on this project, the ERDC COBie Tool Kit will produce one consolidated set of files for that purpose.

## 12.2. O&M Quality Control Report

The quality of the information exported the ERDC COBie Tool Kit is directly proportional to the quality of the information that was captured in the COBie Construction Mobilization Model as updated through the use of the COBie-formatted submittals. The O&M Quality Control Report may be run at any time to identify potential gaps in the information in the database of the ERDC COBie Tool Kit. That set of gaps can form a helpful to-do list of tasks necessary to deliver electronic O&M Manuals.

The O&M Quality Control Report cannot definitively determine if a specific data set meets, or does not meet, the requirements of UFGS 01 78 00, “Closeout Submittals.”

This report works by comparing the basic asset information about rooms, zones, systems, equipment types, and specific equipment with a list of potentially required information and the information entered through the COBie templates. An example of information that cannot be identified by the O&M Quality Control Report is that if system or equipment that were not identified in the COBie Construction Mobilization Model cannot be checked.

## 12.3. O&M Manual Production

The ERDC COBie Tool Kit will create the electronic O&M Manual by creating a website that can be provided, via approved media, to the Government. This Manual will be comprised of files that contain reports from the ERDC COBie Tool Kit and linked files.

When creating the electronic O&M Manual for the first time the ERDC COBie Tool Kit will create a new subdirectory called “eManual.” The COBie QC Manager may regenerate this information whenever needed. Each time, the eManual is created the former eManual sub-files will be entirely deleted and a completely new set of files will be produced.

Reports are produced in web page (HTML) format. These files may be found in the “eManual” subdirectory. The COBie file produced as part of the eManual will also be found in the “eManual” directory. Documents and drawings files (in PDF format) are copied to the eManual sub-directory called “docs”. All associated photographs (in JPEG format) are copied the eManual sub-directory called “pics”.

## 12.4. O&M Manual Outline

The eManual produced by the ERDC COBie Tool Kit is provided in the format listed in this section.

### 1. Cover Page (index.html)

To update the eManual cover page a separate COBie Template will be created to allow the COBie QC Manager to update overall project and project participants.

This page begins with the name and location of the project from the COBie.Facility data

eManual Title	COBie Data Field
Facility Name:	COBie.Facility.Name
Project Name:	COBie.Facility.ProjectName
Site Name:	COBie.Facility.SiteName
Project Category:	COBie.Facility.Category

Next on this page information about the organizations responsible for this project are listed. This list is generated from information provided through the COBie.Contact worksheet. Specifically the all records with the following COBie.Contact.Category values will be listed. More than one firm may be listed. This listing shall not identify individuals. If more than one contact is given for a specific company on the first instance of matching COBie.Contact.Company information will be given.

eManual Title	COBie.Contact.Category
Corps of Engineers District	34-20 41 00: Contract Administrator
Corps of Engineers Resident Office	34-35 15 17: Project Engineer
Architect	34-20 11 11: Architect
Engineer	34-20 11 21: Engineer
Prime Contractor	34-35 15 11: Contractor
Subcontractor	34-35 15 14: Sub Contractor

### 2. Publication Information (publication.html)

This page will provide information about the version of the ERDC COBie Tool Kit that produced the eManual and date and time of publication.

### 3. Table of Contents (content.html)

This page provides one page that links all subsections of the Manual.



#### 4. Room Finish Schedule (finish.html)

This page will provide the complete set of tables that mirror the associated COBie Room Finish Template. One table will be provided for each floor identified in the COBie.Floor data. Due to the information layout of the COBie Room Finish Template, this page will be organized in landscape, not portrait, layout mode.

#### 5. Material & Equipment Schedules (schedule.html)

When creating the eManual a complete product schedule page, similar, to that found on a design drawing schedule will be provided in HTML format for each COBie.Type.Category. Within a given product type schedule all components and properties will be provided, sorted by COBie.Type.Name and COBie.Category.Name.

The Material & Equipment Schedule page provides two indexes to each of these individual product schedule files. The first index provides a listing of each schedule based on the assignment of its related COBie.Components to the COBie.Systems Tab.

To ensure that the information found in the O&M manual has been updated based on the as-built project conditions separate COBie Template will be created to allow the COBie QC Manager, or designated other, to update the COBie.Systems tab. The table below provides the eManual System Title to be assigned to a given COBie.System.Category. If additional COBie.System.Categories are provided in the COBie file these will be listed by their COBie.System.Category name following the systems listed in the table below.

eManual System Title	eManual page	COBie.System.Category
HVAC System	hvac.html	21-04 30 : HVAC System
HVAC Control System	hvaccontrol.html	21-04 80 10 50: Control of HVAC Systems
Plumbing System	plumbing.html	21-04 20 : Plumbing
Electrical System	electrical.html	21-04 50 : Electrical
Fire Supression System	firesupression.html	21-04 40 : Fire Protection
Fire Alarm System	firealarm.html	21-04 70 50 10: Fire Detection and Alarm
Security System	security.html	21-04 70 10: Access Control Systems
Data Communications	datacomms.html	21-04 60 10 : Data Communications
A/V Communication	avsystem.html	21-04 60 30 : Audio-Video Communication
Site Water Utilities	sitewater.html	21-07 30 10 : Water Utilities
Site Electrical	siteelectric.html	21-07 40 10 : Site Electric Distribution Systm
Elevators	elevator.html	21-04 10 10 : Vertical Conveying Systems

In addition to the system-based index, another product and equipment schedule index is provided in the eManual. This index is alphabetical by COBie.Type.Name.

## **6. Maintenance Procedures (maintenance.html)**

Maintenance procedures will be identified by equipment type. In some cases these procedures will be linked through the identification of maintenance submittals created from manufacturer documents in individual PDF files. In other cases, book marks within larger manufacturer submittals will be referenced. In other, cases specific COBie.Job projects will capture these maintenance procedures.

Regardless of how the information is captured, the eManual output will be developed by the ERDC COBie Tool Kit by extracting the COBie.Jobs for each COBie.Type. In addition, COBie.Documents categorized as “Operation and Maintenance” submittals will be listed in this section.

Internal bookmarks on these tables allow this information to be cross-referenced with each Product Type.

## **7. System Operations Procedures (operation.html)**

Given the complexity of the physical and control connections between components in building systems, the following types of procedures may also be required to properly operate the facility. The information below is contained in the COBie System Operations Plan Template.

- a. Start-Up Procedures
- b. Shut-Down Procedures
- c. Normal Operating Instructions
- d. Emergency Operating Instructions

If these procedures were developed as stand-alone PDF files, then the files may be referenced in the COBie System Submittal Template. In addition to these system-related procedures there are also different types of drawings used to assist facility managers to operate a given system. The following documents may be cataloged as part of the COBie System Submittal Template.

- a. System Flow Diagram
- b. Referenced Drawings

## **8. Testing Procedures (test.html)**

Testing procedures provided as stand-alone documents may be provided through either one of the COBie Type Submittal Template, the COBie Component Submittal Template, or the COBie System Submittal Template. Testing procedures may also be provided in the Type Plan Template or System Operations Plans Templates.

Internal bookmarks on these tables allow this information to be cross-referenced with each Product Type.

## **9. Troubleshooting & Repair Procedures (troubleshooting.html)**

Troubleshooting and Repair Procedures provided as stand-alone documents may be provided through either one of the COBie Type Submittal Template, the COBie Component Submittal Template, or the COBie System Submittal Template. Testing procedures may also be provided in the Type Plan Template or System Operations Plans Templates.

Internal bookmarks on these tables allow this information to be cross-referenced with each Product Type.

## **10. Manufacturers & Suppliers Schedules (suppliers.html)**

The list of each manufacturer and supplier are provided in this section based on previously submitted COBie Templates. This list will be provided in alphabetical order. An additional comma delimited file will also be created to allow facility managers to directly incorporate these manufacturers and suppliers into their email/phone book applications.

Internal bookmarks on these tables allow this information to be cross-referenced with each Product Type.

## **11. Warranty Certifications (warranty.html)**

Warranty information is provided a series of tables sorted by alphabetical order by Product Type. Within each of those tables the warranty certificates provided in the COBie Type Submittal Template will be linked. The next section of the table will provide the complete contact information for the guarantor for that warranty as found in the COBie.Type worksheet. The Warranty period for each Product Type will also be displayed. Under that heading each individual component will be listed along with the start and end date of the warranty period for that specific component.

Internal bookmarks on these tables allow this information to be cross-referenced with each Product Type.

## **12. Tests and Certifications (test.html)**

Tests and Certifications COBie submittal documents are provided as linked documents through either one of the COBie Type Submittal Template, the COBie Component Submittal Template, or the COBie System Submittal Template.

Internal bookmarks on these tables allow this information to be cross-referenced with each Product Type.

### **13. Parts and Consumables (parts.html)**

Parts and Consumables information is provided in tables listed by Product Type.

Internal bookmarks on these tables allow this information to be cross-referenced with each Product Type.

### **14. Training & Instructions (training.html)**

Training & Instructions COBie submittal documents are provided as linked documents through either one of the COBie Type Submittal Template, the COBie Component Submittal Template, or the COBie System Submittal Template.

Internal bookmarks on these tables allow this information to be cross-referenced with each Product Type.

### **15. Design Drawings (drawing.html)**

Drawings of all types are provided as linked documents through the COBie Drawing Template. This section will include Contract Drawings, Contract Amendments, and Contract Modifications.

All documents in this category will be identified by selecting a value in the COBie Drawing Template “Facility Name”. If appropriate, the optional template “Floor Name” column value will also be selected.

Note that both the native design file and PDF design file are required.

### **16. Fabrication Drawings (drawing.html)**

Drawings of all types are provided as linked documents through the COBie Drawing Template.

All documents in this category will be identified by selecting a value in the COBie Drawing Template “Facility Name” column. If appropriate, the optional “Floor Name” column value will also be selected.

All drawings in this category will be identified by selecting a value in the COBie Drawing Template “System Name” column.

Note that both the native design file and PDF design file are required.

## **17. System Flow Diagrams Drawings (drawing.html)**

Drawings of all types are provided as linked documents through the COBie Drawing Template.

All documents in this category will be identified by selecting a value in the COBie Drawing Template “Facility Name” column. If appropriate, the optional “Floor Name” column value will also be selected.

All drawings in this category will be identified by selecting a value in the COBie Drawing Template “System Name” column.

This type of drawing may be provided in PDF format only.

## **18. Utility Connection Drawings (connections.html)**

Drawings of all types are provided as linked documents through the COBie Drawing Template.

All documents in this category will be identified by selecting a value in the COBie Drawing Template “Facility Name” column. If appropriate, the optional “Floor Name” column value will also be selected.

All drawings in this category will be identified by selecting a value in the COBie Drawing Template “System Name” column.

This type of drawing may be provided in PDF format only.

## **19. As-Built Drawings (drawing.html)**

Drawings of all types are provided as linked documents through the COBie Drawing Template. This section will include Contract Drawings, Contract Amendments, and Contract Modifications.

All documents in this category will be identified by selecting a value in the COBie Drawing Template “Facility Name”. If appropriate, the optional template “Floor Name” column value will also be selected.

Note that both the native design file and PDF design file are required.

## **20. Design Calculations (design.html)**

Documents of this type will be provided as linked documents through the COBie Drawing & Design Template. This section will include Design Calculations and Basis of Design documents.

All documents in this category will be identified by selecting a value in the COBie Drawing Template “Facility Name”. If appropriate, the optional template “System Name” column value will also be selected to reference systems described in specific documents.

It is expected that these files will be provided in PDF format.

## **21. Installed Equipment Photographs (photo.html)**

The Contractor will provide links to all installed equipment photographs through the COBie Equipment Photos Template. A minimum of one photo shall be provided for each product or piece of equipment with a nameplate bearing a specific serial number.

## **22. COBie File (cobie.html)**

One single COBie data file shall be provided with the submittal. The data provided in this COBie data file shall be provided in multiple formats to allow the use of this information by those receiving the information. These data formats shall be created using the ERDC COBie Tool Kit. The following COBie files shall be provided and referenced through this cobie.html page:

- Excel native format (xls orxlsx)
- SpreadsheetML (Microsoft XML 2003 format)
- COBieLite
- IFC

{End of Document}