


SAN FRANCISCO PUBLIC UTILITIES COMMISSION WATER SYSTEM IMPROVEMENT PROGRAM CONSTRUCTION MANAGEMENT BUSINESS PROCESSES	
SECTION: WSIP CONSTRUCTION MANAGEMENT	APPROVED: 
BUSINESS PROCESS NO.: 003b TITLE: DRAWING CONTROL	DATE: 02/12/09 REVISION: 0a

The Construction Contract contains instructions for the issue, maintenance, control and use of Project Record Documents. The Construction Management Information System (CMIS) is used to control Construction Drawings and revisions issued to the Contractor. This Business Process Report describes the process for the control and maintenance of Construction Drawings during construction and project closeout; the creation and use of Drawing Sets; and the development of the Drawing Register. Shop drawings are considered submittals, and are included in Business Process 001b.

Definitions

Conformed Drawings: Issued for construction by the Project Engineer (PE) incorporating all changes to drawings via addenda during the bid period.

Record Drawings: Conformed drawings stamped “Record Drawings” that the Contractor secures from the Project CM following Notice to Proceed. The Contractor updates the Record Drawings to show all changes or variations between designed and as-constructed facilities.

Final Record Drawings: Final submittal by the Contractor of the Record Drawings reflecting all the changes from the Conformed Drawings made and actually constructed.

Contractor’s As-Built Drawings: Final Record Drawings certified by the Project CM as marked-up Construction Drawings representing facilities as constructed.

Conformed As-Built Drawings: AutoCAD files of conformed drawings incorporating all the mark-ups in the approved Contractor’s As-Built Drawings. Project Engineer (PE) certifies Conformed As-Built Drawings were correctly transcribed from the Contractor’s As-Built Drawings and the changes were previously approved by PE.

Interim Contractor’s As-Built Drawings: Construction drawings which the Contractor updates throughout construction to show all changes or variations between designed and as constructed facilities. This set is submitted by the Contractor as Substantial Completion.

Drawing Control Process

After the notice to Proceed, the Project CM Receives from the Project Engineer a Three sets of full-size unmarked Conformed Drawings affixed with a "Construction Drawing" Stamped specifically for the incorporation of detailed as-built changes and subsequent approval of those changes by the City Representative. Two sets will be printed on bond paper and one on vellum. A CD containing a full set of construction drawings in electronic format shall also be provided by the Project Engineer. The Project Engineer also provides a drawing log of all drawings issued for construction. The drawing log is in a Microsoft Excel worksheet conforming to the specific format shown in Exhibit 2.

The Office Engineer (OE) creates a Drawing Register by importing the drawing log obtained from the Project Engineer, or by logging the drawings in the CMIS, attaches the electronic file to the Drawing record, and creates in the CMIS a "Construction Drawing" drawing set. The Project CM transmits two sets of Construction Drawings(one copy on bond paper and one copy on vellum) to the Contractor and retains a copy of the drawings for the use of the project CM team.

The Contractor uses the Construction Drawings printed on bond paper to maintain the Interim Contractor's As-Built Drawings showing the current conditions of the site and of construction. The Contractor will make all progress and field conditions on the Record Drawings as they occur. The Record Drawing set on vellum shall contain the Record Drawings as issued by the City Representative at the beginning of the Project, as well as all drawing revisions, additions and deletions resulting from approved and certified Changes. At Final Completion, the Interim Contractor's As-Built Drawings shall be transcribed into the Final Record Drawings and are submitted for archiving along with a CD-ROM containing scanned files of the Final Record Drawings.

Construction Drawings may be revised in the course of construction due to changes. The PE is responsible to revise and transmit to the Project CM any Construction Drawings amended by the change. The Project CM in turn transmits to the Contractor the Construction Drawing revisions as a drawing set in the same manner as the original drawing set.

Prior to the Final Completion, the Contractor transmits to the Project CM for approval the Contractor's As-Built Drawings reflecting the facility installations as actually constructed at project completion. After the Project CM has approved all Contractor's As-Built Drawings, the Contractor shall certify the Contractor's As-Built Drawings and transmit them to the Project CM who also certifies them. Upon certification, the Contractor transmits the Contractor's As-Built Drawings on vellum and a scanned set on CD-ROM to the OE, who prepares the drawings for transmittal as Final Record Drawings to the Regional PM, who submits them for archiving and to the PE to create Conformed Drawings in AutoCAD.

Drawing Sets

Drawing Sets are a mechanism provided by the CMIS to group drawings for a specific purpose. The initial set of Construction Drawings is grouped into a "Construction Drawing" drawing set. The OE, who is responsible for the maintenance of the drawing register and of the Job Sit drawings as well as the transmittal of hard copy drawing sets,

may create drawing sets in the CMIS for any purpose as directed by the Project CM, PE or other Project Team member.

Drawings pertinent to or affected by a Change Management process, such as a Proposed Change Order, Change Order Request, Field Order, Change Order or Unilateral Change Order will be grouped into a Drawing Set, which may be tracked or distributed using the CMIS Ball in Court function or Distribution function.

Drawing Register

The Drawing Register (Exhibit 3) is a log of the drawings entered by the OE into CMIS. The Drawing Register groups the drawings by the Drawing Set and sorts them by Drawing Number, listing the Drawing Number, latest Revision Number, Title, project work are, discipline and dates received or sent.

Business Process'

The Business Process steps are defined in the following phases:

- Initiation - After Notice to Proceed, the initial entry of Construction Drawings into CMIS.
- Change Management - Revision of Construction Drawings during construction due to changes.
- Closeout - Preparation and transmittal of Final Record Drawings for archiving.

Drawing Sets are used throughout the Business Process. The specific data requirements necessary for each phase are listed as part of the phase data requirements.

Initiation

1. The PE issues the Construction Drawings and drawing log to the Project CM.
2. The OE creates the drawing register in the CMIS, sets the Revision Number to 0, attaches electronic files to each drawing in CMIS and creates a "Construction Drawing" drawing set that includes all Construction Drawings. (Note: the Revision Number is a prerequisite field to identify and include a drawing record in the drawing set.)
3. The Project CM transmits the Construction Drawings to the Contractor.

Change Implementation

1. The PE confirms with the OE the Revision Number of the revised Construction Drawings, coordinates for the required modifications to the Construction Drawings and ensures the transmittal of the revised Construction Drawings to the Project CM.
2. The OE logs the revision; attaches the revised Construction Drawings or new Construction Drawings to the CMIS Drawing record as a revision; creates a Drawing Set containing the revised drawings, creates a Transmittal Form (Exhibit 4) for the Drawing Set.
3. The Project CM Transmits two sets of the revised Drawing Set to the Contractor, one printed on the bond and one on vellum.

4. The OE inserts the revised drawing(s) over the original drawings with in the job site set, stamps the obsolete drawing(s) "Inactive" and retains all drawings until Project Closeout.

Closeout

1. Prior to Substantial Completion, the Project CM transmits to the Contractor a log of the most current Construction Drawings.
2. Prior to Final Completion, the Contractor prepares and transmits to the Project CM one original set of Contractor's As-Built Drawings.
3. Upon the Project CM's approval of the Contractor's As-Built Drawings, the Contractor certifies the Contractor's As-Built Drawings on vellum and electronically scans the certified drawings files in "tiff" format onto a CD-ROM and transmits the certified Record Drawings and CD-ROM to the Project CM.
4. The OE acknowledges receipt of the Contractor's As-Built Drawings, creates a drawing set of Final Record Drawings and attaches the scanned files to the CMIS Drawing records.
5. The Project CM certifies the Final Record Drawings.
6. The OE transmits the Final Record Drawing Set to the Regional Project Manager (RPM) for delivery to the Infrastructure Records Management for archiving and to the PE to create Conformed Drawings in AutoCAD.
7. PE creates conformed drawings in AutoCAD.

Data Requirements

The data submittal requirement description is organized in the same order as the Drawing Control Business Process in order to define the steps taken in CMIS to accomplish the tasks needed for Drawing Control initiation, Drawing revisions, and closeout. All data Requirements are the responsibility of the Office Engineer.

Initiation

Office Engineer

Drawings

- Drawing Number as shown on drawing
- Sheet Number or Plan Number
- S.F. File Number
- Subject or Drawing title
- Issued Date
- Specification section
- Discipline
- Project area/location
- Contact Number
- Attachments: attach the electronic file

Drawing Revisions (Add a Drawing Revision)

- Revision Number - initial manual revision entry is "000"
- Revision Date
- Add issues, such as change management, if appropriate
- Attach the electronic file of drawing

Drawing Sets

- Name/Project ID - Enter the Contract No.
- Subject - Description of the Drawing Set: "Construction Drawings"

Status

- Date - Date the set is issued to the Contractor
- Priority - "Normal"
- Phase - "Issued for Construction"

Drawings in Set - Select drawings

- Sent Date - Date the set is issued to the Contractor
- Select Contractor
- Copies - 2
- Paper size - Select paper size

File code

Phase 2 - Change Management

Office Engineer

Drawing Revisions

- Revision Number - Increment the Revision Number manually
- Revision Date
- Subject or Reason for Revision - (Change Order and other sources of change, e.g., RFI No, RFD No.)
- Add issues, such as change management , if appropriate
- Attach the electronic file or revise drawing

Drawing Sets

- Name/Project ID - Enter the Contract No.
- Subject - Description of the Drawing Set: "Change Order"

Status

- Date - Date the set is issued to the Contractor
- Priority - "Normal"
- Phase - "Change Order"

Drawings in Set - Select drawings

- Sent Date - Date the set is issued to the Contractor
- Select Contractor
- Copies - 2
- Paper Size - Select paper size

File Code

Exhibit 1: Drawing Control Flow Chart

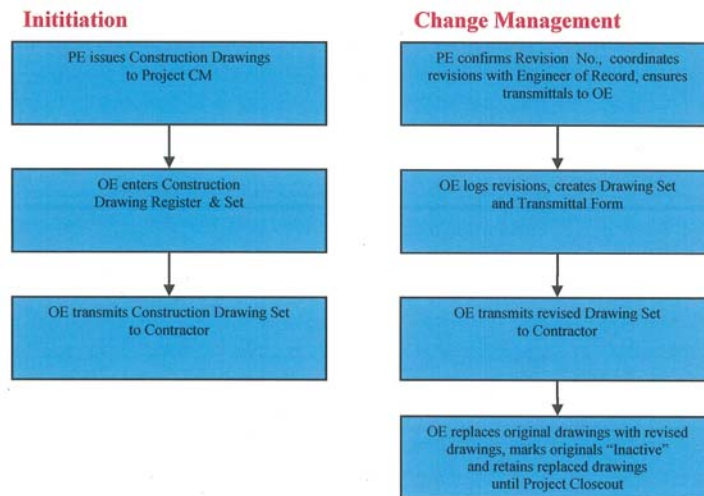


Exhibit 2 – Drawing Log Template

dwmf_table.area	dwmf_table.discipline	dwmf_table.drawing_number	dwmf_table.drawing_phase	dwmf_table.spec_section	dwmf_table.title	dwmf_table.latest_revision_number
Project-specific: construction	Discipline as defined in CMIS	Drawing Number as shown on drawing sheet	Drawing Phase Code as defined in CMIS. Ref. ICF (based for Construction)	Specification Section as defined in CMIS	Drawing Title as shown on drawing sheet	Drawing Revision No. as shown on drawing sheet

The Drawing Log spreadsheet headers must be formatted precisely as shown above to permit the import of the data into CMIS. The data must conform to the values pertinent to the data dictionaries in CMIS, as follows:

1. Area – defined by the Project CM team on project set-up.

2. Discipline			
ARCH	Architecture	LAND	Landscape
CIVIL	Civil	MECH	Mechanical
CRSN	Corrosion	PLUMB	Plumbing and Piping
ELEC	Electrical	REF	Reference
FIRE	Fire protection	SCTY	Security
GENERAL	General	STRUCT	Structural
HVAC	HVAC	TUNNEL	Tunnel

3. Drawing Phase	
IFC	Issued for Construction
INTASBLT	Interim As-Built
CHGORD	Change Order
AS-BUILT	As-Built
FINAL	Final Record Document

Exhibit 3:

DRAWING REGISTER



SAN FRANCISCO PUBLIC UTILITIES COMMISSION
WATER SYSTEM IMPROVEMENT PROGRAM



CONTRACT NAME:
CONTRACT NO:

Date:

Drawing Number	Latest Rev. No.	Title	Area	Discipline	Date Received
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Exhibit 4: TRANSMITTAL



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WATER SYSTEM IMPROVEMENT PROGRAM



CONTRACT NAME: _____ NO: _____
 TO: _____ DATE: _____
 FROM: _____ REF: _____

WE ARE SENDING:	SUBMITTED FOR:	ACTION TAKEN:
<input type="checkbox"/> Shop Drawings	<input type="checkbox"/> Approval	<input type="checkbox"/> Approved as Submitted
<input type="checkbox"/> Letter	<input checked="" type="checkbox"/> Your Use	<input type="checkbox"/> Approved as Noted
<input checked="" type="checkbox"/> Prints	<input type="checkbox"/> As Requested	<input type="checkbox"/> Returned After Loan
<input type="checkbox"/> Change Order	<input type="checkbox"/> Review and Comment	<input type="checkbox"/> Resubmit
<input type="checkbox"/> Plans		<input type="checkbox"/> Submit
<input type="checkbox"/> Samples	SENT VIA:	<input type="checkbox"/> Returned
<input type="checkbox"/> Specifications	<input checked="" type="checkbox"/> Attached	<input type="checkbox"/> Returned for Corrections
<input checked="" type="checkbox"/> Other: 1 CD containing Drawings issued for Cd	<input type="checkbox"/> Separate Cover Via:	<input type="checkbox"/> Due Date:

ITEM NO COPIES DATE ITEM NUMBER REV # DESCRIPTION STATUS

Signed: _____

Revision Control Log

Revision No.	Revision Date	What changed?
Rev 0a	September 21, 2011	<ul style="list-style-type: none">• Formatting refreshed: document footers and page numbers refreshed and updated SFPUC Logo on various attachments• References and/or Links noted to WSIP Website have been updated• Revision Control Log Added
Rev 0	February 12, 2009	Signed