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1 PURPOSE


- 1.1 Define the criteria and guidelines for converting engineering drawings from an obsolete drawing format to a current format.

2 SCOPE – APPLIES TO WHERE & WHEN THE PROCEDURE IS USED


- 2.1 MTS-Eden Prairie
- 2.2 This procedure applies to engineering drawings which currently exist only in an obsolete file format. This includes, but is not limited to: hand-drawn/scan, Microstation and SDRC I-DEAS files. This procedure does not apply to file formats which are supported with current software.

3 DEFINITIONS AND ACRONYMS

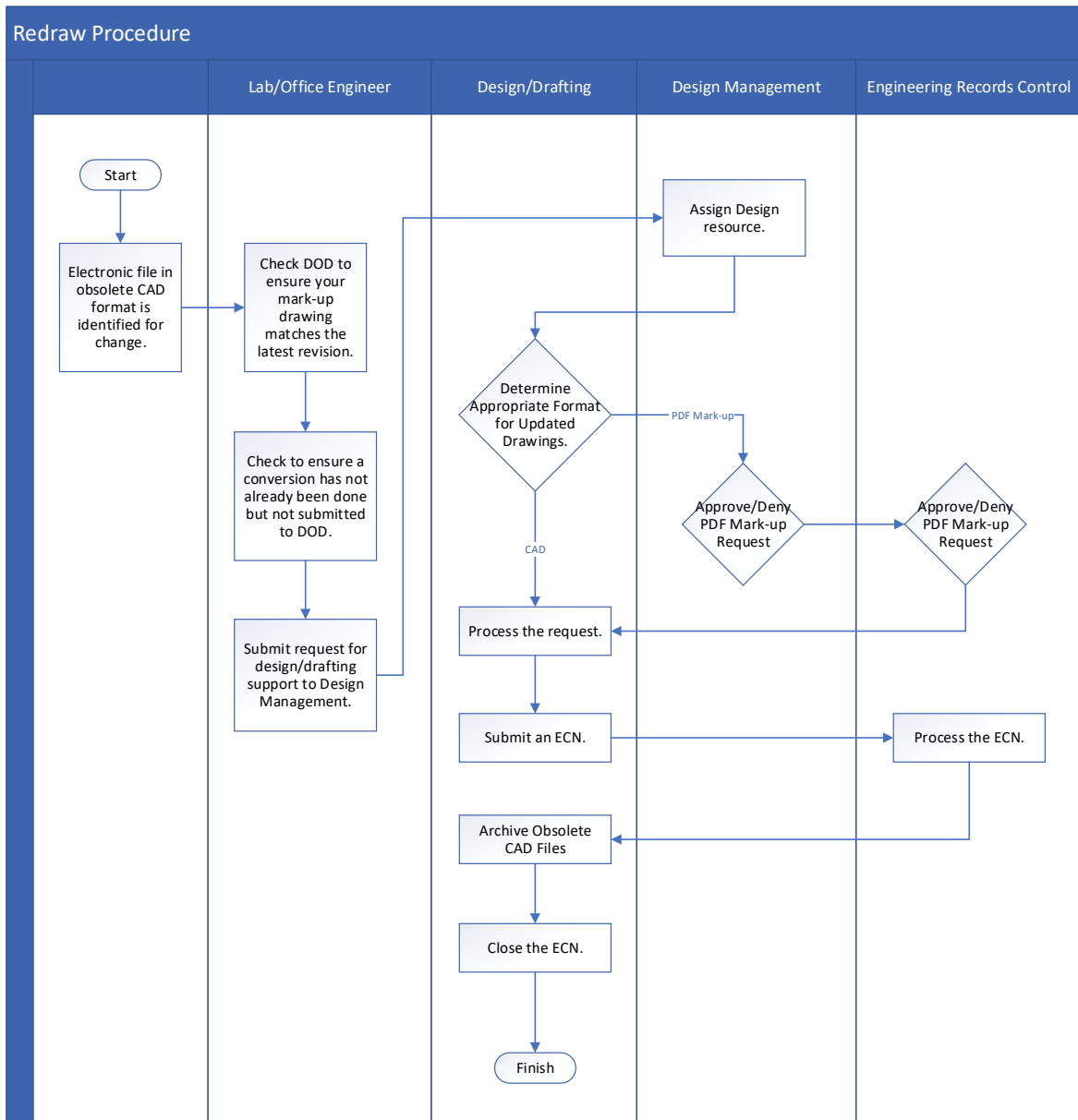
- 3.1 **ECM** – Engineering Change Management


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- 3.2 **ECN** – Engineering Change Notice
- 3.3 **ROI** – Return on Investment
- 3.4 **BOM** – Bill of Materials
- 3.5 **CAD** – Computer-Aided Design
- 3.6 **Engineering Drawings** – This includes any drawing used to communicate design intent or instruction created by the Engineering organization.
- 3.7 **PDF Mark-Up** – A PDF version of an engineering drawing that has been marked up for change.

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4 GRAPHIC



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5 RESPONSIBILITIES

5.1 Lab/Office Engineer

- 5.1.1 Create mark-up of required changes.
- 5.1.2 Submit request for Design/Drafting support.
- 5.1.3 Work with Design/Drafting to evaluate appropriate format for updated drawings.
- 5.1.4 Check updated drawing for accuracy per Drawing & BOM Checking Work Instruction.
- 5.1.5 Review/Approve ECN.

5.2 Design/Drafting


Note: This role may be filled by the Lab/Office Engineer.

- 5.2.1 Determine appropriate format for updated drawings in collaboration with Lab/Office.
- 5.2.2 Submit approval for PDF mark-up (if required).
- 5.2.3 Update the drawing in approved format.
- 5.2.4 Submit an ECN for the updates.
- 5.2.5 Archive file being replaced.
- 5.2.6 Close the ECN.

5.3 Design Management

- 5.3.1 Assign Design resource.
- 5.3.2 Assist in ROI analysis if necessary.
- 5.3.3 Collaborate with ERC on PDF mark-up approvals, as necessary.

5.4 Engineering Records Control

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- 5.4.1 Process the ECN.
- 5.4.2 Collaborate with Design Management on PDF mark-up approvals, as necessary.


6 PROCEDURE

6.1 Lab/Office Engineer

- 6.1.1 Check DOD and SAP to ensure the drawing you intend to mark-up matches the latest revision.
- 6.1.2 Check to ensure a conversion has not already been done but not submitted to DOD. The Vault, DBWorks, CAD SUN, EPLAN repository, etc. should be checked depending on the format of the expected final product.
- 6.1.3 Mark-up the drawing with required changes.
- 6.1.4 Submit a request for design/drafting support to Design management.
 - 6.1.4.1 This should be a simple e-mail request to Design Manager with a description of the changes, estimate of hours, and a charge number.
 - 6.1.4.2 Note: Lab/Office may execute the changes themselves without Design support.
- 6.1.5 Collaborate with Design/Drafting to evaluate appropriate format for updated drawings.
- 6.1.6 Check drawings upon return from Design/Drafting per latest revision of the Drawing & BOM Checking Work Instruction.
- 6.1.7 Review/Approve ECN in the ECM Portal, as required.

6.2 Design/Drafting

- 6.2.1 Determine appropriate format for updated drawings in collaboration with Lab/Office.
 - 6.2.1.1 Formatting options for updated engineering drawings include: AutoCAD, AutoCAD-Electrical, SolidWorks, EPLAN and in special situations, a PDF mark-up. PDF mark-ups are only allowed where the drawing is expected to be re-used rarely and requires both Design Management and ERC approval. ROI

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should be evaluated before conversion if the resulting work is > 1 hour.

6.2.1.2 If the current format is Microstation, AutoCAD and AutoCAD-Electrical are efficient tools to import and update to create an editable file in a currently supported format. Therefore, a PDF mark-up is typically not allowed in this circumstance. Conversion to SolidWorks is preferred for mechanical parts so that the drawing is based on the 3D model and will serve to help check the accuracy of the model.

6.2.1.3 If the current format is a hand-drawn scan, converting to a current format is preferred for clarity. Scanning a PDF mark-up for submission is acceptable under the conditions noted in 6.2.1.1.

6.2.1.4 NOTE: 3rd Party Drafting resources can be an efficient way to re-draw, especially in large quantities. Consult with Design Management.

6.2.2 If a PDF mark-up is the desired output chosen, approval is required from Design Management and ERC. Submit request to Design Management via e-mail with a description of the changes to be made and the estimate of time saved by doing a PDF mark-up instead of conversion.

6.2.3 Make the drawing updates in the appropriate format.

6.2.4 Submit an ECN per the ECM process. Attach a copy of PDF mark-up approval e-mail if PDF mark-up is the chosen format. NOTE: For -XX drawings, all active tabs as well as the -XX document must be included in your ECN.

6.2.5 Archive obsolete CAD files.


6.2.6 Close the ECN.

6.3 Design Management

6.3.1 Assign Design resource as needed.

6.3.2 Assist in ROI analysis if necessary. ROI should be considered when the team is choosing the appropriate format. Several factors may need to be considered including, but not limited to:

- Amount of time required to re-draw. An assembly requiring updates, for example, may require several sub-components to be updated.

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- Potential future usage of the item being documented.
- Value in having a solid model of the part (i.e. for manufacturing or use in upper assemblies.)

6.3.3 Provide approval decision for PDF mark-up requests.

- If approving, seek additional approval from ERC by forwarding the e-mail request with your approval to ERC.
- If rejecting, reply to requester via e-mail with explanation.

6.4 Engineering Records Control

6.4.1 Process the ECN in accordance with the ECM process.

6.4.2 Collaborate with Design Management on ROI Analysis, as necessary.

6.4.3 Provide approval decision for PDF mark-up requests.


- If approving, forward e-mail back to original requester and appropriate Design Manager with your approval via e-mail.
- If rejecting, reply to requester and Design Manager with explanation.

7 ASSOCIATED QUALITY RECORDS – AS STATED IN THE QUALITY RECORDS LIST

Required Record
ECN

8 REFERENCE FORMS / TEMPLATES / DOCUMENTS

Form / Template / Document Title	Location
Drawing & BOM Checking Work Instruction	MTS Quality Management System
ECM Process	MTS Quality Management System

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9 CURRENT REVISION'S TRAINING REQUIREMENTS


Training requirements are determined by the document owner.

1. Select Awareness **and/or** Formal training requirements.
2. List (below) the functions or groups that require the training.

Select (mark X)	Training Type	Training Definition
X	Awareness	Awareness training is conducted by communication, which is sent/delivered by the approver/author/owner of the document to the affected employees/groups.
X	Formal	Formal training requires the approver/author/owner to collect/store evidence that the affected employees/groups were trained.



Functions/Groups that require Awareness to this procedure:

- Awareness: CAD Administration
- Formal: Mechanical Engineering, Electrical Engineering, Mechanical Design, Electrical Design, Engineering Records Specialists

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10 REVISION HISTORY & APPROVAL

Revision History			
Rev	Description of Change	Author	Effective Date
A	Initial Release	J. Gunderson	12/21/2021

Approval of Current Revision		
Name / Function	Signature	Date
Marvin Westermann/Director-Solutions Engineering		13-JAN-2022
Tom Kilinski / Director-Systems Engineering/ERC		13-JAN-2022